



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

ANNUAL REPORT

JECRC

2019-20

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

National/International Conferences/Workshop/FDPs/STTPs Attended

National / International Conferences / Workshops/FDPs / STTPs attended – at JECRC, Jaipur

S. No.	Topic	Total Attended
01	International	09
02	National	22
03	Workshop	37
04	FDPs	193
05	STTPs	15
Total		276



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref: JECRC/REG/2020-21/349

Date: 15/09/2020

To

The Dean Academics,
Rajasthan Technical University,
Kota.

Sub.: QIV Score for A.Y. 2020-21

Dear Sir,

With reference to your letter No. RTU/Acad./F(17)16/2020/1322 dated 14.09.2020 regarding QIV Score for session 2020-21 calculated by QIV committee, based documents submitted online by our institute.

Please find herewith duly signed Quality Index Value Format applicable from academic session 2020-21 and Undertaking (Annexure-1).

Thank you,

Prof. (Dr.) Vinay Kumar Chandna
Principal

PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-302022

Encl.: as above



JECRC Foundation
www.jecrcfoundation.com

Jaipur Engineering College and Research Centre

Approved by AICTE & Affiliated to RTU | Running NBA accredited courses

JECRC Campus, Shri Ram Ki Nangal,

Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302 022

0141-2770100, 2770006, 0141-2770002, info@jecrcmail.com



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref: JECRC/REC/2020-21/350

Date: 15/09/2020

Annexure -1

Undertaking

I, Prof. (Dr.) Vinay Kumar Chandna (Name), Principal/Director of Jaipur Engineering College and Research Centre (Name of Institute) in B.Tech. (B.Tech-Tech./MBA/MCA) course, on behalf of the institute declare that –

1. The documents submitted for online QIV for session 2020-21 are authorized.
2. Original copy of these documents would be submitted as and when required by Rajasthan Technical University.

Date: 15/09/2020

Place: Jaipur

Signature of Principal/Director

Name of Principal/Director Prof. (Dr.) Vinay Kumar Chandna

(With seal and date)

PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-302022



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JECRC Campus, Shri Ram Ki Nangal,

Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302 022



**OFFICE OF THE DEAN ACADEMIC AFFAIRS
RAJASTHAN TECHNICAL UNIVERSITY**

AKELGARH, RAWATBHATA ROAD, KOTA-324010
Ph-0744-2473015, website : www.rtu.ac.in, email : dean.academic@rtu.ac.in

QUALITY INDEX VALUE FORMET APPLICABLE FROM ACADEMIC SESSION 2020-21

NAME OF COLLEGE		Jaipur Engineering College & Research Centre, Jaipur (35/B.Tech.)		
S.N.	Parameter(s)	Quality Index estimation	Max. QIV	
			Obtained	Max. QIV
1	NBA/NAAC *	25 x No. of Courses	50	100
2	Qualified Principal	YES/NO	40	40
3	Student Faculty Ratio	100 x (Actual Number Qualified Faculty/Required Faculty as per AICTE norms)	100	100
4	Professor	40 x (Actual Number Qualified /Required Professor as per AICTE norms)	40	40
5	Associate Professor	40 x (Actual Number Qualified Asso. Prof. /Required Associate Professor as per AICTE norms)	38	40
6	Number of Enrolled Students as per the Duration of Course / Program	50 x (Actual Number/Approved Intake for the duration of the Course/Program, as per AICTE)	50	50
7	Number of Computers	25 x (Actual Number/Required Number as per AICTE)	25	25
8	Internet Facilities in Mbps	25 x (Actual Internet Speed in/ Required-speed as per AICTE)	25	25
9	Other Facilities	3 x Number of Facilities Available	30	30
10	Pay Scale Implementation	YES/NO	15	30
11	Endowment Fund Deposited	YES/NO	20	20
12	Percentage of Student Passed Out	Percentage	81	100
13	Percentage of Student Obtained First Division/Honors	Percentage/2	41	50
14	National/International Conferences/ Workshops/FDPs/STTPs Organized	Number(s) x 20	80	80
15	National/International Conferences/ Workshops/FDPs/STTPs Attended	Number(s) x 03	60	60
16	(v) Paper published in SCI/SCIE/ Scopus Indexed Journal	Number(s) x 15	45	45
	(b) Paper published in UGC listed Journal /Any Journal having ISSN NO.	Number(s) x 5	35	35
	(c) Paper published in Conference/Proceedings	Number(s) x 3	30	30
17	Percentage of Students Placed	$\frac{\text{Nos. of Students placed}}{\text{Enrolled students}} \times 60$	37	60
18	Placement Above Annual Package of 3 laces	$\frac{\text{Students placed with package } > 3 \text{ Laces}}{\text{Nos. of students placed}} \times 30$	22	30
19	Infrastructure/Set up for Swayam Prabha Channel in the Institute	YES/NO	10	10
Total			874	1000

*** Distribution of QIV Score**

NBA	No of Courses	1	2	3	4 or Above
	QIV Score	25	50	75	100

NAAC (EXISTING)	Grade	A++	A+	A	B++	B+	B	C	D
	QIV Score		100	90	80	70	60	50	40
NAAC (OLD)	Grade	A			B		C		D
	QIV Score	100			80		40		0

(Signature) 19/10/2020

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

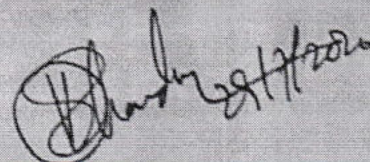
NBA/NAAC

1. Electronics and Communication Engineering
NBA Accredited year 2018 to 2021 (i.e. 30.06.2021)
2. Mechanical Engineering - NBA Accredited
year 2018 to 2021 (i.e. 30.06.2021)

Point 50

QIV

Session 2019-2020 (RTU)



Handwritten signature and date: 28/7/2020

NATIONAL BOARD OF ACCREDITATION

NBCC Place, East Tower, 4th Floor, Bhisham Pitamah Marg,
Pragati Vihar, New Delhi-110 003
Tel: +91 11 2436 0620-22, 2436 0654 ; Telefax: +91 11 4308 4903
Website: www.nbaind.org



F.No.32-7/2010-NBA

Dated: 19-03-2019

To
The Principal
Jaipur Engineering College And Research Centre
Shri Ram Ki Nangal Sitpura Riico Epip Gate ,
Jaipur- 302022, Rajasthan

Subject: Accreditation status of programmes applied by Jaipur Engineering College And Research Centre, Shri Ram Ki Nangal Sitpura Riico Epip Gate , Jaipur- 302022, Rajasthan

Sir,

This has reference to your application I.D. No. 3020-04/07/2018 seeking accreditation by National Board of Accreditation in Tier-II format to UG Engineering programs offered by **Jaipur Engineering College And Research Centre, Shri Ram Ki Nangal Sitpura Riico Epip Gate , Jaipur- 302022, Rajasthan.**

2. An Expert Team conducted on-site evaluation of the programs from 16th to 18th November, 2018. The report submitted by the Expert Team was considered by the concerned Committees constituted for the purpose in NBA. The competent authority in NBA has approved the following accreditation status to the programs as given in the table below:

Sl. No	Name of the Program (UG)	Basis of Evaluation	Accreditation Status	Period of validity	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
1.	Electronics & Communication Engineering	Tier-II June, 2015 Document	Accredited	Academic Years 2018-2019 to 2020-2021 i.e. upto 30-06-2021	Accreditation status granted is valid for the period indicated in Col.5 or till the program has the approval of the competent authority, whichever is earlier
2.	Mechanical Engineering		Accredited		

3. It may be noted that only students who graduate during the validity period of accreditation, will be deemed to have graduated with an NBA accredited degree.

4. The programs have been granted accreditation for 3 years. **Jaipur Engineering College And Research Centre, Shri Ram Ki Nangal Sitpura Riico Epip Gate , Jaipur- 302022, Rajasthan** should submit the Compliance Report at least six months before the expiry of validity of accreditation mentioned above to be eligible for consideration by the concerned Committee in NBA for further processing of the accreditation status. This could entail further extension of accreditation or a revisit, as deemed appropriate by NBA Committees.

Contd/...

5. The accreditation status awarded to the programs as indicated in the above table does not imply that the accreditation has been granted to Jaipur Engineering College And Research Centre, Shri Ram Ki Nangal Sitpura Riico Epip Gate , Jaipur- 302022, Rajasthan as a whole. As such the Institution should nowhere along with its name including on its letter head etc. write that it is accredited by NBA because it is program accreditation and not Institution accreditation. If such an instance comes to NBA's notice, this will be viewed seriously. Complete name of the program(s) accredited, level of program(s) and the period of validity of accreditation, as well as the Academic Year from which the accreditation is effective should be mentioned unambiguously whenever and wherever it is required to indicate the status of accreditation by NBA.


6. The accreditation status of the above programs is subject to change on periodic review, if needed by the NBA. It is desired that the relevant information in respect of accredited programs as indicated in the table in paragraph 2, appears on the website and information bulletin of the Institute.

7. The accreditation status awarded to the programs as indicated in table in paragraph 2 above is subject to maintenance of the current standards during the period of accreditation. If there are any changes in the status (major changes of faculty strength, organizational structure etc.), the same are required to be communicated to the NBA, with an appropriate explanatory note.

8. A copy each of the Report of Chairman of the Visiting Team and Evaluators' Reports in respect of the above programs are enclosed.

9. If the Institute is not satisfied with the decision of NBA, it may appeal within thirty days of receipt of this communication giving reasons for the same and by paying the requisite fee.

Yours faithfully,

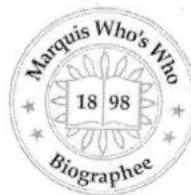

(Dr. Anil Kumar Nassa)
Member Secretary

Encls: 1. Copy of Report of Chairman of the Visiting Team.
2. Copy each of Expert Reports of the Visiting Team.

Copy to:

1. The Registrar
Rajasthan Technical University
Rawat Bhata Road,
Dadabari, Kota, Rajasthan 324009
2. The Director of Technical Education
W-6, Gaurav Path, Residency Road,
Jodhpur (Rajasthan)-342032
3. Accreditation File
4. Master Accreditation file of the State

Dr. Vinay Kumar Chandna
Ph.D. Electrical (DCE), M.E. (Power System), B.E. (Electrical)



Dr. Vinay Kumar Chandna
Self attested

RESUME

Name : **Vinay Kumar Chandna**

Fathers Name : Lt. Sh.K.K.Chandna

Date of Birth : 02-09-1973

Address : E-806, Ashadeep Green Avenue, Near
Gyan Vihar University, jagat Pura, Jaipur-
302017

Phone : +91- 98914 06784 (M)
+91-8506998245 (R)

Passport : H-7395535 (22-10-2009 to 21-10-2019)
T8061396 (

Country Visited: U.S.A. (Louisiana, New York) (2010),
Bangkok (2011), London (2018)

WES REFERENCE : 2787088

E-mail : vinaychandna@yahoo.co.in,
vinaychandna@ieee.org

Biography included in Marqui's Who's Who in the World-2012

Present Skills:

Resource person and Evaluator for ACCREDITATION
as per Washington Accord. In India it is National Board
of Accreditation.

Level-5 certificate course on **leadership & Management**
from CMI London through Dudley College London under
UKIERI programme, 2018.

Dr. Vinay Kumar Chandna
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Present Assignment :

Principal, Jaipur Engineering College and Research
Centre, Jaipur.

Present Training:

Project leader (Rajasthan) for Newton-Bhabha
project to make skill faculty for Deep Learning, AI.

One day workshop on Volunteer, Training, Philosophy, Process &
Best Practices in ABET by Dr. Michael K. J. Milligan, Executive
Director-ABET, on 25/2/15 at India Habitat Centre, Delhi

One day workshop on "Brainstorming session on Effective
Evaluation" by NBA on 24/2/15 at India Habitat Centre, Delhi

Attended World Summit on Accreditation, WOSA-16 at Hotel Leela
Palace during 18-20th March, 2016.

Also attended 3rd and 4th addition of World Summit on Accreditation,
WOSA-17, WOSA-18.

Initiatives at JECRC as Principal/Director:

- a. Best outstanding institute in North India for 2018-19 by NITTTR Chandigarh, sep-2019.
- b. RTU third ranking among A grade institutions for 2018-19.
- c. Speaker at Higher education & Human Resource conclave, Rajasthan on 24-25 September, 2018.
- d. Advisory member at Startup Technology Vibrant IT Summit from 11-13 October, 2018 at Gandhinagar Gujrat.
- e. Member of Newton-Bhabha funding project in the area of Deep Learning, AI in association with Bennet university.
- f. Industry interaction for skill developments of students in the area of Linux, Sales Force, Embedded systems, AI, Deep Learning, IOT, Cyber security, SCADA, PLC etc. and providing training to the students in the area.
- g. Organized Smart INDIA Hackathon-18 and received appreciation from Col. Rajayvardhan Singh Rahore, AICTE and Ministry of I&B on dated 30-31st March-2018.
- h. Advisory Member for Global outreach education conference and awards 2018 on 27th march 2018 by REDINNO.
- i. Motivating faculty members to carryout the OBE process in place.
- j. Placement opportunity creation for the students who are interested in Govt. Jobs and also for non eligible students.
- i. Grant of Rs. 30,00,000 (Rs Thirty Lakh only) for establishing Rural Technology Business Incubator File No. F15(12)DST/EDP-SDP/2016-17/Part-1/5945, Dated 26-3-18.
- j. Initiated ICT based faculty development and student development programs.
- k. Initiated technical events at the department level and created interdisciplinary technical clubs.
- l. Initiative taken for the faculty members to publish papers and attend conferences of repute.

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- m. Chaired a delegation to Lincoln University from JECRC to have bi-lateral relationship and signed an MoU with UKIE pvt. Limited to have collaborative education hub at Jaipur. Signed MoU with Lincoln University UK.
- n. Received certificate of appreciation from Forsk Technologies for contribution towards Project Based learning in Emerging technologies on 11/4/18.
- o. Organized International conference on "Emerging Trends in Expert Application & Security" (ICETEAS2018) in association with Springer as General Chair at JECRC Jaipur.
- p. Organized International congress on "Information and Communication Technology" (ICICT2018) in association with Springer and Brunel University at Brunel UK (London) as Supporting Chair. Delivered Inaugural address, Chaired sessions and presented papers. Received certificate of appreciation at Brunel University.
- q. Invited talk on "Outcome based Education Needs and Advantages" at Global outreach education conference and awards 2018 on 27th march 2018 by REDINNO.
- r. Organized Recent Technological Developments in Electronics and Electrical Engineering-2018 (RTDEEE-2018) and associated with ISST India, UGC approved list
- s. Organized Recent Innovations & Technological development in Mechanical Engineering (RITDME-2018) and associated with ISST India and IFO, UGC approved list
- t. Organized Information Technology and Digital Applications (ICITDA-2018) and associated with International Journal of Information Technology, ACM, IJETAE, IGI Global, IJCEA and Springer and paper will be published in BJIT published by Springer Nature, IJETAE ISSN-2250-2459, IJCEA ISSN: 2321-3469, IGI
- u. Organized Mathematical Modeling and Computing (ICMMC-2018) and associated with Springer and IJETAE ISSN-2250-2459; UGC approved, Indexed by: Google, Yahoo, Entire We, UK Index, Get Cited, Exact Seek, Amphibia Info Mine.

NATIONAL BOARD OF ACCREDITATION PEV VISITS

Visits as Program Evaluator (PEV) through National Board of Accreditation (NBA)

1. Maharashtra Academy of Engineering & Education Research, MIT-Pune from dated 1-3rd August, 2014.
2. **Velammal Engineering College** Chennai, Tamil Nadu from 23rd to 25th January, 2015
3. **MaharajVijayaramGajapathi Raj (MVGR)** College of Engineering, Vijayaram Nagar Campus, Chintalavalasa, Vizianagaram-535005, Andhra Pradesh from 20th to 22nd March, 2015
4. Visit of Expert Team to **Govt. College of Engineering, Vidyanagar**, Karad, Dist:Satara- 415124, Maharashtra from 30th October – 1st November, 2015 to evaluate its UG and PG Engineering programmes in Tier-II format for grant of NBA accreditation.
5. **Sree Vidyanikethan Engineering College, SreeSainath Nagar, A. Rangampet, Tirupati**, Chittoor District – 517102, Andhra Pradesh to evaluate PG Engineering programmes in Tier I format for grant of NBA accreditation, 18-20-12-2015.
6. Visit of Expert Team to **Sardar Vallabhbhai National Institute of Technology, Ichchanath, Surat-395 007**, Gujarat from 29th to 31st January, 2016 to evaluate UG Engineering programmes in Tier I format for grant of NBA accreditation
7. Visit of Expert Team to **Birla Institute of Technology, Mesra, Ranchi, Jharkhand** from 26th to 28th August, 2016 to evaluate PG Engineering programmes in Tier I format for grant of NBA accreditation.
8. Visit of the Expert Team to **North Eastern Regional Institute of Science & Technology, Nirjuli, Itanagar**, Arunachal Pradesh-791 109 from 06th to 08th May, 2016 to evaluate UG Engineering programmes in Tier-I format for grant of NBA Accreditation.
9. Visit of Expert Team to **Heritage Institute of Technology, Chowbaga Road, Anandapur P.O. –East Kolkata Township, Kolkata- 700 107**, West Bengal from 21st to 23rd October, 2016 to evaluate its UG Engineering programs in Tier-II format for grant of NBA accreditation.

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10. Visit of Expert Team to **Crescent Institute of Science and Technology Chennai** from 26th to 28th August, 2016 to evaluate PGEngineeringprogrammes in Tier I format for grant of NBA accreditation.
11. **BankuraUnnayaniInstiute of Engineering, Subhankar** Nagar, P.O. Baghabandh, Dt. Bankura , West Bengal-722146from 1stto 3rd April, 2016 to evaluate its UG Engineering programmes in Tier-II format for grant of NBA accreditation.
12. Visit of Expert Team to **St. Ann's College of Engineering & Technology, Nayunipalli (V), Vetapalem** (Mandal), Chirala, Prakasam District – 523187, Andhra Pradesh from 18th to 20th August , 2017 to evaluate its UG Engineering programme in Tier-II format for grant of NBA accreditation.
13. Visit of Expert Team to **Lords Institute of Engineering and Technology, Sy.No.32, Himayatsagar, Near Police Academy Junction, Hyderabad-500091, Andhra Pradesh**from03rd to 05th November, 2017 to evaluate its UG Engineering programmes in Tier-II format for grant of NBA accreditation.
14. Visit of Expert Team to **SreeVidyanikethan Engineering College, SreeSainath** Nagar, A. Rangampet, Tirupati, Chittoor District – 517102, Andhra Pradesh to evaluate PG Engineering programmes in Tier I format for grant of NBA accreditation.
15. Visit of Expert Team to **R.V.R. & J.C. College of Engineering Chandramoulipuram, Chowdavaram-522019, Guntur District, Andhra Pradesh** from31st March to 02nd April, 2017 to evaluate its UG Engineering programmes in Tier-II format for grant of NBA accreditation.
16. Visit of Expert Team to **Kalaignar Karunanidhi Institute of Technology, Kannampalayam(Post), Coimbatore – 641 402, Tamil Nadu** from 3rd to 5th February 2017 to evaluate its UG Engineering programs in Tier-II format for grant of NBA accreditation.
17. Visit of Expert Team to **Siddartha Institute of Science and Technology, Narayanavanam Road, Puttur-517583, Andhra Pradesh** from 28th-30th September,2018 to evaluate its UG Engineering programs in Tier-II format for grant of NBA accreditation
18. Visit of Expert Team to **Vidya Jyothi Institute of Technology, Azeez Nagar Gate, Himayat Nagar (V), C.B.Post, Hyderabad 500075, Telangana**from 20thto 22ndApril, 2018 to evaluate its UG Engineering programs in Tier-II format for grant of NBA accreditation.
19. **Nehru Institute of Engineering and Technology, Nehru Gardens, Thirumalayampalayam, Coimbatore-641 105, Tamil Nadu** from 12th to 14th April, 2019 to evaluate its UG Engineering programs in Tier-II format for grant of NBA accreditation.
20. Visit of Expert Team to **Shri Sant Gajanan Maharaj College of Engineering, Shegaon, Dist. – Buldana, Maharashtra-444203**from 20th- 22nd September,2019to evaluate its UG Engineering program Electrical and Power under tier-II.

BRIEF RESEARCH WORK

Topic of Thesis during Ph.D.: Design, configuration and implementation of an intelligent SCADA system

The following work is accomplished:

1. Design of the Supervisory Control and Data Acquisition System (SCADA) application to power system is done and Transputrized workstations and FPGA based workstations are proposed for different tasks in the power system.
2. Design of Remote Terminal Unit (RTU) an important component of SCADA system is done and design procedure with reliability analysis and PETRINET algorithm is discussed.

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3. Study of Human Machine Interface is done and Ergonomics in the control centre design for power system is implemented at different stages, also the design of control centre software and database is proposed.
4. Study of pre-processing of data using different techniques is done and pre-processing of data using **Fuzzy logic and Fuzzy-Genetic algorithm** is proposed for the intelligent SCADA system.

EDUCATIONAL QUALIFICATION:

1. Level-5 certificate course on leadership & Management from CMI London through Dudley College London under UKIERI programme, 2018.
2. Ph.D. Electrical (Electrical Engineering), from Delhi College of Engineering, Delhi, Delhi University, May-2008.
3. M.E. Electrical (Power Systems) from Walchand College of Engineering, Sangli, MAH. in 1997 with 76.59% (Distt.).
4. GATE-95 with 86.67%ile.
5. B.E. Electrical from Nagpur University in 1994 with 69.44%.
6. XIIth from CBSE board Delhi in 1990 with 73.25%.
7. Xth from CBSE board Delhi in 1988 with 59.0%.

International Visits / awards:

S. No.	Country	Date	Purpose of visit
1	USA, New Orleans, Louisiana (DST Grant)	April 19-22, 2010	2010 IEEE PES Transmission and Distribution Conference and Exposition
2.	Bangkok	26-28 Dec, 2011	Elsevier International Conference
3.	London	26Feb-2nd March, 2018	Representing JECRC as Host at Brunel university for Springer Conference Chair Conferenec
	Lincoln University, London	2-5 th March, 2018	Represented JECRC for technical collaboration
	City of Oxford college, UK	6 th March, 2018	Represented JECRC for technical collaboration

LIST OF PUBLICATIONS:

International Journal	International Conference	National Conference
17	37	6

International Journal (17)

Dr. Vinay Kumar Chandna
Ph.D. Electrical (DCE), M.E. (Power System), B.E. (Electrical)

2018 (Book Series)

Proceeding on International Conference on Emerging Trends in Expert Application & Security, "Editor: Vinay K. Chandna", Kalpa Publication in Engineering (Easy Chair Publication) , Volume-2, 16 Articles, October 23, 2018.

2018

Surbhi Gupta, Sakshi Jain, Deepika Bansal, Dr. Vinay Kumar Chandna, " A REVIEW ON: BIG DATA SECURITY: CHALLENGES & SOLUTIONS", International Journal of Computer Engineering and Applications, Volume XII, Special Issue, April- ICITDA 18, www.ijcea.com ISSN 2321-3469, UGC approved journal.

Nurul Hassan, Nishchay Jain, Dr. Vinay Kumar Chandna, " BLOCKCHAIN , CRYPTOCURRENCY AND BITCOIN", International Journal of Computer Engineering and Applications, Volume XII, Special Issue, April- ICITDA 18, www.ijcea.com ISSN 2321-3469, UGC approved journal.

Muskan Saxena, Purva Jain, Deepika Bansal, Dr. Vinay Kumar Chandna, " SOCIAL NETWORKING SITES AND ISSUES REGARDING PRIVACY", International Journal of Computer Engineering and Applications, Volume XII, Special Issue, April- ICITDA 18, www.ijcea.com ISSN 2321-3469, UGC approved journal.

Vinay Kumar Chandna, Hemlata Soni, Gaurav Gupta, "Performance Impact on Different Parameters by the Continuous Evolution of Distributed Algorithms in Wireless Sensor Networks", at International conference on "Emerging Trends in Expert Application & Security" (ICETEAS2018) in association with Springer, 16-17 Feb, 2018, JECRC, Jaipur, Springer Journal. ISSN No. 2194-5357.

Gopal Tiwari, Ram Singh, Dr. Vinay Chandna, Dr. S. L. Shami, Manish Jain, "Outcome Based Assessment of Engineering undergraduate final Year Projects for tire-2 Institutes" at International congress on "Information and Communication Technology" (ICICT2018) in association with Springer and Brunel University at Brunel UK (London), 27-28 Feb, 2018, London, Springer Journal. ISSN No. 2194-5357.

Priyanka Mitra, Bhavna Sharma, Vinay Kumar Chandna, Vijay Singh Rathore, "Design and Performance Evaluation of Hybrid Wired-Wireless Network on Chip Interconnected Architectures" at International congress on "Information and Communication Technology" (ICICT2018) in association with Springer and Brunel University at Brunel UK (London), 27-28 Feb, 2018, London, Springer Journal. ISSN No. 2194-5357.

Mukesh Agarwal, Chitra Khandelwal, Aakanksha Desai, Dr. Vinay Kumar Chandna, "A comparative study of mindfulness between mediators and non-mediators" at International congress on "Information and Communication Technology" (ICICT2018) in association with Springer and Brunel University at Brunel UK (London), 27-28 Feb, 2018, London, Springer Journal. ISSN No. 2194-5357.

2015

Vinay Kumar Chandna, Sagar Narang, Yash Bansal, "Sleep Disorder Recognition using Wearable Sensor and Raspberry Pi", (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6 (4) , 2015, 3938-3942, ISSN 09759646

Mini S. Thomas, Vinay Kumar Chandna and Seema Arora, "Parameteric Representation and Modeling of Indoor Broadband Power Line Channel for Data Transmission" Jawaharlal Nehru University, New Delhi, India-110067

Day: 20, September 2015 (Sunday), *Proceedings in McGraw Hill Publication (TMH) and associated International Journals, ICIRESM-15.*

2013

Mini S. Thomas, Vinay Kumar Chandna and Seema Arora, "Load Modeling of Broadband over Power Line Communication (BPLC) Network," International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Volume 2, Special Issue 1, ISSN (Print): 2320 – 3765, ISSN (Online): 2278 – 8875, Dec, 2, 2013.

2011

Seema Arora, **Vinay Kumar Chandna**, Mini S. Thomas, "Performance Analysis of 16-QAM using OFDM for Transmission of Data over Power Lines", Publication and presentation for **Elsevier International Journal (Energy Procedia)**, vol 4, 2012, pp 1723-1729 on 26-28 Dec, 2011, Bangkok, Thailand.

Z.A. Jaffery, **V.K. Chadana** and S.K. Chaudhary, "Sensitivity of input blocking capacitor on output voltage and current of a PV inverter employing IGBTs", *International Journal of Electrical and Electronics Engineering*, vol. 5, no.4, pp. 311-315, 2011. (WASET).

2010

V. K. Chandna, Mir Zahida, "Effect of varying topologies on the performance of Broadband over Power Line", **IEEE Transaction on Power Delivery, Vol-25, No. 4, Oct. 2010, pp 2371-2375.**

S.K. Chaudhary, Z.A. Jaffery and **V.K. Chadana**, "Quality Assessment of Low cost Voltage Control Voltage Source (VCVS) Inverter using Matlab Simulink.", *International Journal of Electrical Engineering*, vol. 3, no. 1, pp. 15-24, 2010.

2004

P. Kumar, **V. K. Chandna**, Mini S. Thomas, "Fuzzy-Genetic algorithm for pre-processing data at RTU", **IEEE Transaction on Power Systems**, No.-19, vol.2, May-2004, vol.19, no.2, pp 718-723.

Mini S. Thomas, P. Kumar, **V. K. Chandna**, "Design, Configuration and Implementation of supervisory control and data acquisition (SCADA) laboratory for teaching and research", **IEEE Transaction on Power Systems**, Aug-2004, vol. 19, no.3, pp 1582-1588.

2003

P. Kumar, **V. K. Chandna**, Mini S. Thomas, "Intelligent algorithm for pre-processing multiple data at RTU", **IEEE Transaction on Power Systems**, Nov-2003, vol. 18, no. 4, pp 1566-1572.

International Conference (27)

2018

Hemlata Soni, Gaurav Gupta, V. K. Chandna, "Performance impact on different parameters by continuous evolution of distributed algorithms in wireless sensor networks: A case study", **Emerging trends in expert applications and security, Springer proceedings of ICETEAS 2018, AISC, vol 814, pp 675-681.**

2018 (Book Series Springer)

Gopal Tiwari, Ram Singh, **Vinay Kumar Chandna**, S. L. Shimi, Manish Jain, "**Outcome-Based Assessment of Engineering Undergraduate Final Year Projects for TIRE-2 Institutes**", Third International Congress on Information and Communication Technology, 211-221, Springer, Singapore, Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 797).

Agarwal M., Khandelwal C., Desai A., **Chandna V.K.**, "**A Comparative Study of Mindfulness Between Meditators and Non-meditators**" In: Yang X.S., Sherratt S., Dey N., Joshi A. (eds) Third International Congress on Information and Communication Technology. Advances in Intelligent Systems and Computing, vol 797. Springer, Singapore, Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 797).

Dr. Vinay Kumar Chandna
Ph.D. Electrical (DCE), M.E. (Power System), B.E. (Electrical)

Mitra P., Sharma B., **Chandna V.K.**, Rathore V.S., "Design and Performance Evaluation of Hybrid Wired-Wireless Network on Chip Interconnect Architectures", In: Yang X.S., Sherratt S., Dey N., Joshi A. (eds) Third International Congress on Information and Communication Technology. Advances in Intelligent Systems and Computing, vol 797. Springer, Singapore, Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 797).

2017

Vineet Mediratta, Kamal Bansal, Piyush Kuchhhal, Vinay Chandna, "Design and Sizing of Decentralized Grid-Connected Solar Power Plant", Proceeding of International Conference on Intelligent Communication, Control and Devices, Springer, Singapore, pp-741-746, 2017.

2015

Vinay Kumar Chandna, "Project Based Teaching-Learning a Tool for Assessment of Graduate Attributes", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

Shallu Bassi, **Dr. V. K. Chandna**, Sangeeta Singh, "Analysis of Course Outcomes of HVE-A tool for Assessment of Programme Outcomes", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

Prof. Vinay Kumar Chandna, "Course Outcome Assessment and Improvement on Weak Student", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

Abhinav Saxena, Udit Mittal, Abhilasha Pawar, **Dr. V. K. Chandna**, "Limitations and improvement in the Assessment of Course Outcomes", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

Dr. Richa Sharma, **Dr. Vinay Kumar Chandna**, "Innovative Approach to Inculcate Essential Management Attributes", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

Parveen P. Terang, Sanjiba Kr. Bisoyi, **Dr. Vinay Kumar Chandna**, "Weightage factor analysis between Programme Outcomes and Course Outcomes: A case study", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

Sanjiba Kr. Bisoyi, Parveen P. Terang, **Dr. Vinay Kumar Chandna**, "174- Analysis of course outcomes of PE-A tool for assessment of Programme Outcomes", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

Amit Kumar Roy, Gunjan Varshney, **Dr. Vinay Kumar Chandna**, "Learning through Modern Tools in Power Quality to evaluate Course Outcomes", 3rd IEEE International Conference on MOOC's, Innovation and Technology in Education, (IEEE MITE-2015), October 1-2, 2015, at AECT, Amritsar, Punjab.

2014

Vinay Kumar Chandna, "Innovative methodology for the assessment of Programme Outcomes", 2nd IEEE International Conference on MOOCs, Innovation and Technology in Education, 19-20 Dec, 2014, Thapar University Patiala, India.

2013

Mini S. Thomas, **Vinay Kumar Chandna**, Seema Arora, "Load Modeling of Broadband Power Line Communication(BPLC) Network", INTERNATIONAL CONFERENCE ON EMERGING TRENDS IN ELECTRICAL SYSTEMS, 12-13 December, Department of Electrical and Electronics Engineering, Mar Athanasius College of Engineering, KOTHAMANGALAM- 686666- KERALA

Dr. Vinay Kumar Chandna
Ph.D. Electrical (DCE), M.E. (Power System), B.E. (Electrical)

2012

Mini S. Thomas, **Vinay Kumar Chandna**, Seema Arora, "Broadband over Power Line Implementation Roadmap for a Smarter Grid: A case study for Indian Power Sector", 2012 IEEE 5th India International Conference on Power Electronics (IICPE), 6-8 Dec. 2012, Delhi Technological University, Delhi.

S Gupta, H Tiwari, M Fozdar, **V Chandna**, Development of a Two Diode Model for Photovoltaic Modules Suitable for Use in Simulation Studies, Power and Energy Engineering Conference (APPEEC), 27-29 March 2012 Asia-Pacific, 1-4

2011

Seema Arora, Vinay Kumar Chandna, Mini S. Thomas, "Performance Analysis of 16-QAM using OFDM for Transmission of Data over Power Lines", Presented at International Conference on Advances in Energy Engineering (ICAEE 2012), Elsevier International Conference on 26-28 Dec, 2011, Bangkok, Thailand.

Seema Arora, Vinay Kumar Chandna, Mini S. Thomas, "Modeling of Broadband Indoor Power Line Channel for Various Network Topologies", 2011 IEEE PES International Conference Innovative Smart Grid Technologies-India, 01-03 Dec, 2011, Kerela.

Seema Arora, Vinay Kumar Chandna, Mini S. Thomas, "Distribution Automation leading to a Smarter Grid", 2011 IEEE PES International Conference Innovative Smart Grid Technologies-India, 01-03 Dec, 2011, Kerela.

2010

V. K. Chandna, Sunil Kumar Choudhary, Z. A. Jaffery, "Simulation of Single phase RMS controlled voltage source inverter (VSI) for variation in Cdc, Cs and Rs", 20-24 Dec, 2010, IEEE PEDES POWERCON India Conference, Delhi.

V. K. Chandna, Mir Zahida, "Performance of Broadband over Power Line System", presented at 2010 IEEE PES Transmission and Distribution Conference and Exposition, April 19-22, 2010, in the session PSC02Wd2P, No. 2010TD0401, New Orleans, Louisiana, USA.

2009

Ruchira Aneja, **V. K. Chandna**, "Comparative analysis for preprocessing voltage at RTU by using different membership functions", IEEE-ALGO-0277, IEEE International Advance Computing Conference IACC-2009, 6-7 March, 2009, pp. 453-457.

2008

V. K. Chandna, P. Kumar, Mini S. Thomas, "Innovation in the design of RTU and migration to IED", IEEE Power India Conference 2008 (Powercon-2008), Oct. 2008, Delhi, India.

V. K. Chandna, P. Kumar, Mini S. Thomas, "Tuned fuzzy controller based over-current protection scheme", IEEE Power India Conference 2008 (Powercon-2008), Oct. 2008, Delhi, India.

2006

P. Kumar, **V. K. Chandna**, Mini S. Thomas, "Ergonomics in the control centre design for power system", 2006 IEEE-INDIA International conference, April 10-12, 2006, 0-7803-9525-5/06/\$20.00 ©2006 IEEE.

2004

P. Kumar, **V. K. Chandna**, Mini S. Thomas, "Intelligent algorithm for pre-processing multiple data at RTU", IEEE PES Meeting at Denver Colorado, June 6-10, 2004.

Dr. Vinay Kumar Chandna
Ph.D. Electrical (DCE), M.E. (Power System), B.E. (Electrical)

P. Kumar, **V. K. Chandna**, Mini S. Thomas, "Fuzzy-Genetic algorithm for pre-processing data at RTU", **IEEE PES Meeting** at Denver Colorado, June 6-10, **2004**.

National conference (6)

2013

Vinay Kumar Chandna, "Typical load shedding scenario and restructuring of distribution system", IEEE sponsored national conference on Advances in Electrical Power and energy systems, 20-21 September, 2013, at AKGEC, 27 KM stone, NH-24, Adhyatmik Nagar, Ghaziabad.

2011

Sunil Kumar, **V. K. Chandna**, Z. A. Jaffery, "Quality Assessment of RMS Controlled and Fuzzy-controlled Single Phase VSI Inverter for UPS Applications", national Conference on Power, Instrumentation, Energy and Control (PICON -2011), Department of Electrical Engineering, Aligarh Muslim University, AMU, 12-13 Feb, 2011.

2008

V. K. Chandna, Ruchira Aneja, "Algorithm for pre-processing multiple data at RTU using Gaussian Membership function", National conference on Emerging Trends in Engineering and Technology, Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Sonapat - 131039 (Haryana), Proceedings, **26-27 May, 2008**, pp 171-175.

2006

V. K. Chandna, "Data mining for power system SCADA" National conference on Energy, Communication and computers, Feb 2-4, **2006**, MAIT Delhi.

2004

V. K. Chandna, "Selection of sensors, transducers and communication buses for SCADA network", National conference on Automation of Distributed Networks at **Delhi College of Engg. Jan-2004**.

2003

V. K. Chandna, P. Kumar, Mini S. Thomas, "Implementation of FACTS scheme in SCADA laboratory", All India **Jamia Millia Islamia** Conference, Aug-**2003**.

Strategic Planning for an Educational Institution

All India Council of Technical Education (AICTE) is an affiliating body for the technical education in India and currently there are approximately 3500 Engineering Colleges are affiliated to the body and catering more than 12Lakh students all over India. The education sector is facing a transformation phase to cater the need of the society at global level. There are many challenges that the institutions facing today are modernization of the syllabus, providing state of the art facilities, interaction with the industry for collaborative projects, generating funds for providing facilities that matches with the need of today and are not included in the syllabus, motivation to the students, overall development of students including communication skills, providing platform for internship, placement opportunities, motivation to faculty members, training to faculty members etc. are some of the prime areas of focus.

Keeping in view the above mentioned challenges in education sector, now there is a need of strategic planning for each and individual sector for their growth. This will provide ample opportunities to develop leadership qualities among faculty members and also boost the confidence of the stakeholders in an entity.

TEACHING EXPERIENCE:

Sl. No.	Organisation / Institute	About Institute / Position	Position held	Nature of duties / work	Date of joining	Date of leaving	Ex mor
1.	Jaipur Engineering College and Research Centre, Jaipur	Permanent	Principal/ Director / CEO E cell JECRC Foundation	Guidance and development of Departments, Accreditation Evaluator NBA	07-07-2015		
2.	JSS Academy of Technical Education (N)	Permanent	Professor and Head	Guidance and development of the Department	21-3-2013	06-07-2015	28
3.	ITS Engineering College	Permanent	Professor and Head	Guidance, development, research activities etc. Head of department	01-09-2011	20-3-2013	18
4.	ITS Engineering College	Permanent	Associate Prof. and Head	Guidance, development, research activities etc. Head of department		Continued (01-01-13)	
5.	Jamia Millia Islamia, Central University, Delhi	Central Govt. / Permanent	Assistant Professor	Teaching, Developing labs, Counseling to students, conducting lab of SCADA, Power Electronics, Establishment of labs.	13-10-2006	31-08-2011	58
6.	Maharaja Agarsen Institute of technology, Delhi	Private / Permanent	Assistant Professor (Associate Professor in new scale)	Teaching, Developing labs, Counselling to students, conducting lab of Electrical Machines, Power Electronics, Circuit Theory, Establishment of labs.	18-07-2005	12-10-2006	15
7.	Raj Kumar Goel Engg. College, Ghaziabad.	Private / Permanent	Assistant Professor (Associate Professor in new scale)	Teaching, Developing labs, Counselling to students, conducting lab of Electrical Machines, Basic	13-07-2004	17-07-2005	12

				Electrical Engineering, Power Electronics, Circuit Theory, Establishment of labs.			
8.	Inderprastha Engg. College, Ghaziabad	Private / Permanent	Sr. Lecturer	Teaching, Developing labs, Counselling to students, Conducting labs, Establishment of labs, Dy.Head Examiner of basic electrical and circuit theory at U. P. Tech. university.	15-10-2000	12-07-2004	45
9.	Shri Ram Deo Baba Kamla Nehru Engineering college, Nagpur.	Private / Permanent	Lecturer	Teaching, Developing labs, Counselling to students.	06-09-1997	15-07-1999	22
10.	Walchand College of Engineering, Vishrambagh, Sangli (Mah.)	Govt. / Adhoc	Lecturer	Teaching, Developing labs, Counselling to students.	01-01-1997	05-09-1997	8

Courses Taught at UG/PG level:

1. **Basic Electrical Engineering**, UG level, Five times. This subject includes the basics of mesh and nodal analysis, application of theorems, viz. Thevenin, Norton, Maximum Power, Tellegen, Compensation, Millman, to dc networks, A.C. fundamentals, basics of D.C. and A.C. machines, etc.
2. **Network theory**, UG level, Five times. This subject includes basics of mesh and nodal analysis, application of theorems, viz. Thevenin, Norton, Maximum Power, Tellegen, Compensation, Millman, to ac networks, Transient and steady state analysis, Laplace Transform, Two port networks, Network synthesis, etc.
3. **Power Electronics**, UG level, three times. This subject includes the general philosophy of power electronic devices, the commutation and firing techniques, application of power electronic device as converter, inverter, chopper, cyclo convertor, and application to different dc and ac drives, etc.
4. **Energy management system**, UG level, two times. This subject involves the methodology of forecast and basics of SCADA system, etc.
5. **Energy management system**, PG level, two times. This subject includes basics of SCADA system, load flow analysis, contingency analysis and application of soft computing techniques to power system, etc.
6. **Restructuring of Power system**, PG level, only once. This subject includes the problems associated with power system viz. reliability of power supply, HVDC and EHVAC systems, power shortage, new methodology adopted by the industry, privatization, etc.

Ph.D. thesis Guided (3)

1. Annu Govind, "Power Quality Assessment of Active Power Filters for Harmonics Reduction in Distribution Systems", in progress since July-2010.

Dr. Vinay Kumar Chandna
Ph.D. Electrical (DCE), M.E. (Power System), B.E. (Electrical)

2. Sunil Kumar Choudhary, "Design and implementation of Intelligent Voltage Source Inverter (VSI) for UPS" in progress since July-2009.
3. Seema Arora, "Design and Configuration of Multi Structured BPL (broadband over power line) system, since July 2010.

PhD Thesis evaluated

1. Ms. Rajkumari K, "Certain investigations on Enhancing and Optimizing task scheduling in cloud computing", dated 20-10-17, Ref. 112109320008, Anna University, Chennai.
2. Vinay Barhate, "Adoptive combined Neuro-Fuzzy approach for enhancing of reliability in Transformer Protection", letter PhD (cell)/713, Rashtrasant Tukadoji Maharaj Nagpur University, 21-04-16 at Laxminarayan institute of technology, Nagpur.
3. Jyoti Agarwal, "Sensorless permanent magnet synchronous motor drive: a comparative study", PhD (cell)/1150, 01-06-2018, Rashtrasant Tukadoji Maharaj Nagpur University, 21-04-16 at Laxminarayan institute of technology, Nagpur
4. Mr. Ashok Kumar, Regd. No. 1205028 entitled "PERFORMANCE ANALYSIS AND OPTIMIZATION OF BANDWIDTH IN PASSIVE OPTICAL NETWORKS", Punjab technical University, dated 01-05-2019.

M.Tech Thesis Supervised (4)

1. Nupur Tripathi, Comparison simulation between sequential and parallel processed SCADA system, M.E. major project, JMI, Delhi, 2008.

The work done in the thesis includes:

- a. Study of sequential and parallel processed system.
- b. Simulation of ferranty effect using MATLAB and simulating the processing time using sequential method and parallel processing using PMATLAB.
- c. Simulation of fault identification algorithm using MATLAB.

2. Mir Zahida, Simulation of broadband over power line system, M.E. major, 2009.

The work done in the thesis includes:

- a. Study of Broadband over power lines (or BPL) system.
- b. Design of the broadband over power lines system using OFDM modulation technique using MATLAB/SIMULINK environment.

Two papers published

V. K. Chandna, Mir Zahida, "Effect of varying topologies on the performance of Broadband over Power Line", **IEEE Transaction on Power Delivery, Vol-25, No. 4, Oct. 2010, pp 2371-2375.**

V. K. Chandna, Mir Zahida, "Performance of Broadband over Power Line System", presented at 2010 IEEE PES Transmission and Distribution Conference and Exposition, April 19-22, 2010, in the session PSC02Wd2P, No. 2010TD0401, New Orleans, Louisiana, USA.

3. Shailendra Saxena, Study of Independent System Operator (ISO) in Indian Scenario (Congestion Management), M.E. major, 2009.

The work done in the thesis includes:

- a. Study of Indian power system scenario.
- b. Study of Generation, Transmission and Distribution restructuring and privatization scenario in India.
- c. Simulation of load flow studies and congestion management for a typical four bus system.
- d. Discussion on the role of Independent System Operator (ISO) in Indian scenario..

4. Uttam Kumar, Implementation of virtual SCADA system using LABVIEW, at Delhi Technical University, Delhi, 2012

Expert lectures Taken

- (a) Expert lectures taken in the area of OBE and accreditation at various institutes and universities.
- (b) Design and configuration of RTU at short-term course on Distributed Automation at Delhi College of Engineering in year 2003.
- (c) Selection of sensors and transducers at short-term course on Distributed Automation at Delhi College of Engineering in year 2003.
- (d) Parallel processed SCADA system at NIT Jaipur in the year 2008.
- (e) Ergonomics in control centre design at NIT Jaipur in the year 2008.
- (f) Application of soft-computing techniques to pre-process data at NIT Jaipur in the year 2008.
- (g) Expert lecture at DCE on Intelligent SCADA system during August-2011 through IEEE PES Delhi Chapter.
- (h) Expert lecture on Control Centre Design to Power Grid engineers at JMI during Sep-2011 for certificate course in SCADA system.

Laboratory Experience

- (i) Setting up teaching and research laboratories

Setting of basic electrical engineering, network theory and power electronics laboratory at UG level at different engineering colleges and also included MATLAB in these laboratories, so that the analysis results may be compared with the experimental results.

- (ii) Using different types of instruments, systems, computers etc.

While doing research a SCADA software Freelance-2000 is used and implemented at UG and PG level, different projects to be loaded on AC-200F ABB RISC processor, also implemented transfer of data from field to computer system via Field BUS, RTU, Ethernet. Also used different instruments in the laboratories viz. voltmeters, ammeters, CRO, and other equipments to conduct various laboratory experiments at UG/PG level.

BOOKS PUBLISHED:

1. Network theory and circuit design in the year 2000 by cyber tech publications.
2. Basics of electrical and electronics engineering question bank in the year 2001 by cyber tech publications.
3. Power systems in the year 2003 by cyber tech publications.
4. Basic electrical engineering, Shubham publication-2005.

COURSES ATTENDED:

1. Short-term course on "Teaching skills and personality development" in 1998 at REC Nagpur.
2. Short-term course on "Recent trends in instrumentation" at SLIT, Longowal in 1999.
3. Short-term course on "Automation in electrical power distribution system" at DCE from 20-31, Dec, 2004.

MEMBERSHIP:

- a. Life membership of ISTE (LM-24058), Member IEEE (07).
- b. Life member CSI.
- c. Promoted to Sr. Member, IEEE from 2011 onwards.

Dr. Vinay Kumar Chandna
Ph.D. Electrical (DCE), M.E. (Power System), B.E. (Electrical)

- b. Biography has been included in Marquis Who's Who in the World Edition 2012.

PROJECTS UNDERTAKEN:

1. PC based automatic testing of three-phase induction motor using 8086 assembly language at B.E.
2. Effects of harmonics due to intermittent load at M.E.

(Dr. V.K.CHANDNA)

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

Faculty Student Ratio

Sanctioned Strength = 870 X 4

= 3480

As per AICTE = 1 : 20

Faculty Required = 174

Actual Faculty = 205

Calculation = $100 * \left(\frac{205}{174}\right)$

Points 100

QIV

Session 2020-21 (RTU)

[Handwritten Signature]
28/11/2020

Faculty List

S.No	PAN	Faculty Name	D.O.B.	Designation	Branch	Highest Degree
1	ADYPC0545P	Dr. Vinay kumar Chandna	02-09-1973	Principal	EE	Ph.D
2	AEVPS8929P	Dr. PRASANTA KUMAR SANTH	09-01-1957	Professor	Chemistry	Ph.D
3	AOSPS1250C	Dr. Sapna Sharma	19-10-1972	Professor	Chemistry	Ph.D
4	BGGPP2578B	Dr. Sonu Pareek	15-01-1972	Professor	Chemistry	Ph.D
5	ABDPJ5506A	Dr. Rajeev Jain	13-12-1957	Professor	E&H	Ph.D
6	AHPPS7011M	Dr. Ravindra Pratap Singh	07-10-1965	Professor	EE	Ph.D
7	AFJPD1423Q	Dr. Deepak Dembla	10-09-1971	Professor	IT	Ph.D
8	AEJPN6073P	Dr. Omprakash Netula	16-07-1974	Professor	CE	Ph.D
9	ALUPJ3984B	Dr. SEEMA JOSHI	24-10-1971	Professor	Chemistry	Ph.D
10	ANYPG8860F	Dr. SANJAY GAUR	05-06-1976	Professor	CSE	Ph.D
11	AIHPJ0122H	Dr. ANITA JAIN	19-01-1968	Professor	E&H	Ph.D
12	BDBPS1973B	Dr. RAJESH KUMAR SHRAMA	26-10-1970	Professor	E&H	Ph.D
13	AALPW2253Q	Dr. Anurakt Williamson	01-06-1967	Professor	ECE	Ph.D
14	BOUPS5721K	Dr. Santosh Kumar Singh	20-11-1967	Professor	ECE	Ph.D
15	ADOPA8110C	Dr. SMITA AGRAWAL	22-05-1977	Professor	IT	Ph.D
16	ASSPS8571J	Dr. Ashok Singh Shekhawat	14-08-1972	Professor	Math	Ph.D
17	AGHPP4837F	Dr. UMESH KUMAR PAREEK	29-09-1969	Professor	Math	Ph.D
18	BHAPS1199C	Dr. Fauzia Siddiqui	01-08-1977	Professor	ME	Ph.D
19	AOPPS5028F	Dr. MAHENDRA PRATAP SINGH	11-01-1975	Professor	ME	Ph.D
20	ALZPM8190P	Dr. R K MANGAL	10-05-1976	Professor	Physics	Ph.D
21	AFGPD6201H	Dr. S K DIXIT	01-01-1967	Professor	Physics	Ph.D
22	IEZPS2649A	RATNI SAINI	18-06-1980	Assoc. Professor	Chemistry	Ph.D
23	ATSPJ8362K	BHAWANA JANGIR	03-09-1987	Assoc. Professor	Chemistry	Ph.D
24	AUUPS5430L	Dinesh Sethi	07-02-1974	Assoc. Professor	ECE	Ph.D
25	BPOPK3332R	Arun Kumar	08-12-2018	Assoc. Professor	ECE	Ph.D
26	ASNPD5449D	DINESH KUMAR DHARAMDAS	22-05-1981	Assoc. Professor	IT	Ph.D
27	AKVPD8781A	GAURAV DEEP	09-10-1981	Assoc. Professor	E&H	Ph.D
28	CGVPS6023A	Kanishk Sharma	10-12-1984	Assoc. Professor	ME	Ph.D
29	AIQPJ5797F	MANISH KUMAR JAIN	25-07-1981	Assoc. Professor	CSE	Ph.D
30	AERPA9903M	Reema Ajmera	17-06-1975	Assoc. Professor	IT	Ph.D
31	BKUPS6033A	RITU SINGH	05-07-1979	Assoc. Professor	E&H	Ph.D
32	AIEPG6683M	Ruchi Goyal	16-06-1978	Assoc. Professor	E&H	Ph.D
33	EGMPS9823R	SAVITA SANGWAN	03-09-1983	Assoc. Professor	Chemistry	Ph.D
34	AWQPK5876J	Shiv Ranjan Kumar	02-05-1980	Assoc. Professor	ME	Ph.D
35	ANFPJ6835N	SMITA JAIN	19981-08-07	Assoc. Professor	Math	Ph.D
36	AKRPB2017M	SUMAN BHATNAGAR	05-03-1973	Assoc. Professor	CSE	Ph.D
37	AGMPG4775E	Varsha Gupta	02-09-1974	Assoc. Professor	CE	Ph.D
38	BWPPS1303G	BARKHA SRIVASATAVA	09-05-1978	Assoc. Professor	Chemistry	Ph.D
39	AONPB5285K	BHUVNESH BHARDWAJ	28-08-1975	Assoc. Professor	ME	Ph.D
40	CUGPS6564P	Girraj Sharma	02-11-1985	Assoc. Professor	ECE	Ph.D
41	AWKPP3733F	Kashish Parwani	19-06-1978	Assoc. Professor	Math	Ph.D
42	ARUPS7035A	MANISH SRIVASTAV	17-05-1967	Assoc. Professor	ME	Ph.D
43	ALTPN0639E	NILAM CHOUDHARY	19-03-1983	Assoc. Professor	CSE	Ph.D
44	AEVRT9930N	PARUL TYAGI	01-07-1982	Assoc. Professor	ECE	Ph.D
45	ANAPR4957L	RAJ KUMAR	10-08-1978	Assoc. Professor	Physics	Ph.D
46	AHDPB0243J	RAJESH KUMAR BATHIJA	15-08-1977	Assoc. Professor	ECE	Ph.D
47	BCEPM3790G	REKHA MITHAL	11-08-1981	Assoc. Professor	Chemistry	Ph.D
48	AYAPP6684K	RISHI PAREEK	25-09-1987	Assoc. Professor	ME	Ph.D

S.No	PAN	Faculty Name	D.O.B.	Designation	Branch	Highest Degree
49	AOPPM9479L	RUCHI MATHUR	21-07-1981	Assoc. Professor	Math	Ph.D
50	AGXPD1228N	RUCHIDA BARMAN	11-11-1969	Assoc. Professor	E&H	Ph.D
51	AFXPV5199R	Dr. SANDEEP VYAS	22-09-1980	Assoc. Professor	ECE	Ph.D
52	BFEP2131M	SARITA POONIA	14-02-1986	Assoc. Professor	Math	Ph.D
53	BSPSP0006J	Dr. SUNIL KUMAR SHRIVASTA	01-05-1985	Assoc. Professor	Math	Ph.D
54	AHPPG4947A	Tripati Gupta	06-10-1978	Assoc. Professor	Math	Ph.D
55	ARPPK9267P	Vijeta kumawat	30-08-1980	Assoc. Professor	CSE	Ph.D
56	AKHPM3052H	VINITA MATHUR	12-01-1982	Assoc. Professor	ECE	Ph.D
57	BJQPS6740B	VISHAL SAXENA	13-05-1981	Assoc. Professor	Math	Ph.D
58	BNPPS2864D	MAN MOHAN SIDDH	17-03-1985	Assoc. Professor	ME	Ph.D
59	GOZPS5894R	LOKESH KUMAR SHARMA	26-11-1985	Asstt. Professor	Chemistry	Ph.D
60	ANQPG4165M	YOGESH KUMAR GUPTA	07-07-1982	Asstt. Professor	Chemistry	Ph.D
61	CPFPK6885P	ADNAN KHOKAR	08-06-1989	Asstt. Professor	IT	Ph.D
62	DETPK0060Q	TARUN KUMAR KUMAWAT	14-07-1991	Asstt. Professor	IT	Ph.D
63	BHWPM2114F	Ram Vilas Meena	05-02-1985	Asstt. Professor	CE	M.Tech
64	cqppp1101g	SATYA PRAKASH PANWAR	25-06-1994	Asstt. Professor	CE	M.Tech
65	ARZPC1928R	Suresh Kumar Choudhary	16-03-1990	Asstt. Professor	CE	M.Tech
66	AKRPN8469M	DEEPESH KUMAR NEELAM	20-07-1989	Asstt. Professor	Chemistry	Ph.D
67	BRVPS2276R	ASHOK KUMAR SAINI	01-07-1993	Asstt. Professor	CSE	M.Tech
68	BLAPM3506M	Neha Mishra	10-06-1987	Asstt. Professor	CSE	M.Tech
69	BNLPG5370G	Nidhi Gour	09-01-1989	Asstt. Professor	CSE	M.Tech
70	AISPV0836F	NOOTAN VERMA	24-11-1989	Asstt. Professor	CSE	M.Tech
71	ANBPJ9489J	PANKAJ JAIN	24-04-1984	Asstt. Professor	CSE	Ph.D
72	BRDPJ1773L	PRIYANKA JAROLI	09-05-1995	Asstt. Professor	CSE	M.Tech
73	AHUPN0454A	PRIYANKA NAIR	15-06-1990	Asstt. Professor	CSE	M.Tech
74	FQEPS1338J	Satyajeet Sharma	10-03-1988	Asstt. Professor	CSE	M.Tech
75	AJEPN9144K	SRAWAN NATH	01-08-1985	Asstt. Professor	CSE	M.Tech
76	HOZPS9872E	SUMEDHA SONI	24-04-1995	Asstt. Professor	E&H	MA
77	CCLPP1068E	Pratik M	28-04-1988	Asstt. Professor	ECE	M.Tech
78	ANSPM6162C	Divya Mathur	24-05-1984	Asstt. Professor	EE	M.Tech
79	AREPP1188K	PAWAN KISHORE JHAJHARIA	13-01-1984	Asstt. Professor	IT	M.Tech
80	CWVPP8727L	Anand Prakash	31-12-1991	Asstt. Professor	ME	M.Tech
81	AZBPP3801G	Yash Pratap Aggrwal Aggrwal	06-12-2018	Asstt. Professor	ME	M.Tech
82	BEDPM3733E	Akhil Maheshwari	14-04-1991	Asstt. Professor	CE	M.Tech
83	AUGPB8419E	Ashish Boraida	28-07-1988	Asstt. Professor	CE	M.Tech
84	CDMPB9103J	BRIJLATA SHARMA	20-07-1990	Asstt. Professor	CE	M.Tech
85	DXSPS0731J	Hetram Sharma	10-05-1987	Asstt. Professor	CE	M.Tech
86	DDVPG1724G	JATIN GUPTA	13-07-1996	Asstt. Professor	CE	M.Tech
87	BDAPK2004G	Jitesh Kumar Jain	24-06-1986	Asstt. Professor	CE	B.Tech
88	GFEPK3827Q	MOHAMMAD AAQIB KHAN	11-12-1993	Asstt. Professor	CE	M.Tech
89	CQFPS6230M	NARENDRA SIPANI	30-01-1992	Asstt. Professor	CE	M.Tech
90	EMOPK3514H	NIDA KHANAM	13-04-1993	Asstt. Professor	CE	M.Tech
91	AVHPJ3092P	Pradeep Kumar Jain	21-11-1992	Asstt. Professor	CE	B.Tech
92	DMRPK5017F	shivangni khandelwal	11-05-1995	Asstt. Professor	CE	M.Tech
93	GFUPS2762Q	SUDHIR PANWAR	13-02-1992	Asstt. Professor	CE	M.Tech
94	DIOPS5034K	Sumit Saini	23-12-1991	Asstt. Professor	CE	M.Tech
95	DXDPS0084M	TEEKAM SINGH	03-02-1992	Asstt. Professor	CE	M.Tech
96	BPTPA1138N	YOGESH KUMAR AGARWAL	10-12-1990	Asstt. Professor	CE	M.Tech
97	AQJPV4495K	REKHA VIJAY	10-12-1982	Asstt. Professor	Chemistry	M.Sc.

S.No	PAN	Faculty Name	D.O.B.	Designation	Branch	Highest Degree
98	AXDPD8864D	ABHISHEK DIXIT	26-06-1987	Asstt. Professor	CSE	M.Tech
99	AKXPM4065A	AMIT MITHAL	03-11-1981	Asstt. Professor	CSE	M.Tech
100	BKYPS2957M	ANIMA SHARMA	26-12-1982	Asstt. Professor	CSE	M.Tech
101	BIKPM6678P	ANSHUL MITTAL	19-06-1986	Asstt. Professor	CSE	B.Tech
102	AZYPK8880D	ARIHANT KUMAR JAIN	02-06-1988	Asstt. Professor	CSE	M.Tech
103	AVBPA4524D	ASHISH AMERIA	24-09-1989	Asstt. Professor	CSE	M.Tech
104	ABHPU5464A	BALAMURUGAN UMAMAHESV	10-11-1978	Asstt. Professor	CSE	M.Tech
105	BLQPS5891H	GAJENDRA KUMAR SHARMA	09-01-1976	Asstt. Professor	CSE	M.Tech
106	ALQPL3272N	GIRIJA LAVANIA	10-07-1991	Asstt. Professor	CSE	M.Tech
107	CBEPS2552L	JAY SHANKAR SHARMA	25-08-1985	Asstt. Professor	CSE	M.Tech
108	ADYPV1503G	MANJU VYAS	12-02-1980	Asstt. Professor	CSE	M.Tech
109	BBVPB6133Q	NEHA BHARTI	05-05-1986	Asstt. Professor	CSE	M.Tech
110	BEUPS5177P	neha solanki	22-11-1987	Asstt. Professor	CSE	M.Tech
111	AYXPK0185F	PEEYUSH KULSHRESTHA	23-02-1984	Asstt. Professor	CSE	M.Tech
112	BMEPG9736Q	PRIYA GUPTA	13-11-1990	Asstt. Professor	CSE	M.Tech
113	BQQPM4863G	PRIYANKA MITRA	11-07-1988	Asstt. Professor	CSE	M.Tech
114	CHZPS0192P	RICHA SHARMA	19-08-1987	Asstt. Professor	CSE	M.Tech
115	DLJPS1736N	SEEMA YADAV	02-01-1988	Asstt. Professor	CSE	M.Tech
116	BIPPP2666H	YOGITA PANJABI	23-04-1981	Asstt. Professor	CSE	M.Tech
117	ANHPJ1340C	NEELU JAIN	25-06-1984	Asstt. Professor	E&H	MBA
118	CLMPK7282F	Rashmi Kaushik	01-03-1991	Asstt. Professor	E&H	Ph.D
119	AFHPC3165N	SAGUNA CHATURVEDI	20-04-1957	Asstt. Professor	E&H	MA
120	FFHPS5593M	SAROJ PARIHAR	02-06-1991	Asstt. Professor	E&H	MA
121	ARXPA0132B	SONALI AGARWAL	12-07-1988	Asstt. Professor	E&H	MBA
122	GHAPK6917B	Sonia Khubchandani	27-03-1977	Asstt. Professor	E&H	Ph.D
123	DOBPS4622L	AASHISH SHARMA	18-02-1985	Asstt. Professor	ECE	M.Tech
124	AIYPJ3152A	ANIL JAIN	02-12-1979	Asstt. Professor	ECE	M.Tech
125	AXHPR2031G	Anju Rajput	14-09-1985	Asstt. Professor	ECE	M.Tech
126	BFDPG0660P	ANKUR GANGWAR	03-10-1988	Asstt. Professor	ECE	M.Tech
127	COPPK1574Q	Ashish Kumar	20-08-1990	Asstt. Professor	ECE	M.Tech
128	BMFPK1793Q	ASHISH Kulshreshtha	02-10-1986	Asstt. Professor	ECE	M.Tech
129	BHVPS3926E	ASHUTOSH SHARMA	21-11-1982	Asstt. Professor	ECE	M.Tech
130	BAXPK5296E	BHOOPESH KUMAR KUMAWA	23-02-1979	Asstt. Professor	ECE	M.Tech
131	BXYPS2998K	DEEPAK SHANKHALA	26-10-1982	Asstt. Professor	ECE	M.Tech
132	AXJPD8149H	DEEPMALA Kulshreshtha	25-04-1992	Asstt. Professor	ECE	B.Tech
133	AOKPG6567J	DEVESH GUPTA	16-03-1983	Asstt. Professor	ECE	M.Tech
134	AKEPA0586H	HONEY AGRAWAL	06-11-1986	Asstt. Professor	ECE	M.Tech
135	AWCPM2988B	Jai Prakash Mishra	09-11-1981	Asstt. Professor	ECE	M.Tech
136	BDYPJ1696M	JAIVERDHAN JAIVERDHAN	06-02-1992	Asstt. Professor	ECE	Ph.D
137	CWXPS7101P	JITENDRA SHARMA	18-01-1989	Asstt. Professor	ECE	M.Tech
138	AXHPS2584H	LOKESH KUMAR SHARMA	25-06-1974	Asstt. Professor	ECE	M.Tech
139	BHMPM5509E	Mamta Rani	28-12-1989	Asstt. Professor	ECE	M.Tech
140	BKZPM4835M	MANGI LAL MEGHWAL	11-07-1985	Asstt. Professor	ECE	M.Tech
141	AJBPY2630E	MANISH YADAV	16-09-1984	Asstt. Professor	ECE	M.Tech
142	ALGPN5796H	NARESH KUMAR	26-09-1983	Asstt. Professor	ECE	M.Tech
143	CNTPS3234E	NEHA SINGH	30-10-1986	Asstt. Professor	ECE	M.Tech
144	AYSN9016F	NISHI AGARWAL	12-07-1984	Asstt. Professor	ECE	M.Tech
145	EBKPS3831J	PRAVIN KUMAR SHARMA	11-10-1989	Asstt. Professor	ECE	M.Tech
146	BDJPB8982K	PREETI BAROT	06-11-1988	Asstt. Professor	ECE	M.Tech

S.No	PAN	Faculty Name	D.O.B.	Designation	Branch	Highest Degree
147	ANSPJ5809M	RAJ KUMAR JAIN	28-08-1985	Asstt. Professor	ECE	M.Tech
148	AMDPK4998A	RAKESH KUMAR KARDAM	20-10-1974	Asstt. Professor	ECE	M.Tech
149	BTCPR2037J	Ritambhara S	10-09-1991	Asstt. Professor	ECE	M.Tech
150	AEKPV4859C	RITU VYAS	26-06-1976	Asstt. Professor	ECE	M.Tech
151	BOQPS0885A	SANDEEP KUMAR DOTYA	15-11-1988	Asstt. Professor	ECE	M.Tech
152	BAWPS0763H	Shweta SHARDA	30-08-1982	Asstt. Professor	ECE	M.Tech
153	AGYPM8906B	SHYAM SUNDER MANAKTALA	14-10-1975	Asstt. Professor	ECE	M.Tech
154	AGDPC9408K	Siddharth Chaturvedi	23-04-1978	Asstt. Professor	ECE	M.Tech
155	BLGPD6639E	Tripti Dua	27-08-1991	Asstt. Professor	ECE	B.Tech
156	CQFPS8859A	Vikas Sharma	18-04-1986	Asstt. Professor	ECE	M.Tech
157	BRDPS2349B	YAZUSHA SHARMA	08-10-1986	Asstt. Professor	ECE	M.Tech
158	ALUPY2403L	YOGITA TALUJA	21-02-1993	Asstt. Professor	ECE	M.Tech
159	AVYPC9362J	ASHOK SINGH CHUNDAWAT	01-08-1990	Asstt. Professor	EE	M.Tech
160	AOMPK3315A	Atul Kulshreshtha	01-01-1969	Asstt. Professor	EE	M.Tech
161	AGPPT8253R	Gopal Tiwari	29-06-1969	Asstt. Professor	EE	M.Tech
162	ADMPL0195Q	L SENTHIL	14-05-1983	Asstt. Professor	EE	M.Tech
163	ATUPA4690H	Neha Agrawal	14-02-1991	Asstt. Professor	EE	M.Tech
164	AORPY4996C	Nupur Yadav	10-04-1993	Asstt. Professor	EE	M.Tech
165	AWIPG6475H	Praveen Kumar Goyal	08-01-1985	Asstt. Professor	EE	B.Tech
166	BRKPM8121L	RAHUL KUMAR MALEE	01-07-1992	Asstt. Professor	EE	M.Tech
167	BQDPS6091P	Ram Singh	15-08-1982	Asstt. Professor	EE	B.Tech
168	CHJPS7633B	Ritu Soni	24-01-1987	Asstt. Professor	EE	M.Tech
169	CPEPS2445Q	SHAIENDRA SRIVASTAVA	24-11-1969	Asstt. Professor	EE	M.Tech
170	APTPC4654C	SONALI CHADHA	18-06-1985	Asstt. Professor	EE	M.Tech
171	AWRPS4184J	Vishal Sharma	26-12-1980	Asstt. Professor	EE	M.Tech
172	EDIPS5407N	Vishnu Dutt Sharma	27-01-1990	Asstt. Professor	EE	B.Tech
173	CJYPS8747K	BRIJESH KUMAR SINGH	01-08-1987	Asstt. Professor	IT	M.Tech
174	ATDPA1234E	DEEPIKA BANSAL	04-04-1992	Asstt. Professor	IT	M.Tech
175	AMLJP3549E	KANISHK JAIN	20-Aug-87	Asstt. Professor	IT	M.Tech
176	ADSPY7113K	KUSUM YADAV	19-11-1984	Asstt. Professor	IT	M.Tech
177	AQNPK6885E	NAVEEN KUMAR KEDIA	20-02-1982	Asstt. Professor	IT	M.Tech
178	ARIPG1623N	PIYUSH GAUTAM	27-01-1986	Asstt. Professor	IT	M.Tech
179	DWCPS1470R	PREETI SHARMA	25-01-1990	Asstt. Professor	IT	M.Tech
180	DFNPS4835A	Shikha Shrivastava	26-09-1987	Asstt. Professor	IT	M.Tech
181	DHJPS9219G	SHWETA SAXENA	30-10-1990	Asstt. Professor	IT	M.Tech
182	AJUPB1506F	SUNIL BHARDWAJ	03-07-1978	Asstt. Professor	IT	MCA
183	AUYPN8399M	Aashish Nagpal	14-06-1988	Asstt. Professor	ME	M.Tech
184	BVBPK2936A	abhishek kumar	02-02-1989	Asstt. Professor	ME	M.Tech
185	AHJPV3272D	AKHIL VIJAY	13-01-1988	Asstt. Professor	ME	M.Tech
186	CPSPP3593N	Akhilesh Paliwal	10-07-1989	Asstt. Professor	ME	M.Tech
187	ARZPR1164L	DAYAL SINGH RATHORE	10-07-1986	Asstt. Professor	ME	M.Tech
188	AZBPP5053C	DILIP KUMAR PRAJAPATI	17-06-1985	Asstt. Professor	ME	M.Tech
189	APGPB2872J	HEMANT BANSAL	25-11-1983	Asstt. Professor	ME	M.Tech
190	AXAPC7807L	HUKUM CHAND	15-04-1990	Asstt. Professor	ME	M.Tech
191	BEDPG1771G	JITENDRA KUMAR GUPTA	04-02-1990	Asstt. Professor	ME	M.Tech
192	BKOPS5002H	KULDEEP SHARMA	01-01-1977	Asstt. Professor	ME	M.Tech
193	BQSPS3044K	LALIT KUMAR SHARMA	23-11-1983	Asstt. Professor	ME	M.Tech
194	AUEPC0203F	NITIN CHHABRA	05-01-1987	Asstt. Professor	ME	B.Tech
195	AMHPN6656J	PALAK JINDAL	11-01-1988	Asstt. Professor	ME	M.Tech

S.No	PAN	Faculty Name	D.O.B.	Designation	Branch	Highest Degree
196	ATUPB1700A	Priti Pramod Bodkhe	06-06-1987	Asstt. Professor	ME	M.Tech
197	AGVPG7205J	RAJENDRA KUMAR GUPTA	14-07-1979	Asstt. Professor	ME	M.Tech
198	BJQPS8962K	SATYA PRAKASH SAINI	30-12-1986	Asstt. Professor	ME	M.Tech
199	BSKPK2741R	SATYENDRA KUMAR	13-11-1986	Asstt. Professor	ME	M.Tech
200	AZWPB3081B	SHRIKANT BANSAL	01-07-1991	Asstt. Professor	ME	M.Tech
201	AVGPD6643R	YOGESH DUBEY	11-09-1978	Asstt. Professor	ME	M.Tech
202	AZXPP0888K	MANOJ PATHAK	10-12-1975	Asstt. Professor	Physics	M.Sc.
203	BEGPG5297A	Sachin Gupta	16-11-1986	Asstt. Professor	CSE	M.Tech
204	AJUPJ2510R	Ranjan Kumar Jha	07-06-1987	Asstt. Professor	CSE	M.Tech
205	AKLPV5480G	Jisha Varghese	08-12-1987	Asstt. Professor	EE	M.Tech

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Fax No.0141-2770803

Professor

Professor required as per AICTE

$$\text{Required Professor} : \frac{174}{9}$$

$$= 19.33$$

$$= 19$$

$$\text{Available} : 21$$

$$\text{Calculation} : 40 * \left(\frac{21}{19}\right)$$

$$= 44$$

Points 40

QIV

Session 2020-21 (RTU)

[Handwritten signature]

Professor (2020-21)

S.No	PAN	Title	Faculty Name	D.O.B.	Designation	Branch	Highest Degree
1	ADYPC0545P	Dr.	Vinay kumar Chandna	02-09-1973	Principal	EE	Ph.D
2	AEVPS8929P	Dr.	PRASANTA KUMAR SANTRA	09-01-1957	Professor	Chemistry	Ph.D
3	AOSPS1250C	Dr.	Sapna Sharma	19-10-1972	Professor	Chemistry	Ph.D
4	BGGPP2578B	Dr.	Sonu Pareek	15-01-1972	Professor	Chemistry	Ph.D
5	ABDPJ5506A	Dr.	Rajeev Jain	13-12-1957	Professor	E&H	Ph.D
6	AHPPS7011M	Dr.	Ravindra Pratap Singh	07-10-1965	Professor	EE	Ph.D
7	AFJPD1423Q	Dr.	Deepak Dembla	10-09-1971	Professor	IT	Ph.D
8	AEJPN6073P	Dr.	Omprakash Netula	16-07-1974	Professor	CE	Ph.D
9	ALUPJ3984B	Dr.	SEEMA JOSHI	24-10-1971	Professor	Chemistry	Ph.D
10	ANYPG8860F	Dr.	SANJAY GAUR	05-06-1976	Professor	CSE	Ph.D
11	AIHPJ0122H	Dr.	ANITA JAIN	19-01-1968	Professor	E&H	Ph.D
12	BDBPS1973B	Dr.	RAJESH KUMAR SHRAMA	26-10-1970	Professor	E&H	Ph.D
13	AALPW2253Q	Dr.	Anurakt Williamson	01-06-1967	Professor	ECE	Ph.D
14	BOUPS5721K	Dr.	Santosh Kumar Singh	20-11-1967	Professor	ECE	Ph.D
15	ADOPA8110C	Dr.	SMITA AGRAWAL	22-05-1977	Professor	IT	Ph.D
16	ASSPS8571J	Dr.	Ashok Singh Shekhawat	14-08-1972	Professor	Math	Ph.D
17	AGHPP4837F	Dr.	UMESH KUMAR PAREEK	29-09-1969	Professor	Math	Ph.D
18	BHAPS1199C	Dr.	Fauzia Siddiqui	01-08-1977	Professor	ME	Ph.D
19	AOPPS5028F	Dr.	MAHENDRA PRATAP SINGH	11-01-1975	Professor	ME	Ph.D
20	ALZPM8190P	Dr.	R K MANGAL	10-05-1976	Professor	Physics	Ph.D
21	AFCPD6201H	Dr.	S K DIXIT	01-01-1967	Professor	Physics	Ph.D

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Fax No.0141-2770803

Associate Professor

Associate Professor Required As per AICTE

Required Associate Professor : $\left(\frac{174}{9}\right) * 2$

= 38.66

= 39

Available : 37

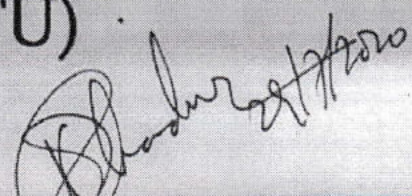
Calculation : $40 * \left(\frac{37}{39}\right)$

= 37.94

Points 38

QIV

Session 2020-21 (RTU)



Handwritten signature and date: 17/2/2020

Associate Professor (2020-21)

S.No	4.10 PAN	4.1 Faculty Name	4.2 D.O.B.	4.3 Designation	4.4 Branch	Highest Degree
1	AHDPB0243J	RAJESH KUMAR BATHIJA	15-08-1977	Assoc. Professor	ECE	Ph.D
2	BPOPK3332R	Arun Kumar	08-12-2018	Assoc. Professor	ECE	Ph.D
3	BWPPS1303G	BARKHA SRIVASATAVA	09-05-1978	Assoc. Professor	Chemistry	Ph.D
4	ATSPJ8362K	BHAWANA JANGIR	03-09-1987	Assoc. Professor	Chemistry	Ph.D
5	AONPB5285K	BHUVNESH BHARDWAJ	28-08-1975	Assoc. Professor	ME	Ph.D
6	ASNPD5449D	DINESH KUMAR DHARAMDASANI	22-05-1981	Assoc. Professor	IT	Ph.D
7	AUUPS5430L	Dinesh Sethi	07-02-1974	Assoc. Professor	ECE	Ph.D
8	AKVPD8781A	GAURAV DEEP	09-10-1981	Assoc. Professor	E&H	Ph.D
9	CUGPS6564P	Girraj Sharma	02-11-1985	Assoc. Professor	ECE	Ph.D
10	CGVPS6023A	Kanishk Sharma	10-12-1984	Assoc. Professor	ME	Ph.D
11	AWKPP3733F	Kashish Parwani	19-06-1978	Assoc. Professor	Math	Ph.D
12	BNPPS2864D	MAN MOHAN SIDDH	17-03-1985	Assoc. Professor	ME	Ph.D
13	AIQPJ5797F	MANISH KUMAR JAIN	25-07-1981	Assoc. Professor	CSE	Ph.D
14	ARUPS7035A	MANISH SRIVASTAV	17-05-1967	Assoc. Professor	ME	Ph.D
15	ALTPN0639E	NILAM CHOUDHARY	19-03-1983	Assoc. Professor	CSE	Ph.D
16	AEVPT9930N	PARUL TYAGI	01-07-1982	Assoc. Professor	ECE	Ph.D
17	ANAPR4957L	RAJ KUMAR	10-08-1978	Assoc. Professor	Physics	Ph.D
18	IEZPS2649A	RATNI SAINI	18-06-1980	Assoc. Professor	Chemistry	Ph.D
19	AERPA9903M	Reema Ajmera	17-06-1975	Assoc. Professor	IT	Ph.D
20	BCEPM3790G	REKHA MITHAL	11-08-1981	Assoc. Professor	Chemistry	Ph.D
21	AYAPP6684K	RISHI PAREEK	25-09-1987	Assoc. Professor	ME	Ph.D
22	BKUPS6033A	RITU SINGH	05-07-1979	Assoc. Professor	E&H	Ph.D
23	AIEPG6683M	Ruchi Goyal	16-06-1978	Assoc. Professor	E&H	Ph.D
24	AOPPM9479L	RUCHI MATHUR	21-07-1981	Assoc. Professor	Math	Ph.D
25	AGXPD1228N	RUCHIDA BARMAN	11-11-1969	Assoc. Professor	E&H	Ph.D
26	AFXPV5199R	SANDEEP VYAS	22-09-1980	Assoc. Professor	ECE	Ph.D
27	BFEP2131M	SARITA POONIA	14-02-1986	Assoc. Professor	Math	Ph.D
28	EGMPS9823R	SAVITA SANGWAN	03-09-1983	Assoc. Professor	Chemistry	Ph.D
29	AWQPK5876J	Shiv Ranjan Kumar	02-05-1980	Assoc. Professor	ME	Ph.D
30	ANFPJ6835N	SMITA JAIN	19981-08-07	Assoc. Professor	Math	Ph.D
31	AKRPB2017M	SUMAN BHATNAGAR	05-03-1973	Assoc. Professor	CSE	Ph.D
32	BPSPS0006J	SUNIL KUMAR SRIVASTAVA	01-05-1985	Assoc. Professor	Math	Ph.D
33	AHPPG4947A	Tripati Gupta	06-10-1978	Assoc. Professor	Math	Ph.D
34	AGMPG4775E	Varsha Gupta	02-09-1974	Assoc. Professor	CE	Ph.D
35	ARPPK9267P	Vijeta kumawat	30-08-1980	Assoc. Professor	CSE	Ph.D
36	AKHPM3052H	VINITA MATHUR	12-01-1982	Assoc. Professor	ECE	Ph.D
37	BJQPS6740B	VISHAL SAXENA	13-05-1981	Assoc. Professor	Math	Ph.D

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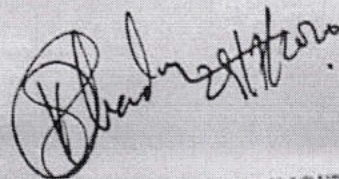
Student Enrolled

Student Enrolled : $50 * \left(\frac{3467}{3480}\right)$
: 49.81

Points 50

QIV

Session 2020-21 (RTU)



PRINCIPAL
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Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

Number of Computers

Required Computer : 580

Available Computer : 868

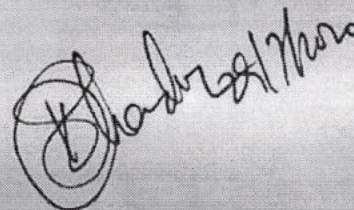
Calculation : $25 * \left(\frac{868}{580}\right)$

Points 25

List Attached:

QIV

Session 2020-21 (RTU)



PRINCIPAL
Jaipur Engineering College &
Research Centre

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

Number of Computers

Required Computer : 580

Available Computer : 868

Calculation : $25 * \left(\frac{868}{580}\right)$

Points 25

List Attached:

QIV

Session 2020-21 (RTU)

S.No.	Name of Lab	No. of PC's	Configuration	Software	Licensed Yes/No
1	CP-1	32	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Ubuntu, Windows XP, Java, Turbo C++, , Acrobat reader, Winrar	Yes
2	CP-2	28	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Ubuntu, Windo, , Acrobat reader, Winrarws XP, Java, Turbo C++	Yes
3	CP-3	28	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW	Ubuntu, Windows XP, Java, gcc, Model Sim, Acrobat reader, Winrar	Yes
4	CP-4	28	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW	Windows XP, Oracle 10g, My Sql , Acrobat reader, Winrar	Yes
5	CP-5	10	Intel(R) Core(TM) i5-2400 CPU @ 3.10GHz (4 CPUs), 3.1GHz, DH61WW MB, NVIDIA GeForce 210 Graphics Card, 8 GB DDR3 RAM, Segate HDD 500 GB SATA, Logitech USB MM KB, Logitech USB Mouse, LG DVD RW, Samsung SA-300 19.5" LED	Windows 8, MS office Professonla, Acrobat reader, Winrar	Yes
6	CP-6	28	HCL PIV 3.0 HT, 512 DDRII, HDD80, 17" TFT, HCL USB Keyboard, HCL USB Mouse, Asus 865/915 MB	Ubuntu, Windows XP, Java, Turbo C++, , Acrobat reader, Winrar	Yes
7	CP-7	28	HCL PIV 3.0 HT, 512 DDRII, HDD80, 17" TFT, HCL USB Keyboard, HCL USB Mouse, Asus 865/915 MB	Ubuntu, Windows XP, Java, gcc, Model Sim, Xiline, , Acrobat reader, Winrar	Yes
8	CP-8	28	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Windows XP, Oracle 10g, My Sql , Acrobat reader, Winrar	Yes
9	IBM Lab	64	HCL Dual-core E-5500@2.80Ghz, G-41 Intel Chipset MB, 2GB DDR3 RAM, SATA 160 GB HDD, DVD RW, HCL MM PS 2 KB, HCL USB OPTICAL Mouse, HCL 18.5" wide LCD with speaker	Windows XP, Java, Acrobat reader, Winrar	Yes
10	Robotics Lab	9	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Windows XP, Java, Acrobat reader, Winrar	Yes

S.No.	Name of Lab	No. of PC's	Configuration	Software	Licensed Yes/No
1	CP-1	32	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Ubuntu, Windows XP, Java, Turbo C++, , Acrobat reader, Winrar	Yes
2	CP-2	28	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Ubuntu, Windo, , Acrobat reader, Winrarws XP, Java, Turbo C++	Yes
3	CP-3	28	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW	Ubuntu, Windows XP, Java, gcc, Model Sim, Acrobat reader, Winrar	Yes
4	CP-4	28	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW	Windows XP, Oracle 10g, My Sql , Acrobat reader, Winrar	Yes
5	CP-5	10	Intel(R) Core(TM) i5-2400 CPU @ 3.10GHz (4 CPUs), 3.1GHz, DH61WW MB, NVIDIA GeForce 210 Graphics Card, 8 GB DDR3 RAM, Segate HDD 500 GB SATA, Logitech USB MM KB, Logitech USB Mouse, LG DVD RW, Samsung SA-300 19.5" LED	Windows 8, MS office Professonla, Acrobat reader, Winrar	Yes
6	CP-6	28	HCL PIV 3.0 HT, 512 DDRII, HDD80, 17" TFT, HCL USB Keyboard, HCL USB Mouse, Asus 865/915 MB	Ubuntu, Windows XP, Java, Turbo C++, , Acrobat reader, Winrar	Yes
7	CP-7	28	HCL PIV 3.0 HT, 512 DDRII, HDD80, 17" TFT, HCL USB Keyboard, HCL USB Mouse, Asus 865/915 MB	Ubuntu, Windows XP, Java, gcc, Model Sim, Xiline, , Acrobat reader, Winrar	Yes
8	CP-8	28	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Windows XP, Oracle 10g, My Sql , Acrobat reader, Winrar	Yes
9	IBM Lab	64	HCL Dual-core E-5500@2.80Ghz, G-41 Intel Chipset MB, 2GB DDR3 RAM, SATA 160 GB HDD, DVD RW, HCL MM PS 2 KB, HCL USB OPTICAL Mouse, HCL 18.5" wide LCD with speaker	Windows XP, Java, Acrobat reader, Winrar	Yes
10	Robotics Lab	9	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Windows XP, Java, Acrobat reader, Winrar	Yes

11	Innovation Academy	9	Compaq Dual- Core E5200@2.50GHz, Intel® Chipset G31 MB, 2 GB DDR2 RAM, 320 GB SATAN HDD, COMPAQ USB KB, COMPAQ USB Optical Mouse, LIGHTSCRIBE DVDRW, BENQ TFT-LCD 17"	Windows XP, Java, Acrobat reader, Winrar	Yes
12	CP-11	28	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
13	CP-12	28	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
14	CP-13	32	Intel 865 Chipset, Intel P-IV 2.8 Ghz, 1x2 MB DDR2 Ram, 80 GB SATA, CD R, HCL PS2 Keyboard, HCL USB 2 button Optical Mouse, HCL TFT-LCD Monitor 17", uATX (Dasher)	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
15	CP-14	28	Compaq Dual- Core E5200@2.50GHz, Intel® Chipset G31 MB, 2 GB DDR2 RAM, 320 GB SATAN HDD, COMPAQ USB KB, COMPAQ USB Optical Mouse, LIGHTSCRIBE DVDRW, BENQ TFT-LCD 17"	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
16	CP-15	28	Compaq Dual- Core E5200@2.50GHz, Intel® Chipset G31 MB, 2 GB DDR2 RAM, 320 GB SATAN HDD, COMPAQ USB KB, COMPAQ USB Optical Mouse, LIGHTSCRIBE DVDRW, BENQ TFT-LCD 17"	Windows XP, Java, gcc, FreeMat, Acrobat reader, Winrar	Yes
17	CP-18	28	Compaq Dual- Core E5200@2.50GHz, Intel® Chipset G31 MB, 2 GB DDR2 RAM, 320 GB SATAN HDD, COMPAQ USB KB, COMPAQ USB Optical Mouse, LIGHTSCRIBE DVDRW, BENQ TFT-LCD 17"	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
18	CP-19	28	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
19	CP-20	28	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW - (24) HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW - (4)	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
20	CP-21	28	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
21	CP-22	28	Compaq TFT-LED 18.5", Intel Core i3-3240 3.40 Ghz, Intel H61 Chipset, 4GB DDR3, 500 GB SATA HDD, USB Keyboard & Mouse, DVD RW	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
22	CP-23	28	HCL 18.5" LED, Intel Core i3-2100 3.10 Ghz, Intel H61 Chipset, 320 GB SATA, 2X2 DDR3 RAM, 10/100/1000 Lan, DVD RW-28 PC, HCL 18.5" LCD, Dual-core 2.80 Ghz, G-41 Intel Chipset, 160 GB SATA, 2 GB DDR3 RAM, 10/100/1000 Lan, DVD RW-4 PC	RedHat, Windows XP, Java, gcc, FreeMat, Acrobat reader, Winrar	Yes

23	CP-26	28	Lenovo 17" TFT, Lenovo Dual Core 1.60 Ghz=28, 80GB HDD, 1GB RAM DDR-2, DVD Combo - 28 pc, HCL 18.5" LCD, HCL Dual Core 2.8 Ghz, 160 GB HDD, 2GB RAM DDR-3, 10/100/1000 Lan, DVD RW - 2 PC	Windows XP, Java, gcc, Acrobat reader, Winrar	Yes
24	CP-27	30	HCL 18.5" LED, Intel Core i3-3220 3.30 Ghz, Intel H61 Chipset, 320 GB SATA, 4 GB DDR3 RAM, DVD RW	Windows XP, Java, gcc, Acrobat reader, Winrar, Oracle 10g	Yes
25	DF-5	30	HCL Dual-core E-5500@2.80Ghz, G-41 Intel Chipset MB, 2GB DDR3 RAM, SATA 160 GB HDD, DVD RW, HCL MM PS 2 KB, HCL USB OPTICAL Mouse, HCL 18.5" wide LCD with speaker		
26	DF-8	32	Intel H61 Chipset, Intel Corei-3, 2100, 3.1Ghz, 3M Cache, 2x2 GB DDR3 Ram, 1333 Mhz, 320 GB SATA 3.0 Gbps, 7200, DVD RW, HCL USB Heavy duty Keyboard, HCL USB 2 button Optical Mouse, HCL Digital Colour TFT-LED Monitor 18.5", uATX (Dasher)		
27	DS-8	32	Compaq Dual- Core E5200@2.50GHz, Intel® Chipset G31 MB, 2 GB DDR2 RAM, 320 GB SATAN HDD, COMPAQ USB KB, COMPAQ USB Optical Mouse, LIGHTSCRIBE DVDRW, BENQ TFT-LCD 17"		
28	Staff PC	106			
29	Server	6	IBM Xeon (5) AIX (1)		
	Total	868			

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

Internet Facility

Required Internet Facility : . 100 Mbps

Available Internet Facility : 250 Mbps

Calculation : $25 * \left(\frac{250}{100}\right)$

Points 25

QIV

Session 2020-21 (RTU)



PRINCIPAL
Jaipur Engineering College &

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

Other Facility

Available Other Facility : 29

Calculation : 3 X Number of Facility

Points 30

List Attached :

QIV

Session 2020-21 (RTU)

S.No	Other Facility	Available Facility (Yes/No)
1	Drinking water facility	Yes
2	Electric supply	Yes
3	Generator (min. 25kva)	Yes
4	Sewage disposal	Yes
5	Telephone facility	Yes
6	Vehicle parking stand	Yes
7	Institute website with mandatory disclosure	Yes
8	Barrier free built environment for disable	Yes
9	Safety provisions(Fire and others)	Yes
10	General insurance for assets	Yes
11	All weather approach road	Yes
12	Notice Boards(General notice boards & Departmental notice board)	Yes
13	ERP for student-institution,parent interaction	Yes
14	Transport facilities for staff and students	Yes
15	Bank/Extension counter facility / Post	Yes
16	CCTV Security	Yes
17	LCD Facility	Yes
18	Group Insurance for employee	Yes
19	Group Insurance for students	Yes
20	Staff quarters/Warden quarters	Yes
21	Availability for specially designed toilets for ladies and gents	Yes
22	Medical and Counselling Facilities	Yes
23	First Aid Facility	Yes
24	Establishment of Grievance Redressal Committee in the Institute and Appointment of OMBUDSMAN by the University (Regulations,2012 F.No.37-3/Legal2012, dated 25.05.2012)	Yes
25	Establishment of Internal Complaint Committee(ICC) (As Per section 4 of Sexual Harassment of Women at Workplace(Prevention, Prohibition and Redressal) Act, 2013)	Yes
26	Establishment of Committee for SC/ST (As Per the Scheduled Castes and the Scheduled Tribes(Prevention of Atrocities)act, 1989, No. 33 of 1989,dated 11.09.1989)	Yes
27	Biometric attendance facility for Faculty and Staff	Yes
28	Adoptation of any surrounding village to convert into smart village	Yes
29	Fire Safety System	Yes
30	MOU	Yes

ADVITIYA LEARNING SOLUTIONS

(A Unit of KDK Enterprises Pvt. Ltd.)

MEMORANDUM OF UNDERSTANDING

Between

ADVITIYA LEARNING SOLUTIONS

(A Unit of KDK Enterprises Pvt. Ltd.)

And

Jaipur Engineering College & Research Centre, Jaipur

Dr. 
Jaipur Engineering College &
Research Centre

Trunk Road, Jaipur - 303 905

Corporate Office: Unit-4, LGF, Gallon Plaza, 3/31-34, Shivaji Road, Malviya Nagar, New Delhi 110 017
Telephone: 91-11-32456644, 41830652 Web: advitiyalearningsolutions.com

Director

ADVITIYA LEARNING SOLUTIONS

(A Unit of KDK Enterprises Pvt. Ltd.)

Memorandum of Understanding

This Memorandum of Understanding (MOU) entered on 16/07/18

By and Between

M/S Advitiya Learning Solutions (A Unit of KDK Enterprises Pvt.Ltd.), having its head office at Unit-4, LGF, Gallon Plaza, 3/31-34, Shivalik Road, Malviya Nagar, New Delhi 110017 and represented by its Managing Director Mr.Vikas Kumar Khairari which expression shall mean and include its successors in office and assigns.

And

The Principal, Jaipur Engineering College & Research Centre, Tonk Road, Jaipur, Rajasthan (herein after referred as "JECRC" represented by its Dr. Vinay Kumar Chandra (Principal), which expression shall mean and include its successors in office and assigns.

Terms of Memorandum of Understanding

Objective of the program:

The objective of program ensures employability and productivity of student's right from the day one. Advitiya Learning Solutions is now beginning the mission to bridge the skill gap between academy and industry with the most demanding and trending technologies, which is expected to acquire a huge market in future.

Corporate Office: Unit-4, LGF, Gallon Plaza, 3/31-34, Shivalik Road, Malviya Nagar, New Delhi 110017
Telephone: 91-11-32456544, 41830552 Web: advityalearningsolutions.com

Director

Dr. Vinay Kumar Chandra

Principal
JECRC
Tonk Road, Jaipur - 302 008

ADVITIYA LEARNING SOLUTIONS

A Unit of AOK Enterprises Pvt. Ltd.

Education methodology, curricula and content:

AWS Architect Associate program developed by an expert team of Advitiya Learning Solutions which is resembles with AWS Certified Solution Architect Associate program of Amazon Web Services. After successful completion of program candidates can appear in AWS Solution Architect Certification by AWS.

In addition, real time practices and projects are also included to provide hands on experience to students.

eContent for blended classroom learning for students that are facilitated by instructor.

Guideline to be provided by instructor to students to setup online AWS Free Tier account to attend LABs.

Training by industry experienced and AWS Certified instructor for the program.

Periodical assessments of students for their further improvement.

Certificate of Completion will be provided to every student who will successfully complete the training.

Enrollment Criteria of students to register into the program:

A screening test will be conducted to select students for the training by Advitiya Learning Solutions.

JECRC Jaipur shall provide the following:

The required number of computer systems/Laptops in LAB 1:1 ratio with at least 1 MBps internet connectivity individually on each system to run online LABs.

The class room will be equipped with high resolution LCD projector.

The class room will be equipped with whiteboard and markers.

Schedule the classes for the training

Corporate Office: Unit-4, LGF, Gallon Plaza, 5/51-34, Shwaik Road, Malviya Nagar, New Delhi-110017
Telephone: 91-11-32456644, 41830652 | Web: advityalearningsolutions.com

Partners: EDUCAPTECH PRIVATE LTD.


Director


PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-302005

ADVITIYA LEARNING SOLUTIONS

(A Unit of KDK Enterprises Pvt. Ltd.)

Disciplinary support for the smooth and timely completion of the program.

IT support will be arranged for computers.

Training Fees:

The training fee for the strength of 30/40 students for AWS Cloud Computing Architect Associate program will be INR 8,000 per student all inclusive.

Payment Term:

- 33% after successful completion of one week training
- 33% after successful completion of middle of the training
- Remaining after successful completion of the training
- All payments will be paid on the name of M/S KDK Enterprises Pvt. Ltd., New Delhi

Common points of consideration:

1. The MOU does not imply any kind of financial obligation, unless agreed upon in writing, on either side and neither party can claim for any financial charges. The charges of the training would be discussed from time to time for each batch.
2. The association and activities carried out through the MOU should never be considered as an employment opportunity in any course of time by any individual concerned.
3. The MOU shall be effective from the date of signing/ approval through official mail and either party may terminate or extend this MOU by providing 60 days' notice in written to the other party.
4. Neither party shall be liable for any indirect, punitive, special, incidental or consequential damages arising out of or in connection with this understanding, whether for breach of this MOU or in torts, including loss of business, data, revenue and profits or for any third party claims against the other whatsoever.

Corporate Office: Unit-4, LGF, Gallon Plaza, 3/31-34, Shivalik Road, Malviya Nagar, New Delhi 110 017
Telephone: 91-11-32456644, 41830652 Web: advitiyalearningsolutions.com

[Handwritten signature]
Date: _____
Page 2 of 2

ADVITIYA LEARNING SOLUTIONS

(A Unit of KDK Enterprises Pvt. Ltd.)

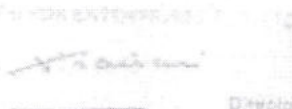
5. Any and all the disputed, controversy or claims related to or arising in connection with this MOU shall be referred to the Chief Executive Officers of each of the parties for an informal solution.
6. Any interaction of any kind will have to be carried out by keeping the Point Of Contact of both the parties through mails/ letters/ invites etc.

IN WITNESS WHEREOF the parties hereto have executed this understanding on the day and date as below

For JECRC, Jaipur

For Advitiya Learning Solutions

(A Unit of KDK Enterprises Pvt.Ltd.)



Name: Dr. Vinay Kumar Chandna

Vikas Kumar Khairani

Designation: Principal, JECRC Jaipur

Managing Director

Date:

18/07/2015
Jaipur
JECRC Jaipur
18/07/2015



Automation Anywhere Academic Alliance Agreement (Non-US)

This Academic Alliance Agreement ("Agreement"), dated as of 20th December 2019 (the "Effective Date"), is entered into by and between Automation Anywhere, Inc., a California corporation with offices at 633 River Oaks Parkway, San Jose, CA 95134 U.S.A. (hereafter referred to as "AAI"), and Jaipur Engineering College & Research Centre a Rajasthan / India affiliated to Rajasthan Technical University located at Shri Ram Ki Nagal, via Sitapura RIICO Tonk Road, Jaipur – 302 022 (hereafter referred to as "University"). University and AAI are hereafter collectively referred to as the "parties".

WHEREAS, AAI is offering the "Automation Anywhere University Talent Development Program", in which enrolled students of certain universities ("Students") may attend a non-unit lab practicum course (the "Course"), taught by a faculty member directly trained and certified by AAI as an AAI trainer ("Faculty Trainer") in a classroom enabled with AAI software as an AAI Center of Excellence, after which those trained students may themselves seek accreditation as AAI trainers through testing with AAI (the "Program");

WHEREAS, University desires to participate in the Program.

THEREFORE, for good and valuable consideration as set forth below, the parties agree as follows:

1. Definitions.

"Center of Excellence" or "CoE" means the setup of the Software on University equipment by AAI and provision of Documentation to enable the Faculty Trainer to instruct the Students in the Course.

"Certification" means accreditation by AAI of any Student or Faculty Trainer in the Software as a result of passing an examination provided by AAI for this purpose.

"Documentation" means (a) the manuals, handbooks, and other written materials related to the Use of the Software, whether in hard copy or soft copy form, that are provided by AAI along with the Software, and (b) the training materials that the Faculty Trainer will use in instructing Students as part of the Course, as such Documentation may be updated by AAI from time to time.

"Software" means AAI's proprietary software in machine-readable, object code form only, related Documentation, and all modifications made thereto by AAI, and any updates or upgrades that AAI provides to University, in order for University to provide the Course under this Agreement.

"Use" means the installation, accessing, displaying, and operation of the AAI Software to automate business processes and tasks.

2. **Obligations.** The parties agree to each undertake and fully perform during the Term the following obligations for the success of the Program, and, except as explicitly stated in Section 2.2, such obligations will be undertaken at the respective party's sole cost and expense:

2.1 AAI Obligations.

AAI Responsibilities:
-Provide AAI train-the-trainer courses for University's faculty (at either University's premises or remotely); and thereafter test such faculty and issue AAI trainer certification to those faculty who have successfully completed such training;
-Provide e-learning access to those Students enrolled in the Course;



-Provide the Software under the license terms in Section 3 of this Agreement;
-Work with the University to set up the CoE, including installing the Software and providing Documentation;
-Provide the University with the certification test materials needed to test Students on for Student's AAI certification;
-Issue the AAI certification to those students who have successfully completed the certification course.

2.2 University Obligations.

University's Responsibilities
-Have faculty members attend AAI train-the-trainer courses, and have those who have successfully completed such course be tested for AAI train-the-trainer certification;
-Train Students using only Faculty Trainers who at the time of the Student training are already AAI certified trainers;
-Provide Students with the opportunity to enrol in the Course, enrol Students in the Course, and conduct and oversee Student's participation in the Course;
-Advise in writing to all enrolled and prospective Students that neither the Student's completion of the Course nor the Student's Certification provides any assurance of any employment by any of the parties to this Agreement;
-Provide the physical space(s) needed for Students to take the Course and to engage in learning and training certification activities;
-As part of providing the physical space(s), obtain and maintain appropriate insurance coverages as mandated by applicable law;
-Provide and maintain the computers and all related equipment necessary for the successful implementation and running of the CoE;
-make the CoE available for Students to use for their Course-related learning activities, and have the use of the CoE be supervised by the Faculty Trainer;
-Support, encourage and drive Students to progress through the Course;
-Provide AAI with written feedback on Student progress, including any impediments to progress, and feedback on the Course itself ("Feedback");
-Take measures to ensure that neither the University, its personnel, its faculty, or other agents charge Students any fees to enrol in and complete the Course;
-For those Students who have completed the Course, offer and proctor a Certification test using AAI-provided Certification testing materials;
-Take measures to ensure that the results of each Student's Certification test are true and accurate, including but not limited to closely proctoring and monitoring student Certification testing so that cheating or other conditions affecting testing accuracy do not occur;
-Reimburse AAI for reasonable costs of travel, accommodations, and incidental expenses, as incurred by AAI representatives while setting up the CoE.

3. Intellectual Property.

3.1 *Limited University License.* Subject to the terms and conditions of this Agreement, AAI grants University a limited, non-exclusive, non-transferable, non-production license to Use the Software during the Term only for University's Use for the express purpose of providing the Course to Students in connection with Program. For clarity, University may not Use the Software for its own internal use.



3.2 Restrictions. The Software is licensed, not sold. Title to the Software and all associated intellectual property rights are retained by AAI and/or its suppliers. All rights in the Software not expressly granted hereunder are reserved. University shall not modify, enhance, translate, supplement, create derivative works from, reverse engineer, reverse compile or otherwise reduce the Software to human readable form. University shall not remove any copyright or other proprietary notices contained in the Software. University shall not cause or permit: (a) competitive analysis, benchmarking, or the Use, evaluation or viewing of the Software or Documentation for the purpose of designing, modifying, or otherwise creating any software program, or any portion thereof, that performs functions similar to the functions performed by the Software; or (b) any of the following: (i) copying (except as set forth herein), (ii) sublicensing, or (iii) providing access or other dissemination of the Software, in whole or in part, to any third party. No right, title or interest in or to any AAI trademark, service mark, trade name, or logo of AAI or its licensors is granted under this Agreement.

3.3 Warranty Disclaimer. AAI DISCLAIMS ALL WARRANTIES AS TO ANY MATTER WHATSOEVER, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT, AND THE SOFTWARE IS PROVIDED "AS IS". TO THE EXTENT THE LAWS OF UNIVERSITY'S JURISDICTION DO NOT PERMIT SUCH DISCLAIMER WITH RESPECT TO THE SOFTWARE AS LICENSED HEREUNDER, AAI PROVIDES ONLY THE MINIMUM LAWFUL WARRANTY BEYOND THAT WARRANTY EXPRESSLY MADE ABOVE AND DISCLAIMS ALL WARRANTIES TO THE EXTENT PERMITTED BY APPLICABLE LAW.

3.4 Publicity; Use of Trademarks.

a. At AAI's discretion, the parties may issue a joint press release in form and substance reasonably acceptable to each party as promptly as practicable following the Effective Date. Further, AAI may include University's name on list of schools participating in the Program in AAI promotional materials including but not limited to AAI's website.

b. This Agreement does not grant either party the right to use the other party's trademarks except as set out under this Section 3.4(b). Subject to the parties' respective trademark policies as either posted on the parties' respective websites or available upon the other party's request (which policies may be amended from time to time in each respective trademark owner's sole discretion), and the terms and conditions of this Agreement, each party hereby grants to the other a non-exclusive, non-transferable, and non-sublicensable license to use its respective trademarks during the Term solely in connection with (a) the joint press release described in Section 8(a) above and (b) the promotion and advertising of the Courses and Program as more fully set forth in Sections 2.1 and 2.2 under this Agreement.

4. Confidentiality

4.1 Confidential Information. "Confidential Information" means with respect to AAI information, the Documentation, Software, any results of any testing or analysis of the Software or Documentation by any party and any Feedback regarding the Course, and with respect to any party's information, all information that: (a) is marked as confidential or proprietary; (b) is disclosed verbally and identified as confidential or proprietary at the time of disclosure; or (c) by its nature is normally and reasonably considered confidential.



4.2 *Non-Disclosure and Restrictions on Use.* As a result of the relationship entered into by the parties under this Agreement, the parties acknowledge that they may from time to time require or gain access to Confidential Information of the other party. The receiving party: (a) shall hold all Confidential Information in confidence; (b) shall use the Confidential Information only for the purposes expressly permitted herein; (c) shall reproduce the Confidential Information only to the extent necessary for such purpose; (d) shall restrict disclosure of the Confidential Information to its employees, consultants, agents and representatives with a valid need to know in connection with this Agreement and who are bound to protect the confidentiality of such Confidential Information (and shall advise such employees, agents and representatives of the obligations assumed herein); and (e) shall not disclose or cause to be disclosed the Confidential Information to any third party without prior written approval of the disclosing party, except as allowed under (d) above.

4.3 *Confidentiality Exceptions.* The foregoing confidentiality restrictions shall not apply to Confidential Information that: (a) is or becomes a part of the public domain through no wrongful act or omission of the receiving party; (b) was in the receiving party's lawful possession prior to the disclosure and had not been obtained by the receiving party either directly or indirectly from the disclosing party; (c) is lawfully disclosed to the receiving party by a third party without restriction on disclosure; (d) is independently developed by the receiving party without reference to or reliance on the Confidential Information; or (e) that the disclosing party agrees in writing is free of such restrictions.

5. Indemnity.

5.1 *Indemnification Obligation.* Each party (the "Indemnifying Party") will defend the other party, and its employees, directors, agents, and representatives (collectively, the "Indemnified Party"), from any actual or threatened third party claim to the extent that it arises from: (a) the Indemnifying Party's breach of its confidentiality obligations in Section 4; (b) any alleged infringement by the Indemnifying Party of any third party intellectual property rights; (c) the negligent acts, omissions, negligence or willful misconduct of the Indemnifying Party in the performance of its obligations pursuant to this Agreement; (d) the failure of the Indemnifying Party to comply with, and any liabilities arising under, any applicable law (each, a "Claim").

5.2 *Indemnification Procedures.* The parties' respective indemnification obligations above are conditioned on: (a) the Indemnified Party giving the Indemnifying Party prompt written notice of any Claim; (b) the Indemnifying Party having full and complete control over the defense and settlement of the Claim; (c) the Indemnified Party providing assistance in connection with the defense and settlement of the Claim as the Indemnifying Party may reasonably request; and (d) the Indemnified Party complying with any settlement or court order made in connection with the Claim. The Indemnifying Party will indemnify the Indemnified Party against: (i) all damages, costs, and attorneys' fees finally awarded against any of them by a court of competent jurisdiction in any Claim under this Section 5; (ii) all out-of-pocket costs (including reasonable attorneys' fees) reasonably incurred by any of them in connection with the defense of the Claim (other than attorneys' fees and costs incurred without the Indemnifying Party's consent after it has accepted defense of such Claim); and (iii) if any Claim arising under this Section is settled by the Indemnifying Party or with its approval, then the Indemnifying Party will pay any amounts to any third party agreed to by the Indemnifying Party in settlement of any such Claims.

5.3 *Indemnification Limitations for Third Party Infringement Claims.* An Indemnifying Party will have no obligation under this Section 5 or otherwise solely to the extent the claim is based on: (i) any combination of the Indemnifying Party's technology, products, or services with technology,



capabilities of any AAI courses or training certifications, AAI products or services, that are inconsistent with the literature and documentation distributed by AAI.

8.3 *Anti-Corruption.* The parties each represent and warrant that neither it, nor any of its subsidiaries, nor any of their respective directors, officers, employees or agents have taken any action, directly or indirectly, that would constitute a violation, or implicate AAI in a violation, of any law of any jurisdiction in which it performs business, or of the United States of America, including without limitation, the Foreign Corrupt Practices Act of 1977, as amended ("FCPA"), and where applicable, any anti-bribery/corruption legislation ("Anti-Bribery Act") enacted by countries in which it is incorporated as an entity, including, but not limited to, the country or countries in which it is to perform under this Agreement (collectively, "Anti-corruption Laws"). University, and, to its knowledge, its affiliates have conducted their businesses in compliance with such Anti-corruption Laws and have instituted and maintain policies and procedures designed to ensure, and which are reasonably expected to continue to ensure, continued compliance therewith.

8.4 *Third-Party Software.* The Software contains and is distributed with open source software that is covered by a different license, and AAI's obligations set forth in this Agreement do not extend to any such open source software. University agrees that all such open source software shall be and shall remain subject to the terms and conditions under which it is provided.

8.5 *Governing Law and Jurisdiction.* This Agreement and all matters relating to this Agreement shall be governed by, and construed in accordance with the following laws:

1. If University is located outside of the United States, then any dispute arising out or in connection with this Agreement, including any question regarding its existence, validity or termination, shall be referred to and finally resolved by arbitration under the LCIA Rules (the "Rules"), which Rules are deemed to be incorporated by reference into this clause. The number of arbitrators shall be three. The seat, or legal place, of arbitration shall be London. The language to be used in the arbitral proceedings shall be English.
2. If University is located within the United States, then the governing law of this Agreement shall be the substantive law of California. Jurisdiction shall be of the State of California (without giving effect to the choice of law principles thereof). Any action based on or arising out of this Agreement or the Services shall be brought and maintained exclusively in any state or federal court, in each case located in Santa Clara County.

The parties hereby expressly and irrevocably submits to the jurisdiction of the above-referenced courts for the purposes of any such action and expressly and irrevocably waives, to the fullest extent permitted by law, any objection which it may have or hereafter may have to the laying of venue of any such action brought in any such court and any claim that any such action has been brought in an inconvenient forum.

8.6 *Injunctive Relief.* The parties acknowledge that any breach of the confidentiality provisions or the unauthorized use of a party's intellectual property may result in serious and irreparable injury to the aggrieved party for which damages may not adequately compensate the aggrieved party. The parties agree, therefore, that, in addition to any other remedy that the aggrieved party may have, it shall be entitled to seek equitable injunctive relief without being required to post a bond or other surety or to prove either actual damages or that damages would be an inadequate remedy.



8.7 *Force Majeure.* A party is not liable under any Agreement for non-performance (other than failure to pay) caused by events or conditions beyond that party's reasonable control, if the party makes reasonable efforts to perform.

8.8 *Parties' Relationship.* The parties agree that this Agreement is non-exclusive, and no party will be prevented from entering into similar arrangements with other third parties. The parties are independent contractors of each other in the performance of the obligations of this Agreement. Notwithstanding the identification of "Partner" in this Agreement, neither party will be considered the legal partner of the other party in any respect, and nothing in this Agreement or in the performance hereof will create or imply any joint venture, franchisee-franchisor relationship, or principal-agent relationship between the parties. No party will have any right, power or authority to create any obligation, express or implied, on behalf of the other party.

8.9 *Binding Nature; Assignment.* This Agreement shall be binding on the respective parties thereto and their respective permitted successors and assigns; provided, however, that University shall not assign, delegate, or otherwise transfer this Agreement or any of its rights or obligations to a third party without the prior written consent of AAI; any other attempted assignment shall be void.

8.10 *Notices.* Ordinary day-to-day operational communications may be conducted by email or telephone communications. Any other notice required by this Agreement shall be made in writing and given by (a) personal delivery, (b) prepaid, first class, certified mail, return receipt requested, (c) email (with a duplicate notice sent promptly by one of the other methods in this Section), or (d) courier service of recognized standing (with confirmation of receipt); in any case to the receiving party, "Attention: Legal" at its address set forth in the heading to this Agreement, or to a different address of which the addressee party has notified the other in accordance with this Section. Any notice given in conformance with this Section shall be effective upon actual delivery or refusal of delivery.

8.11 *Headings.* Section headings are included for convenience or reference only and are not intended to define or limit the scope of any provision of this Agreement and should not be used to construe or interpret this Agreement.

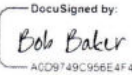
8.12 *Survival; Interpretation; Severability.* All provisions which are intended by their nature to survive, shall survive such performance, or the expiration or termination of this Agreement, including without limitation those relating to limitation of liability, and infringement indemnity. Each provision of this Agreement shall apply to the fullest extent of the law, whether in contract, statute, tort (such as *negligence*) or otherwise, notwithstanding the failure of the essential purpose of any remedy. If any provision of this Agreement shall for any reason be held illegal or unenforceable, such provision shall be deemed severable from the remaining provisions of this Agreement and shall in no way affect or impair the validity or enforceability of the remaining provisions of this Agreement, unless such omission would frustrate the intent of the parties, in which case this Agreement may be reformed to give effect to the other provisions hereof.

8.13 *Entire Agreement; Modification and Waiver.* This Agreement constitutes the entire understanding between the parties with respect to the subject matter hereof, and no other terms or conditions set forth in any other document provided by University shall be part of any this Agreement unless specifically accepted by AAI in writing. No modification of this Agreement will be binding unless in writing and signed by an authorized representative of each party. Any express waiver or failure to exercise promptly any right under this Agreement will not create a continuing waiver or any expectation of non-enforcement. There are no third-party beneficiaries to this Agreement.




IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be signed by duly authorized officers or representatives as of the Effective Date.

AUTOMATION ANYWHERE, INC.

By: 
Name: Bob Baker
Title: VP, Corporate Operations
Date: 1/10/2020

UNIVERSITY: Jaipur Engineering College & Research Centre

By: 
Name: Prof. (Dr.) Vinay Kumar Chandna
Title: Principal
Date: 20th December 2019
Email: principal@jecrcmail.com

END OF DOCUMENT

Memorandum of Understanding

THIS MEMORANDUM OF UNDERSTANDING made on the 22nd MARCH, 2017

Between

"Indovision Services Private Limited" Authorized Huawei Network Academy Partner, registered under the Companies Act, 1956 and having its corp. office at 3rd floor, 1st part of M.D. Khosla number 369, MG Road, Saltapur, New Delhi 110019, hereafter called **"INDOVISION"** ("The First Party")

And

JECRC ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR (RAJASTHAN), there in after called **"JECRC"** the **"Second Party"**

WHEREAS the First party has agreed to arrange Huawei Industrial Training (HIT) of Huawei at JECRC campus of Second Party which will be conducted by First party on the terms and conditions as agreed between the parties and set out hereunder

"HIT"

Huawei Industrial Training, popularly known as HIT is a premier course which provides the cutting edge ICT training to college students to bridge the college-Industry gap and help to make students employable

HIT comprises of a standard program which includes theory class & lab training. However, this program will be adjusted as per the local needs such that the theory and lab training is not less than **40 hrs.** and students will also get **Industry Experience of minimum 20 hrs. off campus** at their own fooding, lodging & travelling expenses.

Now it is hereby **agreed upon and accepted** between the parties as follows: -

"INDOVISION Responsibilities"

1. That Indovision is an authorized delivery partner of Huawei.

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V. [Signature]
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur - 303 005

1. Indovision will arrange Huawei Industrial Training (HIT) for the students of course-B.Tech at College campus or in Huawei campus Gurgaon. This course will be conducted by Huawei.
2. Huawei will approve to JECRC, Jaipur as Huawei Authorized Network Academy (HANNA). To start with the relevant software, remote access to software and access to hardware will be installed in the lab.
3. Huawei will evaluate and give inputs to students through weekly tests and final evaluation as part of their standard process.
4. Huawei will provide training certificate to all the students.
5. Huawei will provide Huawei printed study material to all the students.
6. All the classes will be conducted in college campus or Indovision/Huawei campus.
7. Indovision will provide free of charge training for 2 faculty members in this training program if training will execute in college campus.
8. Indovision will provide ID and password to excess Huawei training labs.

"JECRC" Responsibilities:

1. The boarding and lodging expenses of visiting Indovision training staff like Accommodation, fooding, local travel would be borne by JECRC, Jaipur.
2. Class room, projector, internet, marker, board, mike etc. would be provided by JECRC, Jaipur.

"Placement Assistance"

1. All students will get a chance to appear in the placement of Huawei, its subjective to Huawei requirements.
2. In addition to that, Indovision will bring at least two partners of Huawei for selection of the students, after completing training and students should be in final year at placement time because company wants on the spot joining.

"Fee"

The fee for the proposed module will be as below

Course	Fee at Indovision Huawei campus	Fee at College campus	Duration	Note
HIT	10,000	7,000	60 hours	Fee will be directly paid to second party/First Party

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V. @ [Signature]
 Jaipur [Signature]
 .Tonk Road, Jaipur - 303 905

1. Huawei Authorized Network Academy (powered by IndoVISION) logo will be provided to JECRC to use on Banner, Brochure & Prospectus etc
2. College will provide a platform to interact with the students as per convenient time of both the parties.
3. The interested students may register for the course and this MoU will be valid for next two years.

“Force Majeure”

Indovision will not be responsible for any failure or delay on its part in performing any of its obligation or any loss, damages, costs, charges or expenses incurred or suffered by the other party by reason of such failure or delay, if such failure or delay is caused due to any force majeure condition, such as acts of God, Government laws and regulation, strike, Lockouts, war or any other causes beyond its control.

The above mentioned terms & conditions have been agreed by both the parties and signed by the representatives of IndoVISION Services Private Limited, New Delhi & JECRC, Jaipur.

(Authorized Signatories)

**Indovision Services Private Limited
(Sign & Stamp)**

Director/Manager:

Date:
Place:



(Authorized Signatories)

**JECRC ENGINEERING COLLEGE AND RESEARCH CENTRE,
JAIPUR RAJASTHAN**

(Sign & Stamp)

Head of the Institution/ Director:

Date:
Place:

PRINCIPAL
JECRC Engineering College &
Research Centre
Tonk Road, Jaipur - 303 905

MEMORANDUM OF UNDERSTANDING

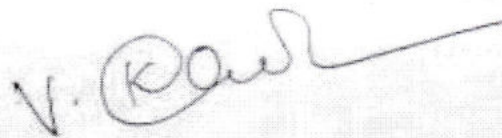
Between

CADD CENTRE TRAINING SERVICES (By Its Raja Park, Jaipur Centre)

And

Jaipur Engineering College & Research Centre, Jaipur





MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU) entered on 30th Oct.-2017.

By and Between

CADD Centre Training Services Pvt. Ltd. Chennai, having its local office at No. 106-107 Mahima Majesty, Ram Gali No. 6, Raja Park Jaipur, (hereinafter referred as "CADD Centre" for the sake of brevity) and represented by its Centre head, – **Mr. Rajeev Bhargava** which expression shall mean and include its successors in office and assigns.

And

Principal, JECRC Tonk Road, Jaipur, Rajasthan, (herein after referred as "JECRC" represented by its Dr. Vinay Kumar Chandna (Principal), which expression shall mean and include its successors in office and assigns.

Objective of the program:

In today's world, CAD-CAM has become an indispensable skill required to make every professional employable and productive in the work place. The objective of the training program is:

- To train the students of JECRC Jaipur at their college campus for CAD and 3D printing by "CADD CENTRE"
- To train the students of JECRC Jaipur on the concepts and soft tools of CAD – CAM, as per the industrial / corporate requirements.
- To facilitate them to excel in their workplace.
- To bridge the skill gap between the individuals and the industry.

Course Fees and Training Program Detail:-

As per annexure 1

COURSEWARE

CADD Centre's Curriculum & Product development (CPD) team develops the courseware. Each book is conceived, prepared and printed after a thorough research on industry specific courses. The team consists of engineers, industry experts who are involved in the development of courseware. The course material is developed specially

for instructor-lead training as well as self-study material. The CPD team reviews the curriculum and updates as needed. Every student who enrolls for a course is provided with a reference manual which is of World Class Standards, comprehensive in coverage and with a nice layout that pleases the eyes!

SUBJECTS:

THEORY

PRACTICALS / LAB

PROJECT BASED ASSESMENT:

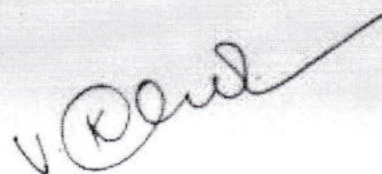
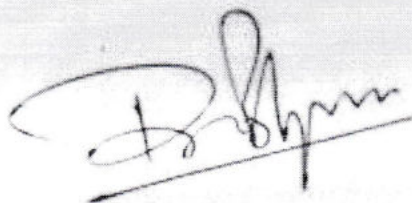
Students are encouraged to work on their own projects during the training program. Project-based learning helps students to learn the subject and understand to meet the international standards. Project-based learning encourages students to use information, ideas, skill, to answer real-world questions and solve them. Projects will be assessed by the instructor.

The advantages of project-based learning:

- Provides real-world orientation.
- Encourages higher-order thinking skills.
- Allows the instructor to be a facilitator of learning.
- Provides for ongoing student self-assessment.

CADD Centre through its Raja Park, Jaipur Shall Provide

- The proprietary and internationally acclaimed CADD Centre course material to each Student.
- Provide qualified trainers for the course.
- Periodical assessments of students for their further improvement.
- Certificate of Completion will provided to every student who will successfully complete the training program.
- CADD Centre will provide "Certificate of Association" between CADD Centre with JECRC Jaipur.
- Permit JECRC Jaipur to use CADD Centre logo as the Skill Development Partner.



JECRC JAIPUR Shall Provide:

- The required number of computer systems with latest configuration, switch in the lab and other required infrastructure and software for the practical session.
- The Class rooms with LCD projector for the theory classes. IT support should be arranged, if encountered with any problem.
- Schedule the classes for the training.
- Disciplinary support for the smooth conduct and timely completion of the entire course.
- The supports to ensure, all students attend the training program.
- Shall provide minimum hours for complete the training program.

PARTICIPANTS:

The participants would be the Students of JECRC JAIPUR.

COURSE CONTENTS:

As per CADD CENTRE norms and course books.

Proposed Class Timing

As per mutually decide.

COMMENCEMENT OF COURSE

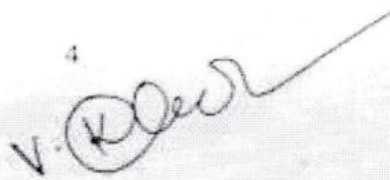
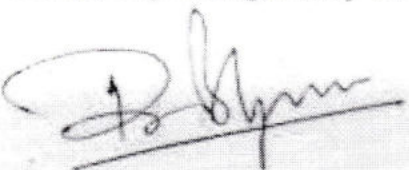
JECRC Jaipur will ensure that the courses will start within 15 day's from the date of signing the MOU

COURSE FEES & PAYMENT PATTERN

The course fee per student for each course offered is decided and mutually agreed by both the parties as mention in annexure 1. The student shall pay the course fee directly to MULTI CAD SOLUTION (CADD CENTRE), Jaipur or JECRC Jaipur.

Validity

This contract shall be in force for three years and valid till oct. 2020 and reviewed every year if need any changes may occurred.



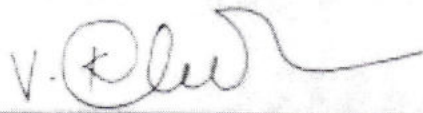
JURISDICTION

All matters, queries, disputes, or differences, whatsoever, arising between the parties touching the construction, meaning, operation or effect of this Memorandum of Understanding or out of or relating to this Memorandum of Understanding or breach thereof shall be settled through arbitration in accordance with the relevant Arbitration Act in force at such time. The Arbitration award shall be binding on both parties.

This Memorandum of Understanding shall come into effect from 30th Oct. 2017.

For: JECRC, Jaipur

for: MULTI CAD SOLUTION (CADD CENTRE).



Name: Dr. Vinay Kumar Chandna
Designation: Principal
Date: 30th Oct. 2017



Name: Mr. RAJEEV BHARGAVA
Designation: Centre Head
Date: 30th Oct. 2017



Entrepreneurship Development – Institutional Association MOU

This non-binding memorandum of understanding ("MOU") is signed on 13/10/2017 (Effective Date) by and between:

Name: Jaipur Engineering College and Research Centre

hereinafter referred to as "Partner Institute" (which expression shall, unless it be repugnant to the subject or context thereof, include its successors and permitted assigns).

Address: JECRC Campus, Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur – 302 022

Registered under: National Society For Engineering Research and Development, Jaipur

And

Wadhvani Operating Foundation, a California nonprofit public benefit corporation, with offices at Four Main Street, Suite 120, Los Altos, CA 94022, hereinafter referred to as "WOF", (which expression shall, unless it be repugnant to the subject or context thereof, include its successors and permitted assigns).

This MOU is non-binding in nature and does not create any legal obligations between the Parties, except for the intellectual property provisions in Section 5, confidentiality provisions in Section 7 and dispute resolution provisions in Section 10. The Partner Institute and WOF agree to work together to systematically develop the entrepreneurship programs described below.

Partner Institute and WOF are hereinafter individually referred to as a "Party" and collectively as the "Parties" as the context may require.

Terms of the Entrepreneurship Development – Institutional Association MOU:

1. Objectives:

- Introduce and/or strengthen entrepreneurship education on campus through deployment of a systematic approach to optimizing and increasing the impact of teachers and training programs on entrepreneurship education.
- Provide students with the opportunity to become entrepreneurially skilled and inspired to be entrepreneurs.
- Enable aspiring graduating students who start meaningful ventures by connecting them to mentoring platform and related entrepreneur support systems.

2. Roles of the Parties:

Both Parties commit to sincerely fulfilling their roles and responsibilities to the fullest in order to accomplish their mutual objectives.

Specific responsibilities include:

Wadhvani Operating Foundation
Four Main Street, Suite 120,
Los Altos, CA 94022

V. K. Dewar 13/10/17

PRINCIPAL
Jaipur Engineering College &
Research Center
Tonk Road, Jaipur - 302 022



WOF shall provide the following:

- Entrepreneurship education methodology, curricula and content:
 - eContent for blended classroom learning for students that are facilitated by faculty
 - Guide the setting up of E Cells (student entrepreneurship clubs) to facilitate delivery of practicums that strengthen student experience in entrepreneurship.
- Access to Technology platform to manage the delivery of the blended learning modules and manage student participation on signing of licensing agreement.
- Structure, content and methodology for faculty training as entrepreneurship facilitators and educators for effective blended learning.
- Structure, content and methodology for Student E Leader training (for E Cells).
- Access to Entrepreneur engagement platform E Week.
- Program Advisory service to the entrepreneurship faculty and E Cell leaders.
- Framework for entrepreneurship outcomes and impact assessment measurement.

Partner Institute shall provide the following:

- Develop/strengthen the institutional mandate for entrepreneurship education and development.
- Mainstream (as required or elective courses) entrepreneurship curricula within the Partner Institute for holistic development of students' knowledge, skills and experiences and implemented the courses and practicum as prescribed by WOF-NEN.
- IT infrastructure (sufficient bandwidth to provide live and uninterrupted student-device level access in classroom of WOF content) to enable students to learn using modern blended learning methodologies.
- Designate and support required numbers of motivated faculty towards entrepreneurship and provide for their training. Training will be provided by WOF designated Master Trainers. Institutes will have to bear expenses towards attending such training programs, including their proportion of Master trainer expenses.
- Support practicum programs on campus with required faculty supervision including engagement with entrepreneurs and professionals knowledgeable about venture creation.
- Track and share input data (including WOF courses offered, student sign-up, number of faculty teaching courses), output data (including student course consumption), and outcomes information to measure impact (companies started by students each year). WOF will attempt to automate most of this data collection but Institutes would provide data where it cannot be automated or comply to enable automation of data collection.
- Ensure that periodic training is provided for facilitator and educator through trained master trainers and other infrastructure costs related to running the classroom and practicum programs.
- Partner Institutes will run the programs offered by WOF, including the online course in entrepreneurship (Curriculum) and the E-cell activities (Practicum). Running the program live in the class-room, using internet connectivity, is a critical requirement of the program. Running the program off-line will amount to a breach of the objectives and terms of the MOU.

WOF reserves the right to modify the MoU, if during the course of this program, it becomes evident that it is imperative to do so for the success of the program. Such communication will be sent via email to the registered email address which will be provided at the time of the registration on the Online Learning Platform.

3. Financial Terms: Each Party will bear the costs of meeting its responsibilities described in Section 2 above and will not owe the other Party any amounts pursuant to this MOU.

V. [Signature] 13/10/17



4. **Review Process:** Both Parties will review progress of the programs conducted pursuant to the MOU on at least a half-yearly basis. The Head of the Partner Institute will participate in the final review for each year to ensure that the management is fully apprised of the development of the programs. The Partner Institute is expected to track progress and data of students, student entrepreneurs, and entrepreneurs that it works with during the course of this association.

5. **Intellectual Property Rights**

- "Intellectual Property" includes creations, domain names, inventions, know-how, trade or business secrets, patents, copyrights, trademarks, logos, designs, works of authorship, software programmes, papers, models, teaching techniques, research projects, databases and instruction manuals.
- Each Party shall retain all rights to its IP and nothing contained in this MOU, nor the use of the IP in the publicity, advertising, or promotional or other material relating to the fulfillment of the obligations of the Parties contained herein shall be construed as giving to any Party any right, title or interest of any nature whatsoever to any of the other Party's IP.
- Partner institute will not copy or reproduce in any form, WOF's IP.

6. **Representations and Warranties:**

- Each Party hereby represents and warrants that the use of IP made available or contributed by it does not violate the IP rights of any third party.
- Each Party has all requisite power and authority to enter into this MOU and the execution, delivery and performance by such Party of this MOU has been authorised by all necessary and appropriate corporate or governmental action and will not, to the best of its knowledge, violate any applicable law or approval presently in effect and applicable to it.

7. **Confidentiality:**

- The Parties acknowledge that during the term of this MOU each Party may obtain confidential and/or proprietary information of the other Party including, but not limited to, financial or business information, contracts and employee details (collectively, "Proprietary Information"). Such Proprietary Information shall belong solely to the disclosing Party. Proprietary Information shall not include information that is or becomes publicly known through no wrongful act of the receiving Party.
- The receiving Party shall not disclose Proprietary Information to third parties without the prior written consent of the disclosing Party and agrees to undertake reasonable measures to ensure that such is kept confidential and to disclose to its employees, officers, directors or representatives on a need to know basis only.
- The receiving Party also agrees to report immediately to the disclosing Party any unauthorized disclosure of Proprietary Information of which it has knowledge.

8. **Third Party:**

- Nothing in this MOU shall mean or shall be construed to mean that either Party is at any time precluded from having similar arrangements with any other person or third party.
- The Parties shall wherever necessary enter into definite written agreements with/without third parties to facilitate the implementation of specific initiatives with the prior written consent of the other Party. Such agreements will be independent and exclusive of this MOU.
- Each Party will promptly notify the other Party of any potential conflict of interest arising from the conduct of activity pursuant to this MOU as soon as it is known by the

V. @ [Signature] 13/07/17



Party that becomes aware of the potential conflict.

9. Termination:

a) This MOU is for the duration of three (3) years from the date of this MOU. However, either Party may terminate or extend this MOU by providing 60 days' notice in writing to the other Party. In the event that the Partner Institute would like to continue operating under the terms of the MOU because of student enrollment in courses conducted pursuant to this MOU, despite having received notice of termination from WOF, WOF will support the students until the end of the course, on submission of proof that the enrollments took place before the date of the termination notice.

b) If the Partner Institute does not fulfil its responsibilities, WOF will discontinue the program and the Partner Institute shall cease to be a member.

10. Dispute Resolution: If a dispute arises concerning the interpretation or implementation of this MOU the Parties agree to settle amicably by mutual consultation or negotiation and shall observe and comply with all laws, rules, and regulations of each other's country where this MOU is performed.

11. Miscellaneous:

a) **Entire MOU:** This MOU constitutes the entire understanding of the Parties with respect to the Project and supersedes any prior or contemporaneous oral or written understanding or communication between the Parties.

b) **Amendment:** This MOU shall not be amended, changed, modified in whole or in part except by an instrument in writing signed by both the Parties hereto.

c) **Relationship of Parties:** Nothing in this MOU shall be construed as creating a relationship of partnership, joint venture, agency or employment between the Parties. Neither Party shall be responsible for the acts or omissions of the other Party, nor shall either Party have the power or authority to speak for or assume any obligation on behalf of the other Party.

d) **Assignment:** Each Party may assign its rights and obligations under this MOU with the prior written consent of the other Party. Notwithstanding the foregoing, WOF shall be entitled to assign any of its rights and obligations to any of its affiliates without the prior written consent of the Partner Institute. It is clarified that:

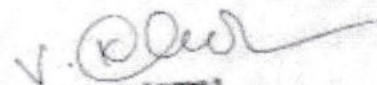
i. The assignment or alienation of any part or whole of the Partner Institute IP or WOF IP shall not be construed to be an assignment of rights or obligations under this MOU; and

ii. The delegation of any obligations under this MOU by WOF to any person or entity shall not be construed to be an assignment of rights or obligations under this MOU, so long as WOF remains at all times responsible for its obligations under this MOU.

e) **Indemnity:** This MOU does not contemplate or provide for the exchange of any funds between the Parties. Therefore, save and except for fraud, no Party shall be liable to indemnify or pay damages to the other Party, its officers, directors, employees or agents from and against any liabilities, costs and expense incurred or suffered, or to be incurred or suffered by the other Party that arise out of or relate to, or result from any breach or termination by either Party of any of the provisions of this MOU.

f) **Counterparts:** This MOU may be executed in two counterparts each of which when so executed and delivered in the English language shall be an original, but all of which shall together constitute one and same instrument.

Wadhvani Operating Foundation
Four Main Street, Suite 120
Los Altos, CA 94022


PRINCIPAL
Jaipur Engineering College &
Research Center
Tonk Road, Jaipur - 303 905





- g) **Notice:** Either Party may, from time to time, change its respective address or representative for receipt of notices or other communications by giving to the other Party not less than 10 days prior written notice in English.

12. Matters Not Covered by the MOU: The WOF brand is upheld not only because of its thought leadership in entrepreneurship and best practices but also for the quality of its content, program management, delivery standards, material, tools, etc. Hence any co-branding, co-certification and marketing association for a program would be subject to quality assessment on a case-by-case basis with individual partners and respective programs. This MOU does not automatically include co-branding, co-certification or marketing of programs operated by the Partner Institute, and discussions regarding such matters would be on a case-by-case basis between the Partner Institute and WOF.

Name of Partner Institute's key Leader & Co-leader (s) to manage the Entrepreneurship Development Affiliation and its deliverables in Annexure 1.

Please note you are required to notify WOF in writing upon making a change at non-membership@wfglobal.org

WOF Affiliation for your institute during the current year will be managed by the following member of the WOF team. Details in Annexure 1.

We have read the above information and agree that the Partner institute will engage in the WOF Entrepreneurship Development Affiliation. We understand that this guidance and support will enhance the value of our experience and speed of development in entrepreneurship education.

Jaipur Engineering College &
Research Centre

Signature:

V. K. Chandra 13/10/17

Name: Dr. Vinay Kumar Chandra

Designation: PRINCIPAL

Date: 13/10/2017

PRINCIPAL
Jaipur Engineering College &
Research Center
Tink Road, Jaipur - 303 905

Wadhvani Operating Foundation

Signature:

Name: Ajay Kela

Designation: Executive Director

Date:



ANNEXURE 1

Name of Partner Institute's key Leader & Co-leader (s) to manage the Entrepreneurship Development Affiliation and its deliverables as follows:

Faculty Leader	Faculty Co-leader
Name: Shri Sidharth Chaturvedy	Name: Shri Sunil Jangir
Phone: 7742794901	Phone: 9251039851
Email: sidharth.ec@jetrc.ac.in	Email: sunil.jangir@jetrc.ac.in
Skype Handle:	Skype Handle:

Name of the WOF Affiliation for your institute during the current year will be the following member of the WOF team:

WOF Team member
Name:
Phone:
Email:
Skype Handle:

V. P. Jangir
PRINCIPAL
Jatpur Engineering College &
Research Center
Tons Road, Jaipur - 303 905

Memorandum of Understanding

Between

Baba Automobile Pvt. Ltd., Jaipur

And

JECRC Foundation, Jaipur

This Memorandum of Understanding (MOU) sets the terms and understanding between Baba Automobile Pvt. Ltd. and JECRC Foundation for provision of Automobile Center of Excellence at JECRC College, Jaipur Raj.

This MOU will be applicable to arrange the facilities to students of B.Tech and Diploma Mechanical, Electrical, Automobile (All year) to participate in Automobile Training/Internship.

The above goals will be accomplished by undertaking the following activities:

1. That Baba Automobile Pvt. Ltd. will arrange all the facilities to conduct automobile training for all students of B.Tech & Diploma. Mechanical, Electrical (All year) students. Details of engines which will be available for training are as follows are mentioned in tabular form:
2. That all apparatus, engines, tools, shall be arranged by Baba Automobile in the premises of JECRC College to provide in depth knowledge of above engines.
3. That the training duration will be throughout the year is per time table provided by head of department (jecrc) irrespective of the time.
4. That the lab space and Cabin space for Automobile faculties will be provided by JECRC College.
5. That an ISO certified certificate or any other study material will be provided by Baba Automobile on the completion of training.
6. Maintenance cost of all components will be bear by Baba automobile.
7. Some Sunday and holiday will be utilized for training on mutual consent.



[Handwritten Signature]
PRINCIPAL
JECRC FOUNDATION
Jaipur

List of 2- wheeler Engines

2-Wheeler Engines	4- Wheeler Engines
1. Bajaj Pulsar-220 cc engine.	8. Hero Honda passion.
2. Honda Shine Engine.	9. Bajaj Discover Engine.
3. Hero Splendor Engine.	10. Bajaj Platina.
4. LML Freedom 150 cc engine.	11. Tvs Sport Engine.
5. Tvs Apache Engine.	12. Tvs Victor Engine.
6. Honda Activa Automatic CVT Engine.	13. Honda Unicorn Engine.
7. Scooty Engine.	14. Automatic CVT Engine.

List of 4-wheeler Engines

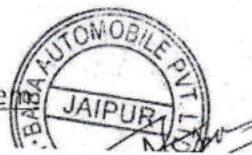
4-Wheeler Engines	4- Wheeler Engines
1. AUDI V-6 Petrol Engine	8. MARUTI SUZUTI 3 CYLINDER PETROL ENGINE.
2. AUDI V -6 Diesel Engine	9. Maruti Suzuki 4-cylinder Petrol Engine.
3. MERCEDES BENZ ENGINE.	10. Hyundai Verna CRDI Engine.
4. BMW AUTOMATIC TRANSMISSION.	11. Tata indigo Car Engine.
5. AUDI SEMI AUTOMATIC TRANSMISSION.	12. Toyota diesel Engine.
6. TATA SAFARI DIESEL ENGINE.	13. Hyundai Car Diesel Engine
7. MAHINDRA SCORPIO DIESEL ENGINE	14. Skoda Car Engine.
15. TATA Truck 18- wheeler Start Engine.	16. Tata Truck Engine For Practical.

List Start Car, Bike, Scooty.

- Tvs Victor one Start Bike.
- LML Freedom one Start Bike.
- Hero/Honda/Bajaj one Start Bike.
- Honda Activa one start Scooty.
- MERCEDES BENZ CAR for Practical & Overhauling.

List of Tool, Machines, Accessories.

- Welding Machine.
- Grinding machine.
- Cutting Machine.
- Drilling Machine.
- Open Spanners 50-Nos.
- Close Spanner 50 – Nos.
- Audi Engine Special Tools.
- Mercedes Engine Special Tools.
- Automatic Transmission Special Tools.
- 4 – Wheeler Differential System.
- Power Steering/ ELECTRICAL STEERING System
- A C System



Signature
5/1/2020

- Electromagnetic Suspension Model
- BS-4, BS-6 System
- ECU Systems With TestRig (testing by Laptops)
- 5-ECU for Electrical Engg. Students.
- Disk Brake System.
- DruM Brake System.
- CRDIMPFI System.
- Air bag system

Financial Terms & Conditions

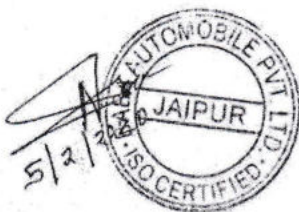
- A security amount of Rs 5 lakh given to Baba Automobile.
- security amount 5 Lakh pay at the time of signing MOU (by cheque/NEFT/RTGS in favour of nimesh baba automobile pvt ltd or baba automobile)
- The duration of lab installation Shell be maximum 30 days after signing MOU.
- Security amount 5 lakhs refund to jecrc college at the End of MOU without any depreciation.
- 20% Amount of total fee received by outside students shall be share of JECRC & will be transferred to JECRC a/c at the end of month and rest 80 % share will be of Baba Automobile.

This MOU is at will may be modified by mutual consent of authorized officials from Baba Automobile and JECRC. This MOU shall become effective upon signature by the authorized officials from Baba automobile and JECRC and will remain in effect for minimum one year and can be further extended by mutual consent.

In the absence of mutual agreement by the authorized officials from Baba Automobile and JECRC, this MOU shall end after provision of training.

Requirements

1. Space for Engines
2. Faculty Sitting Area/office.
3. Suitable Furniture for Engines
4. Space for Tools
5. Light Facility
6. Banner, hooding, flex arranged by college.



(Handwritten Signature)
 PRINCIPAL
 JECRC COLLEGE

Contact Information:

Baba Automobile Pvt. Ltd.
Mr. Nimesh Baba
Director

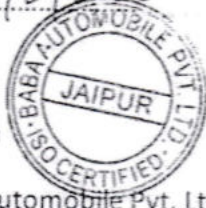
Pratap Nagar, Jaipur, Rajasthan
Contact: +91-8769405920

JECRC Foundation jaipur
Dr. V. K. Chandna
Principal JECRC

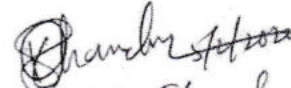
Shri ram ki nangal, tonk road, sitapura jaipur
Contact : 9891406784

Dated: 5/2/2020


Mr. Nimesh Baba

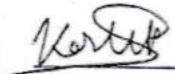


(Director, Baba Automobile Pvt. Ltd.)

Mr. 
Dr. V. K. Chandna

(..... JECRC Foundation, Jaipur)

PRINCIPAL
JECRC FOUNDATION
JAIPUR

Counter Signed By: 

Kartik Muhal (Training Head)

Counter Signed By: Manish Jain

..... (MANISH JAIN.....)



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V PRINCIPAL
Jaipur Engineering College & Research Center. JECRC Foundation
Tonk Road, Jaipur - 303 905

MEMORANDUM OF UNDERSTANDING

The memorandum of understanding (hereinafter 'MOU') is entered into this 15th day of May 2018 between .

The Cyberops Infosec LLP (hereinafter referred as 'Cyberops') is engaged in providing information security solutions and have diverse portfolio in rendering quality services to its associates and members having its office at 1-A Vishveshwarya Nagar, Gopalpura Bypass, Jaipur-302018 Rajasthan, India.

The JECRC College, Jaipur (hereinafter referred as 'JECRC Foundation') is engaged in educational services having its office at Shri Ram ki Nangal, via Sitapura RIICO Tonk Road, Jaipur-302 022 Rajasthan, India.

1. The Program for which this MOU is signed is to be known as "Cyber Security Training Program" of Cyberops with the purpose of rendering cyber security training program to JECRC Foundation students.
2. Date and time table scheduled for the training program will be shared with JECRC Foundation after registration of the training.
3. Both the parties (Cyberops and JECRC Foundation) have mutually agreed to undertake this Memorandum of Understanding with the intention of both being bound to accept the following terms and conditions:
4. (A) Responsibilities of JECRC Foundation

The JECRC Foundation shall:

- Assign a Faculty and two enthusiast and willing student coordinators for the Training Program who on timely basis will coordinate with the representative of Cyberops for the purpose of all requirements regarding training program.
- Technical representative from Cyberops will inspect the Lab and other settings one day prior commencement of the training.
- Help Cyberops in marketing their training program by using various promotional strategies like banner, training announcements, poster display in premises.

Provide the following minimum infrastructural facilities:

- A projector with screen.
- Mike with backup (collar / cordless mike preferred)
- Internet Access without restrictions (firewall) – Wi-Fi preferred
- Computer labs with student capacity of 40 – 50
- A lab technician.

(B) Responsibilities of Cyberops

The Cyberops shall:

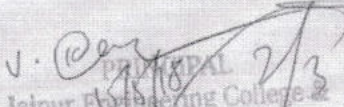
- Develop and provide broad training module to the JECRC Foundation.
- Provide trainer profile and coordinator details.
- Provide complete remote assistance and guidance regarding the training program.
- Shall ensure through proper co-ordination and consultation that all the essentials for providing quality training are met.

5. Terms of payment and Revenue sharing

- The cost of training per student will be:

	Advanced
Course fee	22000
College Discount	16000
Total	6000

- Training fee will be collected by the College one week before the batch starts, from students.
- Mode of payment: Cheque /DD in favor of Cyberops Infosec LLP payable at Jaipur, Rajasthan or cash.
- On commencement of the training program no fee will be refunded in case participant is unable to attend a part of training program given any circumstances.


Principal
Jaipur Engineering College &
Research Center
Tank Road, Jaipur - 302 905



MOU FOR
INDUSTRY ACADEMIA PARTNERSHIP

JECRC COLLEGE, JAIPUR

&

FORSK TECHNOLOGIES

M5, STARTUP OASIS

SITAPURA, JAIPUR

V. [Signature] 2/11/17

[Signature] 2/Nov/2017

Introduction

This MoU is for industry and academia partnership for skill enhancement and improved industry engagement through flip classroom concept and focus on project work through hands on activities.

The objective of this MoU is to bring industry approach of solution development and product engineering to engineering candidates through project based learning backed by data and technology.

To start with, Forsk will offer project based learning in IoT(Internet of Things) and Machine Learning (Data Science) to JECRC college students.

Future courses will be offered based on industry requirement and/or student/faculty feedback. These future courses will be on emerging technologies.

A team of project managers and technical leads would be designing/customizing the course contents. A team of developers would be working with the participants (students) at ground level during the labs.

Certificate will be issued to student after successful completion of the lab.

Why This Collaboration Is Needed

Currently there is no or limited exposure to industry practices during academic programs. Below are some of the highlights of the current scenario in academics.

- Course Composition: 60% Theory, 40% Practical
 - Theory is well handled, but lab part can be greatly enhanced with collaboration with industry to improve: **student's problem solving skills, coding and debugging skills and inculcate industry practices.**
- NASSCOM says only 10 – 20% of engineering graduates are employable.
- No/Less placements in core companies.
- Graduates need training after passing out to get a job.
- Bring new edge technologies and skills to candidates during their studies.
- Better placements and skilled students also improve the institute's reputation and attract better talent in form of students.

Forsk Technologies: Past Experience

As a startup EdTech company, Forsk has achieved below milestones:

- Forsk founders have already worked with Samsung, Nokia, Wipro, Philips, TCS, Qualcomm, and Infosys to provide corporate training in the field of emerging technologies.

V. [Signature]

[Signature]



- Already 1000+ students from SKIT, JU, JECRC, Poornima, NIITU, Manipal, MNIT and IIIT Kota graduated through Forsk's project based learning bootcamps.
- Forsk is conducting bootcamps on Python, IoT and Data Science to Manipal and IIITK students in current semester 2017 and getting overwhelming response from students and faculty.
- Last month, Forsk conducted an Android workshop in MNIT, Jaipur and was a huge success.
- Last month, Forsk has filed a patent for an IoT product that is being developed in-house.
- Forsk as an industry partner to institutes sets up "Forsk Labs: Center for Project Based Learning in Emerging Technologies" in campus to impart project-based learning and works as one stop shop for all industry related interfacing needed by institutes.
- In this setup, we ask students to bring their own laptops for learning; Forsk provides them access to content through its portal and installation of required tools and IDEs. The partner institutes provides basic services like Internet connectivity and power points etc.

Pre-requisite Skills for Beginner's IoT Lab

The candidate should have engineering major in CSE/IT/ECE/EE. The candidate should have knowledge in C/C++ coding. Beginner's welcome!

IoT Lab Details

Forsk Technologies would execute the IoT Lab.

Much of candidate's learning at the IoT lab will happen through hands-on working and building project modules.

Skills	Details
Electronics Basics	The candidates will know about how to read data sheet, analog and digital signals, serial communication, RF and sensors.
JSON/XML	The candidates would be able to write JSON/XML, code based on the project requirements.
Database Basics	The candidates would know how to create database, tables and write SQL queries.
Programming on Development Boards	Understanding of the Arduino board, tool chain and development environment setup.
Sensors and Actuators	Understanding and using various analog, digital sensors.
Nodes and Gateways	Understanding usage of nodes and gateways for sensor communication and external communication.
Communication Protocols	RF, BT, WiFi and GSM

V. K. K. K.

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IoT Cloud Platform	Using IoT Cloud Platforms, Python Script
Big Data Analytics	Mongo DB, Map Reduce, Using cloud APIs for analytics
Visualization	Graphical view of the data.

Pre-requisite Skills for Beginner's Data Science Lab

The candidate should have engineering major in CSE/IT/ECE/EE. The candidate should have knowledge in C/C++ coding. Beginner's welcome!

Data Science Lab Details

Forsk Technologies would execute the Data Science Lab. Much of candidate's learning at the lab will happen through demos, discussions and Code Challenges.

Skills	Details
Development environment setup and Python learning	Introduction To Data Science, Setting up the machine - Anaconda, Introduction to Python, List, Tuples, Dictionaries, List
Libraries for Data Preprocessing and Mathematical/Stats Operations	Python for DS, Scientific libraries - NumPy, SciPy, Matplotlib and Pandas
ETL Operations, Validation and Data Cleaning	Munging with Pandas, Reading data from different sources (excel, csv, database etc.), Imputation
Data Modeling	Dataframes ScikitLearn and Machine Learning
Supervised Learning	Regression, Classification, Confusion Matrix
Unsupervised Learning	Clustering Association
Web Scrapping	Using BeautifulSoup for scrapping the data
Project Work	15 code challenges with one major project

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Roles and Responsibilities

Following are the roles and responsibilities for the lab execution.

FORSK TECHNOLOGIES	JECRC Foundation, JAIPUR
Creation of the lab contents consisting of sub modules and assignments and give access to students through its portal (www.openedx.forsk.in).	Provide the lab infrastructure for the execution. This would include lab space, projector, Internet, power and cooling.
Project Manager from Forsk would be managing the entire lab execution and design the project framework/specs.	
Technical Lead from Forsk would be handling the design for sub modules/projects.	Dr. Bhawna Sharma from JECRC would be working as coordinator and single point of contact with Forsk team.
Engineers from Forsk would be deployed during lab sessions.	
Evaluate candidate's performance during lab sessions.	JECRC Foundation may use these parameters for their academic grading.
Forsk Technologies will generate a dossier post lab execution containing complete report of student's leanings and feedback.	

- All the rights of format and framework for this collaboration belong to Forsk Technologies.
- The content developed for this would be owned by Forsk Technologies and cannot be reused for future usage by JECRC College.
- JECRC College will also need to provide Lab with projector and Internet.
- JECRC College will also provide high-speed Internet facility for Forsk team during lab.

Lab Execution

- JECRC shall provide a coordinating faculty for the execution of this lab, who will also work as a single point of contact with Forsk team.
- 25:1 mapping for candidates to industry resource provided by Forsk.

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Fee

For the Lab execution, we estimate to have following cost for the program, which includes content development and lab execution for candidates.

There will be a Program Manager for this from Forsk Technologies, which will be single point of contact with JECRC.

A team of project managers and technical leads would be designing the lab contents. A team of developers would be assisting the candidates at ground level in the labs.

Sr. No.	Description	Cost
1.	Beginner's IoT Lab (30 Hours)	5500 INR
2.	Beginner's Data Science (Machine Learning) Lab (30 Hours)	5500 INR

* Fee is inclusive of taxes.

Revenue Share between JECRC and Forsk

- Forsk will share the 15% revenue to JECRC against infrastructure usage (mentioned in roles and responsibilities section above) to run course/courses after deduction of the taxes.
 - Sample Calculation, Fee without taxes = $5500 - 990 \text{ (GST)} = 4510$. So JECRC's Share would be $15\% \times 4510 = 676 - 67.6 \text{ (TDS)} = 608$ per student.
 - If the above discount needs to be passed to students directly in lieu to the university/college then the Fee would be $5500 - 608 = 4900$ (rounding off)
- This collaboration is for next 3 years. However, as per the market scenario/content updates and the course Fees may be revised for future batches.
- Along with same lines, Forsk may bring new courses in future based on industry requirements (Cloud Computing, Analytics, AR/VR, AI, Mobile, Full stack Web Development etc.). These would be conducted with same format under the ambit of this MoU by adding an annexure/addendum to existing MoU for new courses with details of course content, fee and JECRC sharing/Student Discount.

Terms & Payment Schedule

- Forsk will collect the fee from the students and JECRC would raise an invoice based on the number of students registered X 608 INR per student share.

FOR AND ON BEHALF OF
Forsk Technologies Private Ltd
Signature

Name: **Dr. Sylvester Fernandes**
Designation: **Director**

FOR AND ON BEHALF OF
JECRC College, Jaipur
Signature

Name: **Dr. Vinay Kumar Chandna**
Designation: **Principal**



About Forsk Team

Dr. Sylvester Fernandes, Co-Founder has obtained his Doctorate in Computer Science (Cryptography), from J.N.V.U. He has a rich experience of 14 years in Application Development as well as deployment of mobile applications for the next generation of computing platforms.

Area of Expertise: Mobile and Wireless Application Development, Web Application Development, Product Engineering, Embedded Solutions and SmartOS Based Solutions.

Industry Verticals Served: Diamond & Jewellery, Manufacturing, Banking and Finance, Medical, Gaming and Petroleum.

Yogendra Singh, Co-Founder has several years of experience with leading mobility and mobile app development companies like Qualcomm, Mango and ZDRIVE. While working with these companies he has played strategic and key role in developing / launching hundreds of applications successfully.

Yogendra was part of the team that developed an application framework for low and mid-tier mobile devices that enables developers to quickly create customized mobile applications and user experience. This product was sold to Qualcomm Inc., world's largest semiconductor company.

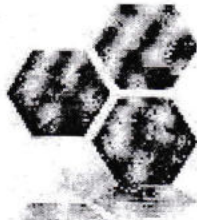
Yogendra is bachelor of technology from Rajasthan University.

Past Experience



V. K. Desai

Sylvester
2/Nov/2017



International Journal of Scientific and Engineering Research (IJSER)

Address: 10585-B Hazelhurst Houston, TX 77043 USA

MEMORANDUM OF UNDERSTANDING

THIS MEMORANDUM OF UNDERSTANDING ("MOU") is made on 30th day of November, 2019, by and between The International Journal of Scientific and Engineering Research ("IJSER") ("Technical Co-sponsor") and Jaipur Engineering College and Research Center, Jaipur sets forth the relationship and obligations relating to the following conferences to be held 3rd-4th April, 2020 with Jaipur /India.

S.No	Name of Conference	Organizing Department
1	INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY AND DIGITAL APPLICATIONS (ICITDA-20)	Department of Information Technology
2	INTERNATIONAL CONFERENCE ON SMART GRID POWER ELECTRONICS & RENEWABLE ENERGY (ICSGPERE-20)	Department of Electrical Engineering
3	INTERNATIONAL CONFERENCE ON COMMUNICATION, OPTICAL AND MICROELETRONICS (ICCOMET-20)	Department of Electronics and communication
4	INTERNATIONAL CONFERENCE ON ADVENT TRENDS IN COMPUTER TECHNOLOGIES (ICATCT-20)	Department of Computer Science Engineering
5	INTERNATIONAL CONFERENCE ON EMERGING TRENDS IN CIVIL ENGINEERING FOR SUSTAINABLE DEVELOPMENT (ICETCFSD-20)	Department of Civil Engineering
6	INTERNATIONAL CONFERENCE ON RECENT INNOVATION IN TECHNOLOGICAL DEVELOPMENT IN MECHANICAL ENGINEERING (ICRITDME-20)	Department of Mechanical Engineering

1. DURATION OF MOU: This MOU addresses the rights and obligations with respect to the Conference. Although the parties may presently be considering the possibility of future conferences similar in theme or subject matter, no party shall be under any obligation to renew this MOU.

2. FINANCIAL LIABILITY: It is understood that financial liability for the Conference is the sole responsibility and obligation of the Conference Organizing Committee sponsor. The technical Co-Sponsor (IJSER) will not share in the surplus of the Conference or be expected to contribute to the financial loss, if any.

3. OWNERSHIP OF INTELLECTUAL PROPERTY: All materials newly developed under this MOU, including, but not limited to, all papers, conference proceedings, copyright, post-event products and all event byproducts in any form and in any media ("Newly Developed Materials"), shall be wholly owned by IJSER.

During the term of this MOU, the Technical cosponsor grants a non-exclusive, royalty-free, worldwide license to the IJSER to use its name and logo in connection with the advertising and promotion of the Conference.



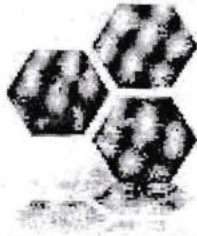
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4. TERM AND TERMINATION OF TECHNICAL CO-SPONSORSHIP: This MOU may not be terminated except by written consent of all parties. Upon termination or non-renewal of this MOU, no Sponsoring Party may use, license, create derivative works, or exploit in any way the jointly owned works without the written consent of the other parties.

5. INDEMNIFICATION: Each Party shall indemnify, defend and hold harmless the other Party from and against any and all claims, demands, liabilities, settlements, damages, costs, and expenses, including reasonable attorneys' fees and expenses, arising out of, or in any way connected with, any default, breach or negligent non-performance of this MOU or any negligent act or omission on the part of indemnifying Party, its agents and employees arising out of this technical co-sponsorship or the conduct of the Conference. Each Party shall provide prompt written notification to the other Party in the event an indemnified claim arises. The indemnified Party shall reasonably cooperate with the indemnifying Party at the indemnifying Party's expense.

6. NON DISCRIMINATION: IJSER is committed to the principle that all persons shall have equal access to programs, facilities, services, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by IJSER policy and/or applicable laws.

This MOU shall not be valid until approved and executed by authorized representatives.



Jayne Gibbon

Authorized Signature with Seal

V. Prasad
3/27/19
PRINCIPAL
Jaypee Engineering Out-
Research Centre
20th Road, Jaypee Nagar

Conference coordinator

LIVEWIRE
FOR LIVE CAREERS



MEMORANDUM OF UNDERSTANDING

Between

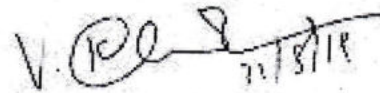
LIVEWIRE (A division of CADD CENTRE TRAINING SERVICES)

(By Its Raja Park, Jaipur Centre)

And

JECRC Foundation, JAIPUR



PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-302022

MEMORANDUM OF UNDERSTANDING

Livewire Training Services will sign a MOU with JECRC Foundation, Jaipur, Rajasthan to establish "Centre of excellence".

This Memorandum of Understanding hereinafter is referred to as "MoU" is made and executed on this 22nd Aug, 2019.

By and Between

LIVEWIRE India (A division of CADD CENTRE TRAINING SERVICES PVT. LTD. Chennai), having its local office at No. 106-107 Mahima Majesty, Ram Gali No. 6, Raja Park Jaipur. (hereinafter referred as "**LIVEWIRE**" for the sake of brevity) and represented by its Centre head, – Mr. Rajeev Bhargava which expression shall mean and include its successors in office and assigns.

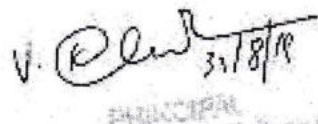
And

Principal (Dr. Vinay Kumar Chandna), JECRC Foundation, Jaipur, Rajasthan, (herein after referred as "**JECRC Foundation**" represented by its Dr. Vinay Kumar Chandna (Principal), which expression shall mean and include its successors in office and assigns.

Objective of the program (Centre Of Excellence):

In today's world IT/Robotics & Automation, has become an indispensable skill required to make every professional employable and productive in the work place. The objective of the training program (under COE) is:

- ✓ To train the students of JECRC FOUNDATION Jaipur at their college campus.
- ✓ To train the students of JECRC FOUNDATION Jaipur on the concepts and soft tools of IT, AI, IOT, Robotics and automation, machine learning etc. all latest technologies use by industry.
- ✓ To facilitate them to excel in their workplace.
- ✓ Motivate to student's for innovation and startup by using new technologies.
- ✓ To facilitate and help them into making their projects.
- ✓ To bridge the skill gap between the individuals and the industry.
- ✓ Saves on travel time as centre of excellence is established in College.
- ✓ World class training at their Campus in very low price in comparison to their center site.
- ✓ Internationally recognized certificate.
- ✓ To build / improve confidence level of students to face the challenges in real time.



31/8/19
PRINCIPAL

Course Fees and Training Program Detail:-

As per annexure 1

COURSEWARE

As per Livewire norms.

SUBJECTS:

THEORY

PRACTICALS / LAB

PROJECT BASED ASSESMENT:

Students are encouraged to work on their own projects during the training program. Project-based learning helps students to learn the subject and understand to meet the international standards. Project-based learning encourages students to use information, ideas, skill, to answer real-world questions and solve them. Projects will be assessed by the instructor.

The advantages of project-based learning:

- Provides real-world orientation.
- Encourages higher-order thinking skills.
- Allows the instructor to be a facilitator of learning.
- Provides for ongoing student self-assessment.

LiveWire through its Raja Park, Jaipur Shall Provide

- The proprietary and internationally acclaimed LiveWire course material to each Student.
- Provide qualified trainers for the course.
- Periodical assessments of students for their further improvement.
- Certificate of Completion will provided to every student who will successfully complete the training program.
- LiveWire will provide "Certificate of Centre Of Excellence" between LiveWire with JECRC FOUNDATION Jaipur.




31/8/18
PRINCIPAL
Jaipur Engineering College &
Research Centre

- Permit JECRC FOUNDATION Jaipur to use LiveWire logo as the Skill Development Partner.
- LiveWire will help out to student's in their technical projects.
- LiveWire will help to college by conducting workshop / Seminar / Conferences related topics.
- Livewire Will help College student's to get job placement through its placement drive for studnt's who joined their courses.

JECRC FOUNDATION JAIPUR Shall Provide:

- The required number of computer systems with latest configuration, switch in the lab and other required infrastructure for the practical session.
- The Class rooms with LCD projector (if available) for the theory classes and for practical class if student's have their laptop.
- Computer lab for training as mutually decide.

PARTICIPANTS:

The participants would be the Students of JECRC FOUNDATION JAIPUR.

COURSE CONTENTS:

As per LiveWire norms and course books (DLM – Deep Learning Module).

Proposed Class Timing

As mutually decide.

COURSE FEES & PAYMENT PATTERN

The course fee per student for each course offered is decided and mutually agreed by both the parties as mention in annexure 1. The student shall pay the course fee directly to MULTI CAD SOLUTION (LIVEWIRE – Authorized Franchisee jaipur), Jaipur.

Validity

This contract shall be in force for three years and valid till Aug, 2022 and reviewed every year if need any changes may occurred.



V. Chandra 31/8/19
 Director
 Multi Cad Solution
 Jaipur

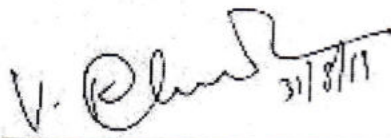
JURISDICTION

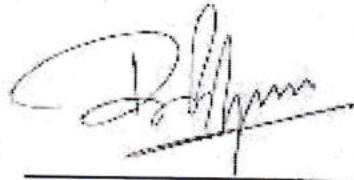
All matters, queries, disputes, or differences, whatsoever, arising between the parties touching the construction, meaning, operation or effect of this Memorandum of Understanding or out of or relating to this Memorandum of Understanding or breach thereof shall be settled through arbitration in accordance with the relevant Arbitration Act in force at such time. The Arbitration award shall be binding on both parties.

This Memorandum of Understanding shall come into effect from 22nd Aug. 2019.

For: **JECRC FOUNDATION, Jaipur**

for: **MULTI CAD SOLUTION (LIVEWIRE).**


31/8/19



Name: **Dr Vinay Kumar Chandna**

Designation: **Principal**

Date: 22nd Aug. 2019

PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-302022

Name: **Mr. RAJEEV BHARGAVA**

Designation: **Centre Head**

Date: 22nd Aug. 2019



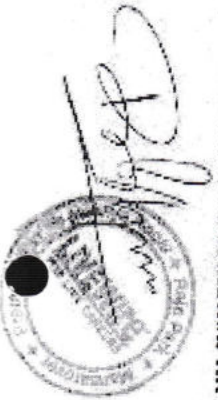
Annexure 1

Courses offered at JECRC campus under COE :-

S.No.	Course	Duration(hrs)	Fees under COE
1.	Python	40 hrs	Decided mutually as per targeted batch (no. of student's) / technology.
2.	AI (Artificial Intelligence)	56 hrs.	
3.	Robotics & Automation	80 hrs.	
4.	Machine Learning by Python	96 hrs.	
5.	Matlab (Electronics / Electrical) kit extra	64 hrs.	
6.	IIOT (Internet of Things)	48 hrs.	
7.	Cloud Computing	40 hrs.	
8.	Data Science / Block Chain	48 hrs.	
9.	Fribical Hacking	68 hrs.	
10.	Data Center Virtualization	56 hrs.	
11.	Diploma in Cloud Computing (Cloud Computing + Data Center Virtualization)	96 hrs.	

Notes :-

1. DLM (Deep Learning Module – Online Course material, ref. links, videos, special lectures, doubts clearing section) Course material access to each student's.
2. Globally Authorized Certificate after completion of course will provided to each student.
3. DLM app access for a month.
4. For Robotics and Automation kit can be purchase separately.



V. Chandan
31/8/18

JECRC Group of Institutions
Jaipur, Rajasthan
2020



**Memorandum of Understanding
Between
JECRC University Jaipur
&
Sambodhi Tech Solutions, Hyderabad**

This Memorandum Of Understanding is entered into this ____ day of ____ 2018 by and between JECRC University, Jaipur, is a private university located in the city of Jaipur, in Rajasthan (hereinafter referred to as "the University").

And

Sambodhi Tech Solutions, Hyderabad (hereinafter referred to as "the Company") - Official Training & Staffing Vendor for Salesforce.com India Pvt. Limited

Recitals

JECRC University, Jaipur is a private university, providing education in area of Engineering, Technology, Sciences, and Management.

Sambodhi Tech Solutions is in business of training, staffing, and development.

The purpose of this MOU is with reference to exploring the areas of cooperation, benefiting both the University and the Company.

Areas of Cooperation

- To impart Salesforce.com training to the students of the University by the Company.
- To facilitate regular interaction between the faculty and students of the University and the workforce of the Company.
- Company to provide regular active inputs in curriculum revision of the courses run by the University.
- The University and the Company shall explore the possibilities of mutual support in their learning, hiring and research requirements based on mutual convenience.
- In no event shall either party be liable for any indirect, incidental, special consequential damages, including but not limited to loss of profits, revenue, data or use, incurred by the other party in connection with, arising out of or under this MOU save for any such loss suffered resulting from any willful and grossly negligent act or omission of either of the parties.

Confidentiality: Each party shall maintain complete confidentiality of any information of the other disclosed during the term of this MOU.



SAMBODHI

TECH SOLUTIONS

redefining IT through higher wisdom

Terms & Conditions:

Total number of Students: 113 students (from JECRC University).

Delivery Period: 100 hours of training – Salesforce.com training which includes CRM, Admin, and Development along with working on Trailhead modules and projects, as per detailed document shared with the HOD-IT/CSE.

Commercials: Rs. 4,000/- per student.

The trainers deputed by Company will be provided free food and accommodation at the Campus for the said duration.

The trainers will abide by the rules and regulations of the University.

Payment: Shall be done as follows:

50% as advance i.e. at the beginning of the training and the remaining 50% in the middle of the training.

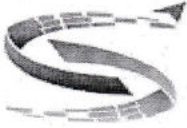
This MOU may be amended with the prior written consent of both the parties.

This MOU will be effective for 3 months from today i.e. 23rd Jan. 2018.

In Witness Whereof the parties have set their hands hereto on the day and year first hereinabove written under their respective seal of office.

Registrar,
JECRC University,
Jaipur

A. Harish Nath, CEO
Sambodhi Tech Solutions
Hyderabad



SAMBODHI TECH SOLUTIONS

redefining IT through higher wisdom

Memorandum of Understanding Between JECRC College, Jaipur & Sambodhi Tech Solutions, Hyderabad

This Memorandum Of Understanding is entered into this 23 day of January 2018 by and between JECRC College, Jaipur, is a private engineering college affiliated to RTU Kota and located at Shri Ram ki Nangal, via Sitapura RIICO Tonk Road, Jaipur-302 022 , Rajasthan (hereinafter referred to as "the College").

And

Sambodhi Tech Solutions, Hyderabad (hereinafter referred to as "the Company") - Official Training & Staffing Vendor for Salesforce.com India Pvt. Limited

Recitals

JECRC College, Jaipur is a private engg. college, providing education in area of Engineering & Technology..

Sambodhi Tech Solutions is in business of training, staffing, and development.

The purpose of this MOU is with reference to exploring the areas of cooperation, benefiting both the college and the Company.

Areas of Cooperation

- To impart Salesforce.com training to the students of the college by the Company.
- To facilitate regular interaction between the faculty and student of the college and the workforce of the Company.
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- The college and the Company shall explore the possibilities of mutual support in their learning, hiring and research requirements based on mutual convenience.
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SAMBODHI

TECH SOLUTIONS

redefining IT through higher wisdom

Terms & Conditions:

Total number of Students: 110 students (from JECRC college).

Delivery Period: 100 hours of training – Salesforce.com training which includes CRM, Admin, and Development along with working on Trailhead modules and projects, as per detailed document shared with the HOD-IT/CSE.

Commercials: Rs. 4,000/- per student.

The trainers deputed by Company will be provided free food and accommodation at the Campus for the said duration.

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Registrar,
JECRC College,
Jaipur

A. Harish Nath, CEO
Sambodhi Tech Solutions
Hyderabad



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref JECRC/2018-19/12

Date 26-7-2018

Agreement for Providing Demonstration Devices
Between

Siemens Limited, with its registered office at Birla Aurora, Level 21, Plot No. 1080, Dr. Annie Besant Road, Worli, Mumbai-400030 (hereinafter referred to as "Siemens")

And

Jaipur Engineering College and Research Centre, located at JECRC Campus, Sri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302022 (hereinafter referred to as "Institute")

WHEREAS Siemens intends to provide various equipments to the Institute for the purposes of demonstration during vocational training or teaching

AND WHEREAS the Institute is desirous of accepting such equipment on an "as is where is" basis for the purposes of demonstration during vocational training or teaching

The terms and conditions provided in this Agreement are hereby agreed between the parties (Siemens and Jaipur Engineering College and Research Centre) as follows:

- (1) Siemens shall provide the equipments listed herewith (hereinafter referred to as the "Equipments") to the Institute for the purposes of demonstration during vocational training or teaching. It is agreed and understood that this is a one-time offer and that nothing contained in this Agreement shall entitle the Institute to receive any further equipments from Siemens at any time for any purpose whatsoever.

LIST OF EQUIPMENTS

- (a) 7SD6101-5BB99-0RA0+L0R+M2G /EEX
 - (b) 7SJ8012-5EB20-1FA0/BBX
 - (c) 7UT6331-6EB92-1BB0/FF LORX
- (2) All Equipments have been tested by Siemens and are operational in accordance with the functional requirements of the Equipment. Provided, however, that it is agreed that:
 - (a) All Equipments are provided by Siemens strictly on an "as is where is" basis and solely for the purposes of demonstration during vocational training or teaching.
 - (b) Siemens provides the Equipments in "as is" condition and does not provide any other representations or warranties (express or implied) regarding the Equipment.
 - (c) Siemens shall in no event be liable or responsible in any manner whatsoever for any malfunctioning of any of the Equipments and shall not be liable to rectify these Equipments. In case any of the Equipments malfunction (whether due to any acts and omissions of the Institute or otherwise), Institute shall save, indemnify and hold Siemens harmless from and against any claim, proceeding, action, fine, loss, cost and damages, the Institute shall be liable to indemnify Siemens and such indemnification

Confidential



Jaipur Engineering College and Research Centre
Approved by AICTE & Affiliated to RTU
JECRC Campus, Sri Ram Ki Nangal
Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302022
t: 0141 2770120, 2770232 f: 0141 2770803 e: info@jecrcmail.com

V. K. Patel
PRINCIPAL
Jaipur Engineering College & Research Centre
302022
302022 - 302022



JECRC/2018-19/12

Date 26-7-2018

- (d) Siemens shall in no event be liable, whether pursuant to any indemnity or in contract, tort (including negligence and statutory duty) or otherwise: (a) for loss of profit or revenue, loss of production, interruption of operations or loss of use, cost of capital, loss of interest, loss of information and/or data, for claims arising from Institute's contracts with third parties, loss of power, voltage irregularities, frequency fluctuations, cost of purchased or replacement power; or (b) for any indirect or consequential damage.
- (e) Siemens' total liability, whether pursuant to any indemnity or in contract, tort (including negligence and breach of statutory duty) or otherwise arising by reason of or in connection with this Agreement shall not exceed in aggregate 10% of the scrap value of the Equipments per event and shall, under any circumstances, be limited in aggregate to 100% of the of the scrap value of the Equipments.
- (3) Institute represents and warrants that it shall use these Equipments strictly for the purpose of demonstration for vocational training and teaching purposes only. Institute shall not sell or use these Equipments in any manner that may result in financial gains for the Institute or any third party. In case it is proved that the Equipments are being used for purpose other than demonstration without the prior written consent of Siemens, the same shall be treated as a breach of the terms of this Agreement. In such case, Institute shall save, indemnify and hold Siemens harmless from and against any claim, proceeding, action, fine, loss, cost and damages arising out of or relating to any noncompliance with the terms of this Agreement.
- (4) Institute agrees that Siemens is and shall remain the rightful owner of all Equipments (including the intellectual property rights in such Equipment) and using such Equipments for demonstration does not in any way transfer the ownership either of the Equipments themselves or any intellectual property rights in the Equipment. If any actions or omissions of Institute results in infringement of any intellectual property rights in the Equipments (whether during demonstration or otherwise), the Institute shall save, indemnify and hold Siemens harmless from and against any claim, proceeding, action, fine, loss, cost and damages.

The terms of the Agreement are the only terms governing the usage of the Equipments. Any amendments or inclusion of additional terms shall have to be agreed in writing and signed by both parties in order to make the same applicable.

Signed
Institute

Signed
Siemens

VRK



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref: JECRC/2018-19/12

Date 26.7.2018

Letter of Undertaking to Siemens Ltd. Gurgaon, EM DG SYS.

(To be duly signed and furnished on official Letter Head)

To Whom It May Concern

With reference to the mail dtd 10.07.2018 from m/s Siemens Ltd for providing the Providing Demonstration Devices to our Institute : Jaipur Engineering College and Research Centre, located at JECRC Campus, Sri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur. The terms and conditions provided in this Agreement are agreed between the parties (Siemens Ltd. and the Institute: Jaipur Engineering College and Research Centre).

Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur 302 022

Confidential

JECRC Foundation

Jaipur Engineering College and Research Centre

Jaipur Engineering College & Research Centre

JECRC Campus, Sri Ram Ki Nangal

Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302 022

t: 0141 2770120, 2770232 f: 0141 2770803 e: info@jecrcmail.com



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref JECRC/2018-19/12

Date 26-7-2018

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- (b) 7SJ8012-5EB20-1FA0/BBX
- (c) 7UT6331-6EB92-1BB0/FF LORX

- (2) All Equipments have been tested by Siemens and are operational in accordance with the functional requirements of the Equipment. Provided, however, that it is agreed that:

- (a) All Equipments are provided by Siemens strictly on an "as is where is" basis and solely for the purposes of demonstration during vocational training or teaching.
- (b) Siemens provides the Equipments in "as is" condition and does not provide any other representations or warranties (express or implied) regarding the Equipment.
- (c) Siemens shall in no event be liable or responsible in any manner whatsoever for any malfunctioning of any of the Equipments and shall not be liable to rectify these Equipments. In case any of the Equipments malfunction (whether due to any acts and omissions of the Institute or otherwise), Institute shall save, indemnify and hold Siemens harmless from and against any claim, proceeding, action, fine, loss, cost and damages, the Institute shall be liable to indemnify Siemens and such indemnification

Confidential



Jaipur Engineering College and Research Centre

Approved by A-CTE & Affiliated to RTO

JECRC Campus, Shri Ram Ki Nangal

Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302022

T: 0141 2770120, 2770232 F: 0141 2770803 e: info@jecrcmail.com

V. K. Singh
PRINCIPAL

Jaipur Engineering College & Research Centre

303 905



Date 26-7-2018

JECRC/2018-19/112

- (d) Siemens shall in no event be liable, whether pursuant to any indemnity or in contract, tort (including negligence and statutory duty) or otherwise: (a) for loss of profit or revenue, loss of production, interruption of operations or loss of use, cost of capital, loss of interest, loss of information and/or data, for claims arising from Institute's contracts with third parties, loss of power, voltage irregularities, frequency fluctuations, cost of purchased or replacement power; or (b) for any indirect or consequential damage.
- (e) Siemens' total liability, whether pursuant to any indemnity or in contract, tort (including negligence and breach of statutory duty) or otherwise arising by reason of or in connection with this Agreement shall not exceed in aggregate 10% of the scrap value of the Equipments per event and shall, under any circumstances, be limited in aggregate to 100% of the of the scrap value of the Equipments.
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Signed
Institute

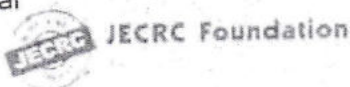
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25/7/18

Signed
Siemens

[Handwritten signature]

VRK

Confidential





JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref: SECRC/2018-19/12

Date 26.7.2018

Letter of Undertaking to Siemens Ltd. Gurgaon, EM DG SYS.

(To be duly signed and furnished on official Letter Head)

To Whom It May Concern

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Jaipur Engineering College and Research Centre
Sri Ram Ki Nangal, Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302 022

Confidential



Jaipur Engineering College and Research Centre

Jaipur Engineering College and Research Centre

JECRC Campus, Sri Ram Ki Nangal,

Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302 022

T: 0141 2770120, 2770232 F: 0141 2770808 e: info@jecrcmai.com

Memorandum of Understanding

Is executed on 12th October, 2018

between

TechieNest Pvt. Ltd., hereinafter referred to as "TechieNest", A company duly incorporated under the provisions of Companies Act 1956, having its registered office at 7 Jawahar Nagar Colony, Gate No 1, near Glass Factory, Tonk Road, Jaipur - 302015 represented through its authorised signatory Mr Chandra Bhan, party of the first part.

And

Jaipur Engineering College & Research Centre, hereinafter referred as "JECRC, Jaipur" represented through its, Principal Dr Vinay Kumar Chandana, party of the second part
For

Collaboration of Training/workshops/Seminar/Projects is for the 3 years w.e.f. 12th October 2018.

TechieNest Pvt. Ltd., Jaipur DELIVERABLES:

1. TechieNest will sponsor INR 1 lakh per year in two instalment.
2. TechieNest will run all technical courses for Electrical & Electronics branch.
3. TechieNest will set up a centre of Excellence in Embedded Systems at JECRC campus.
4. TechieNest will set up training kit in excellence centre (Refundable after training).
5. Students will trained to participate in national level events.
6. The cost of training will be discussed before the start of training course/ making any announcement to the students.
7. 100 % Placement Assistance to each Participants/ Students who will complete minimum three trainings from us.
8. Lifetime Free of cost hands on practice membership card to each participants.
9. A Chance to each participant to win TechieNest Scholarship for any future training on behalf of final training assessment test.
10. Golden opportunity to do summer internship as TechieNest Research Intern at one of our 7 offices across India.
11. TechieNest will provide **Certificate to each Student Coordinator**.
12. TechieNest will provide participation **Certificate** to each participants.
13. TechieNest will provide letter of appreciation to college and faculty coordinators.
14. TechieNest will help students to organize technical fest/event.

V. Chandana
PRINCIPAL
Jaipur Engineering College &
Research Centre

For TechieNest Private Limited
Chandra Bhan

Director

JECRC, Jaipur DELIVERABLES:

1. JECRC will arrange in house training for EC and electrical branch on regular basis.
2. Provide following technical requirements for setting Excellence Centre: -
 - A room.
 - 1 projector
 - White board and marker
 - Extension board (for power supply)
3. Assign at least 2 faculty coordinators from each branch who will support from starting to end of the training.
4. Arrange seminars to interact with students.
5. Try to get maximum registration for Training.
6. Provide Association Certificate/Momentous to TechieNest.
7. TechieNest logo and name will be placed in JECRC website and all social media pages.
8. TechieNest Poster, banner, standee in respective branches.
9. TechieNest name, logo, banner, canopy during annual fest/conference of college.

Terms & Condition

1. Second party will not collaborate/invite any other company/institute/Member for EC and electrical branch and during college fest.

Signature on Behalf **JECRC, JAIPUR**



Name: Dr Vinay Kumar Chandana

Title: Principal

JECRC, JAIPUR

Date:

PRINCIPAL
Jaipur Engineering College &
Research Center
Tonk Road, Jaipur - 302 015

Signature on Behalf of **TechieNest Pvt
Ltd, Jaipur**

For Technest Private Limited


Director

Name: Chandra Bhan

Title: Director

TechieNest Pvt Ltd, Jaipur

Date:

**MEMORANDUM OF UNDERSTANDING
GETTING ASSOCIATED FOR INTELLECTUAL PROPERTY ACTIVITIES WITH
JECRC COLLEGE**

This Memorandum of Understanding (MoU) is made on this Tuesday, the 24th day of December 2019 by and between

JECRC College having its main campus address as Plot No. IS-2036 to IS-2039 Ramchandrapura Industrial Area Jaipur, Sitapura, Vidhani, Rajasthan 303905 (hereinafter referred to as '**JECRC College**', which expression shall include their subsidiaries, branch offices, associations, administrator, legal heirs, group institutions, etc.).

AND

Verispire Inc., a California, (USA) registered company through its Indian entity Verispire Technologies Pvt. Ltd. (herein after referred to as '**Verispire**') having its offices at C-25, Second Floor, Sector 8, Noida, Uttar Pradesh 201301, which expression shall include their subsidiaries, branch offices, associations, administrator, legal heirs, etc.

1. BACKGROUND:

- 1.1. Verispire is an intellectual property consulting company engaged in creating valuable business assets for our clients by safeguarding their intellectual property. We provide the best in class and wide array of intellectual property consulting services to our clients worldwide.
- 1.2. JECRC College has its campus in Jaipur, the capital city of Rajasthan and the famous tourist and business city in north-western India. The 32-acre JU campus combines unique classical architecture and thoughtful layout and landscaping to create a perfect learning ecosystem. JECRC College is driven by the spirit of innovation-led research. This is spelt out in infrastructure as well as practices.
- 1.3. Verispire also conducts hands-on workshops, lecture series and seminars to educate and train the in-house personnel of companies, educational institutions, government and semi-government bodies towards aspects of creation, management and commercialization of IP.
- 1.4. Whereas, JECRC COLLEGE is desirous of getting associated with Verispire for Developing Innovation and Research initiatives or streamlining existing IP process, if any with the following primary objectives:
 - 1.4.1. **Facilitate in developing IP Curate Labs with all the activities mentioned in the proposal and mutually agreed (Annexure A)**
 - 1.4.2. Facilitate patent searching, drafting and patent filing.
 - 1.4.3. Facilitate in patent prosecution cycle
 - 1.4.4. **Provide complete IP management**
 - 1.4.5. Encourage creativity and innovation.
 - 1.4.6. Provide other IP filings (Trademark, Design, Copyright, etc), the time taken to do each task mentioned clearly in Annexure C

- 1.4.7. Organize training programs, seminars, and workshops.
- 1.4.8. Encourage creativity and innovation.
- 1.4.9. Recommend initiatives to sensitize and strengthen JECRC College on IP.
- 1.4.10. Verispire will look out the end to end IP activities of JECRC College.
- 1.4.11. **Commercialization of Intellectual Property.**
- 1.4.12. Recommending and creating IP Policy for Institution

The two parties to the MoU, with the intention of both being legally bound, accept the following terms and conditions:

2. RESPONSIBILITIES OF VERISPIRE:

- 2.1. To act as a resource body to handle the complete innovation and research activities of the JECRC College.
- 2.2. Offer total support and guidance in the field of IP, on a paid and complementary basis as the case may be.
- 2.3. To act as a resource body for rendering research & intellectual property training programs, conducting seminars and workshops including the development of program structure and module development.
- 2.4. To recommend initiatives to sensitize and strengthen the innovation culture in JECRC College
- 2.5. To look after all IP activities (Patent, Trademark, Copyrights, Design) of JECRC College.

3. RESPONSIBILITIES OF JECRC COLLEGE GROUP OF INSTITUTIONS:

- 3.1. To provide infrastructure for establishing IP Curate Lab – an IP Cell powered by Verispire and administrative support in case required for IP related activities.
- 3.2. To encourage the faculty members and students to associate with sensitization programs on IP.
- 3.3. All other support and assistance that would be required in seamlessly carrying on all the activities in IP Curate Lab.

4. INVOICING

- 4.1. Verispire will raise an invoice according to the type of project (pricing in annexure).
- 4.2. Verispire will raise an invoice for government fee in advance and any government filings or submissions will be done within 3 to 5 working days of receiving the fee in Verispire's accounts.
- 4.3. JECRC College shall make the payment towards the invoice raised by Verispire within 5 days of receipt of the invoice. In case the payment is delayed for more than 15 days then an interest of 1.5% per month, on the invoiced amount shall be applicable.
- 4.4. All Invoice will be generated as per mutually agreed price. It is to be noted that the fees mentioned in the annexure are exclusive of GST Tax charges and the same will be applied over the fee amounts mentioned in the annexure.

5. INTELLECTUAL PROPERTY RIGHTS:

- 5.1. All intellectual property rights in the training material and the method of training is sole property of Verispire and will completely vest with Verispire.

6. COORDINATION AND CONTACT PERSONS:

- 6.1. For Verispire: The contact person for the purpose of services and support activities rendered under this MoU will be:
Param Doshi
Business Development Executive
Verispire Inc.
Email: param.doshi@verispire.net
Contact: 9560087801
- 6.2. The contact person at JECRC COLLEGE for the purpose of support activities under this MoU will be:
Prof. Manish Jain
Deputy Director, Special Projects,
JECRC College
Email: manishjain.me@jecrc.ac.in
Contact: 7229823455

7. FORCE MAJEURE

In the event of non-fulfillment of the terms and conditions due to any reason of force majeure namely fires, wars, riots, strikes, natural calamities, etc., neither JECRC College nor Verispire shall be held responsible for any loss or consequential loss.

8. LIABILITIES

- 8.1. JECRC College shall not, however, be liable for:
- a. any payments of claims by employees or associates of Verispire.
 - b. discharging any financial commitments made by Verispire outside the scope of this MoU and without consulting JECRC College.
 - c. any suit on account of demands and other laws by Verispire which have no nexus with the object of the MoU being entered into.
- 8.2. Verispire shall not, however, be liable for:
- a. any payments of claims by employees or associates of JECRC College.
 - b. discharging any financial commitments made by JECRC College outside the scope of this MoU and without consulting Verispire Inc.
 - c. any suit on account of demands and other laws by JECRC College which have no nexus with the object of the MoU being entered into.

9. BREACH OF MoU:

Both parties to the MoU will have the right to terminate the MoU, in case the terms and conditions of the MoU are violated by either party, by giving written notice of 3 months to the violating party.

10. AMENDMENT TO THE MoU

The obligation of JECRC College and Verispire have been outlined in this MoU. However, during the operation of the MoU, circumstances may arise which call for alteration or modifications of this MoU. These modifications/alterations will be mutually discussed and agreed upon in writing.

11. PERIOD OF VALIDITY

This MoU shall be initially valid for 3 years from the date of signing the MoU and to be renewed subsequently by mutual consent of both the parties.

12. DISPUTE RESOLUTION

Any dispute arising with regard to any aspect of this MoU shall be settled through mutual consultations and agreements by the parties to the MoU.

For JECRC College

For Verispire Inc

Prof. V K Chandna, Principal,
Jaipur Engineering College & Research Centre

Sandesh Agarwal, Sr. Manager,
Verispire Inc.

ANNEXURE A: SERVICE MODEL/OFFERING

Payment Plans	Features
Advanced	<ul style="list-style-type: none"> - Formation of IPCurate Labs for end-to-end IP and IP Consultancy processes - Payment of prosecution support services according to Annexure B - 100 Prior Art Searches complimentary from team IPCurate - College Specific E-mail ID for all IP requirements - Monthly team-visits for in IPR and collection of IDF forms, discussions with the inventor - Initial class-to-class awareness seminars with teacher training on IP conducted in the classes of students of the institute once in a year - Guest lectures on IP by an IP-expert on random topics mutually decided on a regular basis - Training programs – separate for faculty and students as FDPs and SDPs on a regular basis - IP value recognition and scalability through proper IP licensing and technology transfers on novel ideas with yearly audit. - With 1 dedicated account manager and dedicated technical manager, plus one year subscription of IP Management technical tool will be provided and basic in-house searching tool.

ANNEXURE B: FILING FEE STRUCTURE

Patent Applications(For Universities)

Description	Government Fee(in INR)	Professional Fees(in INR)	Total Fees(in INR)
SEARCH & OPINION			
Patentability Search	NA	6,500	6,500
PREPARATION & FILING			
Provisional Patent Application	8,000	14,000	22,000
Complete filing of Provisional Patent Previously Filed	NA	18,000	18,000
Complete Patent Application(Preparation & Filing) with Complete Specification	8,000	28,000	36,000
REQUESTS			
Early Publication Request(Can be filed before scheduled 18 months from time of filing)	12,500	2,500	15,000
Request For Examination(Mandatory)	20,000	3,000	23,000
PROSECUTION			
Office action response	NA	12,000	12,000
Hearing and Filing response, if required	NA	15,000	15,000
Forwarding of Patent Registration Certificate	NA	1,000	1,000

Other IP Related Activities

Development of IP Policy

Requirement	Professional Fees	Total
Every industry must have a strong IP Policy to protect its IP and safeguard the company's IP system	10000 INR	10000 INR

Other IP Services

Trademark Applications

Description	Government Fee(in INR)	Professional Fees(in INR)	Total Fees(in INR)
SEARCH			
Trademark Availability Searches per mark per class with report	NA	700	700
FILING			
Trademark Registration (Preparation & Filing)	9,000	7,500	16,500
Trademark Objection Reply	1,000	5,000	6,000
PROSECUTION			
Office Action Response	NA	7,000	7,000
Hearing, if needed	NA	9,000	9,000
Receiving and Forwarding of Trademark Registration Certificate	NA	1,000	1,000

Industrial Designs

Description	Government Fee(in INR)	Professional Fees(in INR)	Total Fees(in INR)
FILING			
Preparation & filing of Design registration application	7,500	7,500	15,000
Industrial Design Objection Reply	NA	7,000	7,000
PROSECUTION			
Office Action Response	NA	7,000	7,000
Hearing, if needed	NA	12,000	12,000
Receiving and Forwarding of Design Registration Certificate	NA	1,000	1,000

Copyright Registration Filing

Description	Government Fee(in INR)	Professional Fees(in INR)	Total Fees(in INR)
FILING			
1. Literary/Artistic work or	500	7,500	8,000

Software Code			
2. Audio Recordings	2,000	8,500	10,500
3. Cinematographic Film	5,000	9,500	14,500
PROSECUTION			
Receiving office action, studying of objections received and preparing and filing of appropriate responses at the Copyright Office	NA	5,500	5,500
Attending hearings, preparing and filing written statements at the Copyrights Office, if needed	NA	10,000	10,000
Receiving and Forwarding of Copyright Registration Certificate	NA	1,000	1,000

Paralegal Services

Govt. Fees	Professional Fees	Total
As per actuals	Project-to-project basis	-

ANNEXURE C: TIMEFRAMES

S.No.	Services	Timeframe Required to Complete Task(Working Days)
1	Patentability Search	3-5 Days
2	Provisional Drafting	5-7 Days
3	Complete Drafting after Provisional	15-18 Days

4	Invalidation/Validity Search	7-10 Days
5	Freedom to Operate	15-20 Days
6	Infringement Analysis	4-5 Days
7	State of Art Search	15-20 Days
8	Landscape Analysis	20-30 Days

**Payment of services mentioned in Annexure B which were not enlisted earlier to occur on a case-to-case basis.

It is to be noted that the above fees are exclusive of GST Tax charges and the same will be applied over the fee amounts mentioned in this document.

**On filing of more than 10 claims, an extra applicable 1,600 INR Govt. Fee and 500 INR Professional fee

**On filing of more than 30 sheets on specifications, an extra applicable 800 INR Govt. Fee and 300 INR Professional Fee

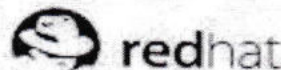
*For PCT and International Filings, fee schedule on request.

**It is also to be noted that travel arrangements and accommodations will be paid and accounted for by the University

-End of Document

**PARTNER ACCEPTANCE DOCUMENT
INDIA**

A-201, Supreme Business Park,
Hiranandani Gardens,
Powai, Mumbai - 400 076
+91 22 61147588, www.redhat.com



Parties	
Partner information	Red Hat India Private Limited
Company name: Jaipur Engineering College & Research Centre	Contact Name: Abhijeet Roy
Address: JECRC Campus, Shri Ram Ki Nangal, Via Scapura BICO, Opp: EPIP Gate, Tonk Road, Jaipur 302 022 (India)	Email: aroy@redhat.com
Contact name: Dr. Vinay Kumar Chandna	Tel no. +91-22-61147588
Email: principal@jecrc.ac.in	Fax: +91-22-61147599
Telephone: 9891406784	

Territory
India

This Partner Acceptance Document, upon execution, authorizes you to participate in one or more of the Red Hat Partner Programs (marked below) in the Territory indicated above and sets forth the terms of your participation. If no Territory is identified above, the Territory will default to the country of your address above. The "Agreement" is comprised of this Partner Acceptance Document(s), the Partner Terms and Conditions, each applicable Program Appendix and transaction document(s) (which may be referred to as "Order Forms") entered into pursuant to these terms (collectively, the "Agreement"). Additional Program Appendices may be added by executing additional Partner Acceptance Documents.

Applicable Program Appendices	Program(s)	Location of Program Terms
<i>(mark all that apply)</i>		
X	Red Hat Academy Program	Attached

Applicable Terms and Conditions (choose only one)	Partner Terms and Conditions
X	The Partner Terms and Conditions set forth in the attached Appendix 1 and, if not attached, then www.redhat.com/licenses/partners .

Additional Terms

Please sign below and fax this Partner Acceptance Document to +91-22-61147588 or send a pdf file by e-mail to aroy@redhat.com. Also, please courier the original signed document to Abhijeet Roy. Each Party has executed this Partner Acceptance Document by its duly authorized representative and by its signature agrees to be bound by the terms of the Agreement.

Jaipur Engineering College & Research Centre

Signature: *V. Chandna*

Printed Name: Dr. V. K. Chandna

Title: Principal

Date: 12/10/17

Principal
Jaipur Engineering College & Research Center
Tonk Road, Jaipur - 302 002

Red Hat India Private Limited

Signature: *Sovik Bromha*

Printed Name: SOVIK BROMHA

Title: DIRECTOR FINANCE

Date: 7/11/17

Stamp Duty

redhat
BID DESK APPROVED
Initials/Date

For CITIZEN/RENTY/30 OF BANK LTD,
 CITIZEN/RENTY/CO-OP,
 BANK LTD, E.C. CLOWY,
 JERALI (W),
 JERALI (W),
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1. **Background and Purpose.** This Program Appendix ("Appendix") establishes the terms and conditions under which Partner will participate in the Red Hat Academy Program ("RHA" or "Program") in the Territory. Under the Program, Red Hat provides Partner an Internet deployed and managed Curriculum, Software, and Services and Partner provides the facilities and Teachers and delivers the Courses to Students as set forth in this Appendix. Capitalized terms not defined in this Appendix shall have the meaning given to them in the Partner Agreement between the parties, including the Partner Terms and Conditions.

2. **Definitions.**

"Partner" means a qualified university, academic institution, or entity with a workforce development program that acquires the Red Hat Academy Subscription for its own use to be provided to Partner's Students and without the right to directly or indirectly sell, resell, remarket, or, in whole or in part, otherwise distribute Red Hat Academy. Eligibility of a Partner is determined at Red Hat's sole and exclusive discretion.

"Appendix Effective Date" means the first date when both parties have fully accepted or signed the Partner Agreement including this Appendix.

"Curriculum" means the Courses, Course Materials, Manuals, and any and all instructional content, assessment, tests, and instructional materials included therein whether in print or electronic format, provided by Red Hat as part of the Red Hat Academy Program.

"Course" or "Courses" means the specific courses or units of study that may be taught under the RHA and as set forth in Exhibit A, Exhibit C and as otherwise offered by Red Hat under the Red Hat Academy Program.

"Course Materials" means any and all instructional and educational content provided directly or indirectly by Red Hat, including without limitation designs, course names and numbers, course materials, Manuals, methodologies, software, scripts, processes, instructional materials, slides, notes, lab exercises, assessment tools, quizzes, tests, answer keys, scripts, files, instructor guides and/or any other materials in any format, provided in connection with the Curriculum whether distributed in print, electronic, or video format, including, without limitation, Student Kits, Exams, Exam Kits, and Exam Authorizations.

"Documentation" means user manuals, training materials, software descriptions and specifications, brochures, technical manuals, license agreements, supporting materials and other printed information provided in connection with the Learning Services, in any format.

"Exam" means a Red Hat performance based certification exam.

"Manuals" means those manuals used by Red Hat instructors in instructing Technical Training courses. Manuals are different from the Course Materials and shall not be used in or brought into the Courses.

"Program Subscription Fee" means the annual subscription fee paid by Partner that provides Curriculum, Software and Services to the Partner and enables Partner to teach the Curriculum to Students as set forth herein or in separate mutually agreed order.

"Services" means Learning Services provided as part of the Program.

"Student(s)" is a person enrolled full or part-time in the Partner's school, institution of learning and admitted to a degree awarding program (e.g. diploma, or degree, program, or certificate program) and attends a Course as taught by a Teacher.

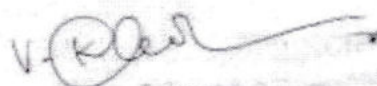
"Student Fee" shall mean the per Student per Course fee set forth in Exhibit A of this Appendix, if applicable.

"Software" means Red Hat Enterprise Linux, JBoss Enterprise Middleware and other software programs branded by Red Hat, its Affiliates and/or third parties including all modifications, additions or further enhancements delivered by Red Hat.

"Teacher" is a Partner employee or contractor who meets all qualifications determined by Red Hat who teaches and instructs Courses for the Partner.

"Technical Training" means the courses and certification exams offered publicly and commercially by Red Hat on an open enrollment or on-site basis, including the Manuals used by Red Hat instructors in instructing technical training courses and the Student Manuals included in the Course.




Jyoti Kulkarni
Red Hat Academy
2015-12-01

3. License and Ownership


- 3.1 **License Grant.** Upon Partner paying the applicable Fee(s), Red Hat grants Partner a non-exclusive, revocable, fully paid license, with no right to sublicense (including, but not limited to, sell), to use the Curriculum and Course Materials pursuant to the Agreement as follows: (a) distribution of Course Materials is limited to one (1) copy per Instructor and one (1) copy per Student; (b) Curriculum are provided solely for the use by Instructors and Students in the Course and such Curriculum may not be copied or transferred without the prior written consent of Red Hat; and (c) Curriculum must be taught sequentially and completed by Partner in no less than eight (8) weeks. The Curriculum shall not be used to teach or instruct to any person who is not officially enrolled as a Student and admitted to a degree, diploma, or certificate awarding program of Partner.

Notwithstanding the foregoing, all Curriculum is the sole property of Red Hat and its licensors, and are copyrighted by Red Hat unless otherwise indicated therein. Red Hat and its licensors will have sole ownership of any and all Curriculum including but not limited to methodologies, software, processes, or other intellectual property developed during the performance of the Services. Red Hat will provide Software for the use by the Partner and Students in the Course. Use of the Software is subject to the End User License Agreement set forth at http://www.redhat.com/licenses/rha_eula.html. The Services may only be used by Partner. Partner is solely responsible for providing prerequisite skills, assessing its Students' suitability for use of the Curriculum, delivery of all instruction to Students, all grading and assessment of Students, and handling of all Student and Teacher information. Partner hereby agrees that Software used outside of the Program is covered under terms and conditions of the Enterprise Agreement including Appendix 1, Subscription Services, set forth at www.redhat.com/licenses, which may be amended from time to time by Red Hat in its sole discretion.

- 3.2 **Retained Rights.** No part of the Curriculum may be photocopied or duplicated by any means, whether photographic, or electronic, or mechanical, or sold or distributed in any other delivery format whether in print or electronic, or used as the basis for any other training product or service, without written permission from Red Hat. Partner's rights in the Curriculum are limited to those license rights expressly granted under this Appendix, and Red Hat retains all rights not expressly granted. Partner will not (a) modify the Curriculum in any manner; or (b) use the Curriculum for any purpose not specifically permitted by this Appendix. Red Hat and its licensors will own and retain all right, title, and interest in the Curriculum and all intellectual property rights inherent therein, including without limitation all changes and improvements requested or suggested by Partner, notwithstanding any use of terms such as "purchase", "sale", or the like within the Agreement. Partner represents and warrants that its use of the Curriculum will be to fulfill obligations under this Appendix. Any unauthorized use of the Curriculum will be deemed a material breach of the Agreement. Prior to providing Students with access to Curriculum, Partner will require each Student to sign or otherwise assent (in a binding manner) to the Enterprise Agreement with Appendix 2, Training, Training Units, and Consulting Units set forth at <http://www.redhat.com/licenses>, which may be amended from time to time by Red Hat in its sole discretion. Partner's internal use of Courses or Exams is subject to the Enterprise Agreement with Appendix 2, Training, Training Units, and Consulting Units set forth at <http://www.redhat.com/licenses>, which may be amended from time to time by Red Hat in its sole discretion.
- 3.3 **Permitted Marks.** Partner may only use the logo(s) set forth in Exhibit B to the Program, based upon the Partner level in Exhibit A, in conjunction with the promotion of Partner providing Red Hat Academy Courses to Students. Partner may use Red Hat Distinguished Academy Logo set forth in Exhibit B if all Partner's Teachers are certified Red Hat Professionals for the Red Hat Software Courses they teach. All other Partners may use the Red Hat Academy Logo set forth in Exhibit B. Partner may not use this logo in general advertisements or marketing materials that do not specifically address or support the sale of Courses under the Program.
- 3.4 **Copyright Notices.** Partner will ensure that all copies of the Curriculum in Partner's possession or control incorporate copyright and other proprietary notices in the same manner that Red Hat incorporates such notices in the Curriculum or in any manner reasonably requested by Red Hat. Partner will promptly notify Red Hat in writing upon its discovery of any unauthorized use of the Curriculum or infringement of the Curriculum or Red Hat's proprietary rights in the Curriculum.
- 3.5 **Use of Red Hat Software.** Any use of Red Hat Software is subject to Red Hat's standard agreements including the Enterprise Agreement set forth at www.redhat.com/licenses, the applicable Red Hat End User Agreement(s) set forth at www.redhat.com/licenses/eulas and/or any other mutually signed written agreement with Red Hat as applicable.

4. Fees and Payment

- 4.1 **General.** Any fees or charges ("Fees") will be due and payable by Partner in accordance with the Agreement. Partner may purchase from Red Hat directly, or through an Authorized Red Hat Reseller Partner. If Partner acquires Subscriptions, Courses and/or Services through a Red Hat Academy Program Reseller, the Fees for such Subscriptions, Courses and/or Services will be determined by such Reseller and may vary from the Red Hat Fees.
- 4.2 **Direct.** If Partner purchases directly from Red Hat, Fees will be identified by Red Hat on an Order Form and are (a) due upon Red Hat's acceptance of an Order Form, and (b) payable in accordance with this section. All Fees are stated in United States


PRINCIPAL
Jaipur Engineering College &
Research Center
Tonk Rd., Jaipur - 302 008

Dollars. Partner must pay all Fees within thirty (30) days from the date of invoice, without regard for when, and whether, Partner collects payment from a Student. Fees do not include out-of-pocket expenses or shipping costs. Partner agrees to reimburse Red Hat for its reasonable expenses incurred in performing the Services including travel, lodging and non-routine supplies, in accordance with Red Hat's travel and expense policies. All Fees are non-refundable. Red Hat will invoice Partner upon Red Hat's receipt of a purchase order for any amounts due to Red Hat pursuant to this Agreement; provided, however, that the terms of such purchase order will not amend, supplement or modify the terms of this Agreement or be binding on Red Hat. Red Hat reserves the right to change the credit terms or terminate the Agreement if Red Hat has not received payment within five (5) days of when it is due. Renewal Fees will be the same price listed in the Order Form.

5. **Publicity.** Red Hat and Partner shall each have the right to identify Partner as a Red Hat Academy partner, provided, however, that for any press release, media alert, or other public communication, each party shall obtain the other party's review and written consent before publishing such information in any form.

6. **Term, Termination and Mandatory Disclosure**

6.1 **Term.** Unless otherwise specified in writing by the parties, the initial term of this Appendix shall be one (1) year (the "Initial Term"). Thereafter, the term for this Appendix shall renew for successive terms of one (1) year each (each, a "Renewal Term"), with each Renewal Term beginning on the anniversary of the Initial Term unless either party gives written notice to the other of its intention not to renew at least sixty (60) days prior to the commencement of the next term. As used herein, the Initial Term and each Renewal Term individually refer to a "Term" and collectively the "Appendix Term."

6.2 **Termination.**

6.2.1 **Termination for Breach.** Notwithstanding anything to the contrary Red Hat may terminate this Appendix as provided for under Section 13.2 of the **Partner Terms and Conditions Appendix**, or in the event (a) Partner fails to pay an invoice when due, (b) Partner commits a breach of this Agreement and fails to remedy that breach within 30 days of receipt of notice of breach, or (c) as otherwise provided in the Agreement, Partner may terminate the Appendix in the event Red Hat commits a material breach of the Appendix and fails to remedy such breach within 30 days of receipt of notice of material breach.

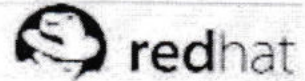
6.2.2 **Termination for Convenience.** Either Party may terminate this Appendix, without prejudice to any other right or remedy, for any reason upon sixty (60) days notice in writing to the other Party.

6.3 **Survival.** Upon expiration or termination, all rights and obligations of the Parties under this Appendix will terminate immediately except, Section 3.2, 3.4, 4.2, Section 3 of Exhibit A, and Exhibit C will survive such termination or expiration. Termination of this Agreement shall not affect any agreements between Red Hat and any Students.

6.4 **Mandatory Disclosure.** For the avoidance of doubt, Partner may disclose the existence of this agreement and relevant terms, if it is required to do so by applicable law or regulation. Before disclosing the information, to the extent reasonably practical, Partner shall first notify Red Hat of the disclosure requirement (if it can provide notice without breaching any legal or regulatory requirement).



V. [Signature]
PRINCIPAL
Jawahar Engineering College &
Mumbai
KIRK ROAD, ANDHRA PRADESH, INDIA



1. Red Hat Academy Subscription. Red Hat Academy Subscriptions contain the following:

- (a) Authorization and access to, and use of, the Curriculum in accordance with the terms set forth herein. The Program Fee includes Curriculum and Fees for the initial two hundred (200) Students. Additional Student Curriculum access may be purchased on a per Student basis.
- (b) Exams and exam delivery are not included in the Red Hat Academy Subscription and may be purchased separately; and
- (c) A list of standard Course offerings in the Red Hat Academy is available from Red Hat or a Red Hat Academy Reseller.

2. Partner Requirements.

- (a) Partner is solely responsible for providing pre-requisite skills, assessing Student's suitability for use of the Course(s) and Curriculum, appropriate use of any internet access, delivery of all instruction to Students, all grading and assessment of Students, and handling of all Student information.
- (b) Partner must notify Red Hat of the number of Students in each Course within one business day after the Course begins.
- (c) Partner will provide Students with access to Student software labs. Access to such labs may be purchased through a Red Hat Lab Partner, through a third party cloud hosting provider authorized to provide such software lab access, or may be provided by the Partner through its own resources.
- (d) Partner shall maintain at least one (1) Red Hat Certified Professional during the Appendix Term. Partner will notify Red Hat upon appointment or replacement of Red Hat Certified Professionals.

3. Red Hat Academy Subscription Fees. Partner shall pay the Program Fee, if applicable, annually, before the beginning of the Initial Term and each Renewal Term. Courses and additional services can be ordered by Partner from a Red Hat Academy Reseller. All Red Hat Services purchased during the Appendix Term must be used within each one (1) year Term in which it was purchased or such Red Hat Services shall be forfeited.



V. Oberoi
PRINCIPAL
Jaipur Engineering College &
Department of
IT & ITES, Jaipur - 302004

Red Hat Academy:

RED HAT[®]
ACADEMY

● **RED HAT[®]**
ACADEMY

RED HAT[®]
ACADEMY

● **RED HAT[®]**
ACADEMY

V. @red
[Faint text and stamp]



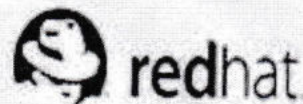


EXHIBIT C
RED HAT ACADEMY, COURSES, AND ADDITIONAL SERVICES

1. Red Hat Services

SKU	Title	Description	Price	Term
RHA100	Red Hat Academy Standard Program	Access for 200 students to approved Red Hat Academy courses (e.g. RH124 + RH134, RH254, CL110, JB125, JB225)	\$0	1 year
RHA101	Red Hat Academy Standard Program: Add-on Student	Access for 1 student to approved Red Hat Academy courses (e.g. RH124 + RH134, RH254, CL110, JB125, JB225)	\$0	1 year

Note 1: All Red Hat Academy Program services purchased during the Appendix Term must be used within each one (1) year Term in which it was purchased or such services shall be forfeited.



V. K. Singh
PRINCIPAL
Jaipur English College &
Residential
Tonk Road, Jaipur - 303 905

भारतीय गैर न्यायिक



INDIA NON JUDICIAL

ଓଡ଼ିଶା ओडिशा ODISHA

37AA 809280

MEMORANDUM OF UNDERSTANDING (MOU) BETWEEN
SAKROBOTIX LAB Startup Centre - IIT Bhubaneswar
AND

This is an agreement between "Party A", hereinafter called SAKROBOTIX LAB, BHUBANESWAR, ODISHA, INDIA and "Party B", hereinafter called Jaipur Engineering College and Research Centre, Jaipur, INDIA (JECRC).

I. PURPOSE & SCOPE:

The purpose of this MOU is to clearly identify the roles and responsibilities of each party. The MOU is intended to establish a mutual agreement in establishing a Robotics Research Centre in the Campus of JECRC, providing Internships to JECRC Students and to engage the students in Robotics training and also offering Robotics product development exposure.

II. BACKGROUND:

SakRobotix Lab Pvt Ltd

SakRobotix is an Indian Robotics Startup headquartered in Bhubaneswar, Odisha, India. It is a Startup Centre, IIT Bhubaneswar that designs, develops, research and sells Robots, Robotics DIY kit, Robotics toys and offers online and offline education. The company's hardware product includes 35 different

For SakRobotix Lab Pvt Ltd

LAK
mitra
Managing Director

V. P. Reddy
Jaipur, India

No 11916
28/4/12
10/1
Smt. Rosabim Das Patra
Plot No-769, 1st Floor
Scheme Nagar - Bhubaneswar

DISTRICT TREASURY
KHURDA, BHUBANESWAR
27 APR 2012
88
ADDL. TREASURY OFFICER

Chandrasekhar Das
SIGNATURE OF PURCHASER

28/4/12
NIRANJAN NANDI
STAMP VENDOR
BHUBANESWAR COURT
REGD. L. NO-3/92
ID. No-8

Robotics DIY (Do it yourself) learning kit, the robotics teddy bear, the stair climbing robot and the teaching robot. SakRobotix's modern platform Gyanx is a open robotics learning platform with unique and application orient courses. SakRobotix have trained more than 1 Lakh students on robotics since its inception by organizing various robotics workshop & programs across India. The company establishes "SakRobotix Research Centre" across premium institutes, as an Industry Institute Partnership Program where the company focuses on engaging students into robotics product development and produces outcome as product with patent. SakRobotix establishes its franchises to make available of quality robotics education across India. The company is in the journey making India the next robotics capital of the world.

JECRC College

Jaipur Engineering College & Research Centre (JECRC) is recognized as one of the best Technical Institutions in Rajasthan and is aiming to adapt to the changes that the Technical Education demands today at the global level. The College situated at Tonk Road, Jaipur, established in the year 2000, conducts six UG courses viz., Computer Science & Engineering, Information Technology, Mechanical Engineering, Electronics & Communication Engineering, Electrical Engineering and Civil Engineering. The College is approved by the AICTE, New Delhi and affiliated to Rajasthan Technical University, Kota (Rajasthan). The College student strength exceeds 4500 and has an active collaboration with several industries. Our alumni have been placed in industries of repute and have also been pursuing higher studies at prestigious universities. It enjoys an enviable patronage so much so that it has become the most sought-after for students with a variety of academic pursuits.

III. SAKROBOTIX LAB RESPONSIBILITIES UNDER THE MOU

1. Each and every SakRobotix RC members will receive a membership club identification card.
2. 6 Full days 100% hands on Engagement, exclusively for all the "SakRobotix RC" Members at the College premise, with the schedule 3 days (initial hands on session) + 1 day (Product development) + 1 day (Product Development) + 1 day (Product development).
3. Robotics kits & components FOR the SRC:-

Robotics Kits & Component :- (These kits have multiple sensor, robot development board, dc motor, wheels, mechanical body, connectors & respective component as per the robot)

1. Autonomous robotics kit Box - 6 No's
2. Underwater robotics kit Box - 6 No's
3. BreadBotix Robotics Kit Box - 6 No's

For SakRobotix Lab Pvt. Ltd.

Manoj Kumar
Director

V. P. Singh
Director
Jaipur Engineering College & Research Centre

Robotics Lab Components:-

1.	No's
2.	
3.	No's
4. IR Sensors/Obstacle sensor	- 6 No's
5. Humidity Sensor	- 2 No's
6. Temperature sensor	- 6 No's
7. Light Sensor	- 6 No's
8. Ultrasonic sensor	- 2 No's
9. DC Motor	- 6 No's
10. wheels	- 6 No's
11. Castro wheel	- 3 No's
12. 4 Wheel robot car chassis kit	- 3 No's
13. Hacksaw	- 1 No's
14. Hammer	- 1 No's
15. C-Clamp	- 6 No's
16. Wire Strippers	- 5 No's
17. Digital Multi Meter	- 4 No's
18. Soldering iron	- 4 No's
19. soldering stand	- 4 No's
20. coded wire	- 20 meter
21. 12 volt dc power supply adapter	- 4 No's
22. De-soldering gun	- 2 No's
23. BreadBoard	- 6 No's
24. Basic electronics components	- 1 set
25. Resistor Box	- 1 No's
26. Capacitor Box	- 1 No's
27. Transistor, LED)	- 2 Box
28. Relay DPST	- 4 No's
29. 555 ic	- 4 No's
30. buzzer	- 4 No's
31. Zero PCB	- 16 Pcs
32. PCB hand drilling tool	- 2 pcs
33. Single stand wire	- 10 metre

4. Involving the SakRobotix RC members in the Research and Product Development.

5. SakRobotix will form Research teams and assign product development assignments to the SakRobotix RC members and prepares a product development road map.

6. SakRobotix will monitor the development and help the students to complete the product development.

7. SakRobotix Robotics Engineers will visit the campus at least 1 time every quarter.

8. During Research, if any Intellectual property will come as an output, then it will equally share among the below 3 parties:

- Innovators (Research Team)
- College; where SakRobotix RC is set up
- SakRobotix Lab Private Limited

For SakRobotix Lab Pvt. Ltd.

Manoj Kumar
Managing Director

V. P. Choudhary

Joint Director

8. SakRobotix RC Student members will get 20% discount in any training program offered by SakRobotix.

9. SakRobotix RC members will Rs.2000/- discount coupon for any courses on Gyanx.com.

10. Regular Technical support through Online.

11. The student members of the RC will improve their robotics and embedded skill set continuously.

12. The student & faculty research work will be covered in our online Robotics magazine, "Robotics Guru".

IV.

UNDER THIS MOU

The Organization should appoint at least one coordinator to manage the equipment and to organize the online classes.

● SRC Setup infrastructure Requirements from the college side:

1. Dedicated Room for establishing Research Centre
2. At least 25 plug points
3. 2-4 No of computers
4. Variable DC Power supply
5. 1 Black Board
6. 1 White Board
7. Projector is preferred
8. Robot test bed (Customized Robotics testing arena) made by plywood & color painting as attached
9. 8 No of Tables size 8*4 square feet & stools
- 10. 100 No of Students membership
11. Water facility is preferred

V. FUNDING

"SakRobotix RC"-Membership fees per student for first year = Rs.1700.00

Annual renewal of the, "SakRobotix RC" membership = Rs.1400.00

The Organization should do the payment in the form of Cheque/ DD/ Bank Transfer

For SakRobotix Lab Pvt. Ltd.

Lax Mahapatra
Director

V. K. Singh
Jalpur College &
183305

VI. CONFIDENTIALITY

Both Parties agree that with respect to any information which the disclosing Party advises the other is deemed to be "Confidential Information". Confidential Information shall mean all information of the disclosing Party, whether commercial, financial, technical or otherwise, disclosed to the recipient whether disclosed orally, in documentary form, by demonstration or otherwise) which is contained in any form whatsoever (including without limitation data, drawings, films, documents and computer readable media) and which is marked or otherwise designated to show expressly or by necessary implication that it is confidential or proprietary to the disclosing Party and both Parties agree -

a) To use such Confidential Information only in the performance of the services as stated under this MoU;

b) Not to disclose any such Confidential Information or any part thereof to a person outside the Party's business organization for any purposes; and,

c) To limit dissemination of such Confidential Information to persons within the Party's business organization, who are directly involved in the performance of services under this MoU and have a need to use such Confidential Information for purposes of such services.

d) Confidential Information shall not include information that -

I. is as of the time of its disclosure part of the public domain; or can be shown to have been in the possession of recipient Party as evidenced by written records.

II. Is required to be disclosed pursuant to court order or government authority, whereupon the receiving Party shall provide notice to the other Party prior to such disclosure.

VII. COMMUNICATION

All communications between the Parties regarding this MoU and all subsequent discussions until the signing of the subsequent agreements shall be done with SakRobotix Lab Pvt. Ltd.

VIII. GOVERNING LAW

This MoU shall be governed and construed in accordance with the laws of India. The Parties agree to submit any dispute or difference of opinion arising out of or in any way related to this MoU, to the exclusive jurisdiction of Courts at Bhubaneswar.

For SakRobotix Lab Pvt. Ltd.

AK
Malapaty
Managing Director

V. K. Deo

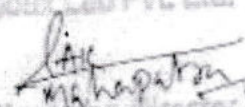
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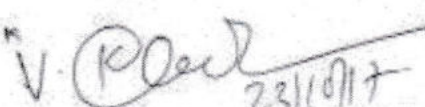
Page 2
Date: 10/10/2018

IX. EFFECTIVE DATE AND SIGNATURE:

This MOU shall be effective upon the signature of Parties A and B authorized officials. It shall be in force from 10TH OCTOBER, 2017. Parties A and B indicate agreement with this MOU by their signatures.

For SakRobotix Lab Pvt. Ltd.


Managing Director 12/10/2017


23/10/17

Mr. Sakyasingha Mahapatra

MD & CEO

SakRobotix lab. Pvt. Ltd.

Dr. Vinay Kumar Chandna

Principal

Jaipur Engineering College & Research Centre

Party 1:

Witness 1:

Name: *Tarun Kumar Patel*

Signature: 

Witness 2:

Name: *Ashish Patra*

Signature: 

Party 2:

Witness 1: *

Name: *Rudra Kumar Singh*

Signature: 

Witness 2: *

Name: *

Signature: *



SakRobotix Lab

SakRobotix Lab Pvt Ltd
Startup Centre IIT BBS,
Samantapuri Campus,
Bhubaneswar, Odisha,
Pin Code -751013

MOU Signing Between SakRobotix & JECRC For SRC

Date: 12/10/2017

From ,
Ms. Ayantika Bhattacharjee
Research Initiatives
SakRobotix Lab Pvt Ltd
Startup centre, IIT Bhubaneswar

To ,
The Principal
Jaipur Engineering College And Research Center,
Jaipur

SUB : MOU Signing

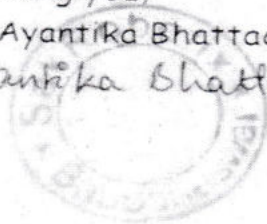
Respected Sir,

It was wonderful talking with you & Now signing up the MOU for SakRobotix Research Center (SRC) at Jaipur Engineering College And Research Center. With reference to your mail dated 11th October 2017 , we have sent you two hard copies duly signed and stamped by our Managing Director Mr. Sakyasingha Mahapatra .

We wish to meet you soon and start the activities by last week of October. We would also make a product development roadmap & follow it.

Meanwhile I am requesting you to sign both the MOU hard copies, you need to keep one copy & send us back the other one.

Thanking you,
Ms. Ayantika Bhattacharjee
Ayantika Bhattacharjee





कार्यालय मुख्य अग्निशमन अधिकारी बनीपार्क नगर निगम जयपुर

क्रमांक: एफ.9()आ.फा./न.नि.ज/19/1586

दिनांक 11/01/2019


श्री अर्पित अग्रवाल,
पुत्र श्री ओ.पी अग्रवाल,
निवासी 25, श्री रामपुरा कॉलोनी,
सिविल लाईन जयपुर।

विषय:- अग्निशमन अस्थाई प्रमाण पत्र की अवधि बढ़ाये जाने बाबत।

उपरोक्त विषयान्तर्गत आवेदित स्थल श्रीराम की नांगल सांगानेर जयपुर में निर्मित होने वाले भवन/शैक्षणिक संस्थान (जयपुर इंजिनियरिंग कॉलेज एण्ड रिसर्च सेन्टर) की पूर्व में इस विभाग के पत्रांक एफ 9 () आ.फा./न.नि. ज/16/132 दिनांक 21.04.2016 के द्वारा जारी दिनांक से तीन वर्ष 20.04.2019 तक अस्थाई फायर अनापत्ति जारी की गई थी।

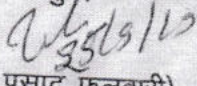
अब आपके द्वारा पुनः इस विभाग में आवेदन कर आवेदित स्थल पर निर्माण किये जाने वाले भवन की अस्थाई फायर अनापत्ति की अवधि बढ़ाने हेतु लिखा है जिसके क्रम में आवेदित स्थल का अग्निशमन सुरक्षा की दृष्टि से मौका निरीक्षण करवाया गया। वर्तमान में स्थल पर सम्बन्धित ब्लोक का कार्य अपूर्ण है।

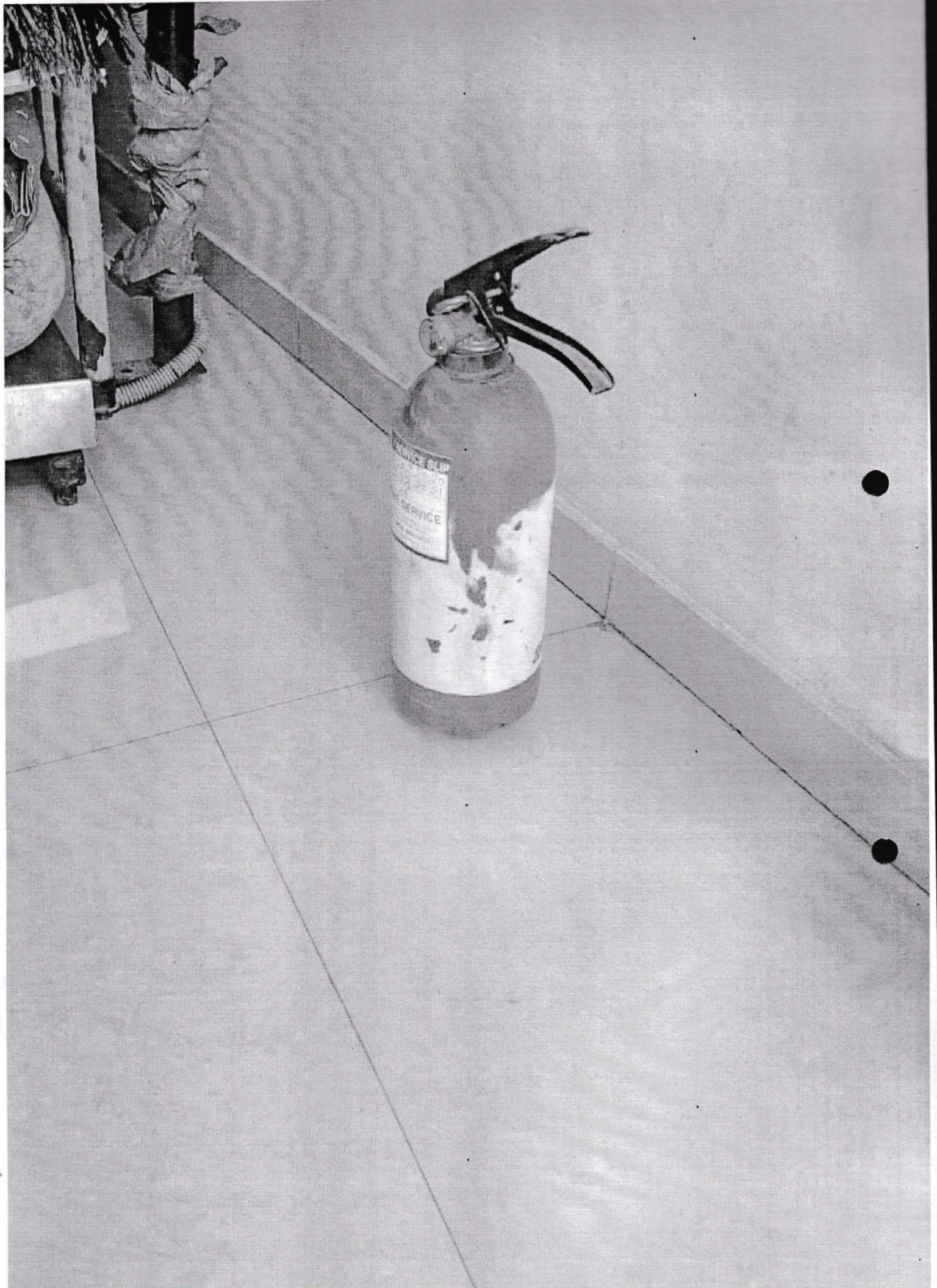
अतः उक्त स्थल पर निर्मित होने वाले भवन/शैक्षणिक संस्थान की अस्थाई फायर अनापत्ति की अवधि जारी दिनांक से दो वर्ष 19.04.2021 के लिये बढ़ाई जाती है। समस्त शर्तें पूर्व में जारी पत्र पत्रांक एफ 9 () आ.फा./न.नि. ज/16/132 दिनांक 21.04.2016 के अनुसार ही मान्य होगी।


(जगदीश प्रसाद फुलवारी)
मुख्य अग्निशमन अधिकारी
नगर निगम जयपुर

प्रतिलिपि

1 अतिरिक्त मुख्य नगर नियोजक, भवन मानचित्र समिति, जयपुर विकास प्राधिकरण जयपुर।


(जगदीश प्रसाद फुलवारी)
मुख्य अग्निशमन अधिकारी
नगर निगम जयपुर





PO

Fire

DRY POWDER





Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

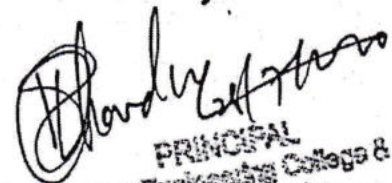
Pay Scale

VI Pay Scale - Yes

Points 30

QIV

Session 2020-21 (RTU)


PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-302 022

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803


Endowment Fund

Endowment Fund Deposited - Yes

Points 20

QIV

Session 2020-21 (RTU)



PRINCIPAL
Jaipur Engineering College &
Research Centre
Via Sitapura, Jaipur-302022



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref: JECRC/2015-16/344

Date: 11/8/2015

The Dean (Academic Affairs),
Rajasthan Technical University,
Akelgarh, Rawatbhata Road,
Kota-324010

Office of The Dean Academic Affairs
Rajasthan Technical University, Kota
Receipt No. 1434
Date: 12/8/15

Sub.: Endowment Fee.

Ref.: Your letter No. 1088 dated 26.06.2015.

Dear Sir,

In reference to the above please find enclosed herewith original
FDR No. 00447 date 06.07.2015 including Pledge letter of HDFC Bank.

Please verify the details and return us original FDR and attested
Pledge letter for our record.

Yours faithfully,


REGISTRAR

*Received original
FDR for Rs five
lacs of HDFC Bank
and original statement ledger
of Pledge letter of HDFC
Bank.*

*Received
Signature
14/8/15*



JECRC Foundation
www.jecrcfoundation.com

Jaipur Engineering College and Research Centre

Approved by AICTE & Affiliated to RTU

JECRC Campus, Shri Ram Ki Nangal,

Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302 022

t: 0141 2770120, 2770232 f: 0141 2770803 e: info@jecrcmail.com

HDFC BANK

to understand your world

Office of The Dean Academic Affairs
Rajasthan Technical University, Kota

Receipt No. 1434

Date 12/8/15

To whom may it Concern

As per received Request letter by JAIPUR ENG COLLEGE AND RESEARCH CENTRE JAIPUR we issued FDR IN the name of JAIPUR ENG COLLEGE AND RESEARCH CENTRE of RS 500000.

Please find all the detail below mention:

FDR ACCOUNT NO:

50300100292553

Amount:

Rs 500000 /-

Lien marked

YES

Lien marked in favor of

Registrar Rajasthan Technical University Kota

The letter has been issued on the specific request and does not having any liabilities to the bank. Removal of lien will be after submission of Lien removal letter from Registrar Rajasthan Technical University Kota.

Regards,
HDFC BANK LTD

AUTHORIZED SIGNATORY





We understand your world

DEPOSIT CONFIRMATION/RENEWALADVICE

M/S. JAIPUR ENG COLLEGE AND RESEARCH CENTRE
SRI RAM KI MANGAL VIA VATIKA
OPP. RPIP GATE TONE ROAD JAIPUR
JAIPUR-302022 INDIA

300447
Deposit Account Number 30300100292553
Cust ID of 1st Applicant 36615155 PAN NO. AAATN2986L
Deposit Branch Name CHANDRA BASTA - JAIPUR
Deposit Type REINVEST. DEPOSIT
NEW Deposit

Pan No.

Deposit amount (in Rs.)	Deposit start date	Period of deposit	Rate of interest (%p.a.)	Deposit maturity date	Maturity + amount (in Rs.)
5,00,000.00	06 Jul 2019	60 Month (s)	8.25	06 Jul 2020	7,52,211.00

Deposit Amount (In Words) : RUPEES FIVE LAKH ONLY

Mode Of Operations : ANYONE
Nomination : Not Registered
Interest Payment Frequency : AT MATURITY
Maturity Instructions : RETURN PRINCIPAL AND INTEREST

Thank you for banking with us,

Head - Retail Deposits

HDFC BANK LTD.

Notes: (1) Please see reverse for applicability of TDS and Form 15G / 15H requirements.
(2) * Interest component of the maturity amount will be subject to TDS, if applicable.

For more information log on to : www.hdfcbank.com



**OFFICE OF THE DEAN (ACADEMIC AFFAIRS)
RAJASTHAN TECHNICAL UNIVERSITY**

AKELGARH, RAWATBHATA ROAD, KOTA
Ph-0744-2473015, Fax-0744-2473857

Website: www.rtu.ac.in Email: rtu.dir.acad@gmail.com

F(17)/Acad/EF/2015/088

Dated: 20.06.2015

26.

प्राचार्य / निदेशक,

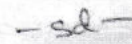
Jaipur Engineering College & Research Centre,
JECRC Campus Opposite EPIP Gate Via Sitapura Near Sanganer Sadar Thana Tonk Road
Jaipur-302022

- सन्दर्भ:- (1) विश्वविद्यालय परिपत्र स.F(17)/Acad/EF/2014/3444 दिनांक 31.10.14
(2) विश्वविद्यालय पत्र स.F(17)/Acad/EF/2014/3356-3249 दिनांक 11.11.2014
विषय:- स्थायी निधि शुल्क (Endowment Fee) के संबन्ध में।

महोदय,

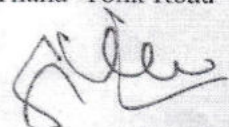
उपरोक्त विषयान्तर्गत संदर्भित पत्र के क्रम में लेख है कि विश्वविद्यालय द्वारा स्थायी निधि शुल्क (Endowment Fee) के संबन्ध में जारी दिशा निर्देशों के अनुरूप आपके संस्थान को स्थायी निधि शुल्क रू० 5.00 लाख की सावधी जमा रसीद / राष्ट्रीय बचत पत्र (FDR/NSC) के रूप में 05(पांच) वर्ष की अवधि के लिये अपने बैंकर्स / डाकघर के माध्यम से रजिस्ट्रार राजस्थान तकनीकी विश्वविद्यालय कोटा के नाम प्रतिभूत (Pledge) करवाकर मूल प्रतिभूत-पत्र (Pledge Letter) के साथ सावधी जमा रसीद / राष्ट्रीय बचत पत्र की प्रमाणित प्रति विश्वविद्यालय को प्रस्तुत की जानी थी, किन्तु आपके संस्थान ने आज दिनांक तक विश्वविद्यालय को प्रस्तुत नहीं की है।

अतः इस पत्र के माध्यम से आपको पुनः सूचित करते हुए संलाह दी जाती है कि स्थायी निधि शुल्क (Endowment fee) की FDR/NSC की प्रमाणित प्रति मूल बैंक प्रतिभूत पत्र (Pledge Letter) के साथ दिनांक 30.06.2015 तक आवश्यक रूप से प्रस्तुत करें।


डीन (अकादमिक अफेयर्स)

प्रतिलिपि:-

- (1) चेयरमेन/निदेशक, Jaipur Engineering College & Research Centre, JECRC Campus Opposite EPIP Gate Via Sitapura Near Sanganer Sadar Thana Tonk Road Jaipur-302022
- (2) सहायक कुलसचिव, अकादमिक अफेयर्स (सम्बद्धता शाखा)


डीन (अकादमिक अफेयर्स)



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Ref. JECRC/REG/2020-21/081

Date: 28.07.2020

To,

The Dean (Academic Affairs),
Rajasthan Technical University,
Akhelgarh, Rawatbhata Road,
Kota- 324010

Subject- Regarding Endowment Fee

Dear Sir,

Please find enclosed herewith renewed FDR No. 50300100292553 dated 06.07.2020. The Original FDR alongwith pledge letter has already been submitted to RTU vide our letter no. JECRC/2015-16/344 dated 11.08.2015 (copy enclosed for your ready reference).

Please verify the details and return us Original FDR and attested pledge letter for our record.

Thanking you,

Principal

PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-372022



JECRC Foundation
www.jecrcfoundation.com

Jaipur Engineering College and Research Centre
Approved by AICTE & Affiliated to RTU
JECRC Campus, Shri Ram Ki Nangal,
Via Sitapura RIICO, Opp. EPIP Gate, Tonk Road, Jaipur 302 022
t: 0141 2770120, 2770232 e: info@jecrcmail.com

DEPOSIT CONFIRMATION/RENEWAL ADVICE

Type of Deposit	Resident
Deposit Account Number	50300100292553
Name and Holding pattern	JAIPUR ENG COLLEGE AND RESEARCH CENTRE(Sole Owner)
Currency	INDIAN RUPEES
Mode of Operation	ANYONE

Current* Principal Amount	Deposit Start Date	Period of Deposit	Rate of Interest(%p.a.)	Deposit Maturity Date	Current* Maturity Amount
724003.00	06 Jul 2020	60 months 0 days	5.50	06 Jul 2025	951319.00

Maturity Instructions : Renew Principal + Interest
Lien Amount : 500000.00
Nomination : Not Registered

Thank you for banking with us.
 This is a system generated Advice, hence does not require any Signature.

IMPORTANT - *As per section 206AA introduced by finance (No.2) Act, 2009 w.e.f.1.4.2010, every person who receives income on which TDS is deductible shall furnish his PAN, failing which TDS shall be deducted at the rate of 20% (as against 10% which is existing TDS rate) in case of domestic deposits and 30.09% in case of NRO deposits. Please further note that in the absence of PAN as per CBDT circular no: 03/11, TDS certificate will not be issued. Form 15G/H and other exemption certificates will be invalid even if submitted and Penal TDS will be applicable.

Terms & Conditions (T&C)

Bank computes interest based on the actual number of days* in a year. In case, the deposit is spread over a leap or a non-leap year, the interest is calculated based on the number of days. i.e. 366 days in a leap year & 365 days in a non-leap year.

Tax Deduction at Source (TDS)

TDS rate is applicable from time to time as per the IT Act, 1961 and IT rules. The current rates applicable for TDS would be displayed on Bank's website. Today, TDS is recovered when interest payable or reinvested on FD & RD per customer, across all Branch, exceeds Rs 40,000/- (Rs. 50,000/- for senior citizen) in a Financial Year. Further, TDS is recovered at the end of the financial year on interest accruals if applicable.

If interest amount is insufficient to recover TDS, the same may get recovered from the principal amount of Fixed Deposit. If customer wishes to have TDS recovered from CASA, same can be availed by filing separate declaration at branch.

For renewed deposits, the new deposit amount consists of the original deposit amount plus Interest Less TDS, if any, less compounding effect on TDS. For reinvestment deposit, the interest reinvested is post TDS recovery and hence the maturity amount for reinvestment deposits would vary to the extent of tax and compounding effect on tax for the period subsequent of deduction till maturity.

As Per Section 139A(5A) of IT Act, every person receiving any sum of income or amount from which tax has been deducted under the provisions of IT Act shall provide his PAN to the person responsible for deducting such tax. In case PAN is not provided as required, the bank shall not be liable for the non-availment of the credit of Tax deducted at Source and non-issuance of TDS certificate.

If your PAN is not updated with the Bank or is incorrect, please visit your nearest branch to submit your PAN details.

No deductions of Tax shall be made from the taxable interest in the case of an individual resident in India, if such individual furnishes to the Bank, a declaration in writing in the prescribed Format (Form 15G / Form 15H as applicable) to the effect that the tax on his estimated total income for the year in which such interest income is to be included in computing his total income will be Nil. This is subject to PAN availability on Bank records.

If aggregated value of all outstanding FDs/RDs booked in same customer id during the Financial Year exceeds INR 5 Lakhs limit (*) then PAN/Form 60 is mandatory.

In absence of PAN/Form 60: (a) FD/RD will not be renewed on maturity and maturity proceeds will be credited to your linked account or a Demand Draft will be sent to your mailing address as updated in Bank's records. (b) Maturity instructions to convert RD proceeds to FD will not be acted upon and RD proceeds will be credited to your linked account on maturity.

The maximum interest not charged to tax during the financial year where form 15G/H is submitted is as below:

- Upto 2,50,000/- for residents of India below the age of 60 years or a person (not being a company or firm).
- Upto 5,00,000/- for senior citizen residents of India between the age of 60-79 years at any time during the FY
- Upto 5,00,000/- for senior citizen residents of India who are 80 years or more at any time during the FY.

Form 15G/H to be submitted by customer in triplicate to the bank, for submitting one copy to IT Department, one copy for Bank record and third copy to be returned to customer with Branch seal as an acknowledgment. A fresh Form 15G/H needs to be submitted at the start of every new Financial Year. In case form 15G/H is submitted post interest payout/credit, waiver shall be effective from the day next to the interest payout/credit immediately preceding the date of submission of form 15G/H.

Form 15G/H needs to be submitted for every fixed Deposits booked with bank for Tax exemption.

The bank shall not be liable for any consequences arising due to delay or non-submission of Form 15G/H

To enable us to serve you better kindly submit the Form 15G/H latest by April 1st of the new financial year

Note: The above guidelines are subject to change as per Income Tax regulations/directives of Finance Ministry Govt of India prevalent from time to time.

Automatic Renewal

We will be happy to renew your deposit, unless we hear from you to the contrary, for the same period as the original deposit, at the prevailing rate of interest. You can change the deposit instruction within 7 days.

Premature Encashment

In the event of death of one of the joint account holders, the right to the deposit proceeds does not automatically devolve on the surviving joint deposit account holder, unless there is a survivorship clause.

In case of joint fixed deposits with a survivorship clause, the Bank shall be discharged by paying the Fixed Deposit proceeds prematurely to survivor/s, on request, in the event of one or more Joint Depositor.

In the case of premature encashment, all signatories to the deposit must sign the encashment instruction

All premature encashment will be governed by rules of Reserve Bank of India Prevalent at the time of encashment

In case of mandate submission any of the holders can sign where mode of operation is either or survivor / former or survivor.

As per IT laws, if aggregate amount of the deposit(s) held by a person with a branch either in his own name or jointly with any person on the date of repayment together with the interest at payable is equal to or exceeds 20,000/- then the amount will be paid by bank draft drawn in the name of the deposit holder or by crediting the savings / current account of the deposit holder.

Partial Premature withdrawal and sweep-in facility is not allowed for fixed deposits with amount >= 5 cr to < 25 cr.

On sweep in/partial withdrawal of FD >= 25cr, if the amount of deposit falls below 5cr, the entire FD will be withdrawn

The interest rate applicable for premature closure of deposits (all amounts) will be lower of: The rate of Original

contracted tenure for which the deposit has been booked OR base rate applicable for the tenure for which deposit has been in force with the Bank.

- For deposits <= 2Cr the base rate applicable will be of < 2Cr as on date of booking. For 5Cr and above deposits, the base rate is the rate applicable for 5Cr deposits.
- As per the bank's T&C, penalty on premature closure of deposit(s) including sweep-in and partial closures has been fixed at the rate of 1%. However premature penalty will not be applicable for FDs booked for a tenor of 714 days and also for deposits >= 25 cr (single fixed deposit booked post sept 2017). There will be "No" penalty on premature withdrawal of all new FD's booked under the new rate slabs i.e. >= 5.25 Cr to < 5.50 Cr and >= 24.75 Cr to < 25 Cr w.e.f August 29, 2018.
- In case of death of primary holder of the deposit prior to maturity date, premature termination of the deposit would be allowed as per the terms of contract subject to necessary verifications and submission of proof of death of the depositor. Such premature withdrawals will not attract any penal charge.

Insurance Cover for Deposits All Bank deposits are covered under the insurance scheme offered by Deposit Insurance and Credit Guarantee Corporation of India (DICGC) subject to a maximum limit of Rs. 1lac per customer (conditions apply).

Non Withdrawable Fixed Deposits (Applicable for Resident and non resident)

The Deposits cannot be closed by the depositor before expiry of the tenure. However, the Bank may allow premature withdrawal

In the event of premature withdrawal of these deposits under above mentioned exceptional circumstances, the Bank will not pay any interest on the principal amount of the deposit. Any interest credited or paid upto the date of such premature closure will be recovered from the deposit.

Sweep-in facility is not allowed.

The minimum tenor for resident deposits is 91 days and 1 Year for NRE deposits.

The deposit will be booked with maturity instruction as 'Do Not Renew'.

The Non Withdrawable Deposit is offered for amount 5 crore and above only.

Only first party FD OD is provided with 90% limit. Third party FD OD is not allowed.

Important Points

Senior Citizens (60 years and above) who are Resident Indians are eligible for senior citizen rates for deposits upto 5cr

Benefit of additional interest rate on deposits on account of being bank's own staff or senior citizens shall not be applicable to NRE and NRO Deposits.

Please quote the Deposit Account Number in all Communication

Please record change of maturity instructions with us well in advance to enable us serve you better.

Any changes made online in respect to change in maturity instruction / tenure, details can be viewed online post the changes.

Please Ignore this advice if you have redeemed or renewed this deposit on or after the maturity date as mentioned herein. In case of

Renewals you will receive a new Fixed Deposit Confirmation / renewal advice.

Rate applicable on monthly interest option will be discounted rate over the standard FD Rate.

In case of more than one deposit linked for Sweep-In, the system will first Sweep-In funds from the last or recently opened deposit, i.e. on LIFO (Last-In-First-Out) basis.

In case your fixed deposit is booked without nomination details, please visit the Branch to update the same.

In case of NRO / Resident FD, no interest will be paid if the deposit is prematurely withdrawn before completion of 7 days.

In case of NRE FD interest will not be paid if the deposit is prematurely withdrawn before completion of 1 year.

Form 15G/H is not applicable to NRIs

TDS is not applicable for Interest earned on NRE deposits

No penalty shall be levied for premature withdrawal of NRE term deposits.

Fixed Deposits booked with monthly or quarterly interest payout option, TDS recovery will by default happen from linked current / savings account. Please visit nearest branch / contact RM for further clarification.

When you open a Fixed deposit with the Bank Interest on Term Deposit is calculated as below:

o On a Quarterly basis for deposits > 6 months. Simple interest is paid at maturity for deposits <= 6 months.

o Cumulative Interest/ re-investment interest is calculated every quarter, and is added to the principal such that Interest is paid on the Interest earned in the previous quarter as well.

o In case of monthly deposit scheme, the interest shall be calculated for the quarter and paid monthly at discounted rate over the Standard FD Rate.

If FD is not booked / renewed as per applicable T & C, Bank reserves the right to rebook the same with correct details.

Maturity Instructions:

For Office Use only:
 Liquidation Instructions
 Liquidation :
 Credit Account No. :
 Issue Pay order favouring :
 Date of Liquidation :

Signature(s)

On Maturity / Premature withdrawal

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

Fax No.0141-2770803

Pass out Students

Total Student (2015-19) : 1051

Total Student Pass : 820

Calculation : $100 * \frac{820}{1051}$

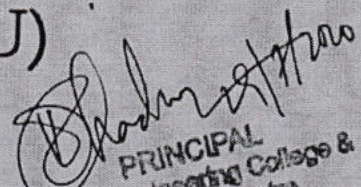
Percentage : 78.02%

: 78

Points 78

QIV

Session 2020-21 (RTU)


PRINCIPAL
Jaipur Engineering College &
Research Centre
Tonk Road, Jaipur-302022

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,

Tonk Road, Jaipur-302 022

Ph. No.0141-2770232, 2770120

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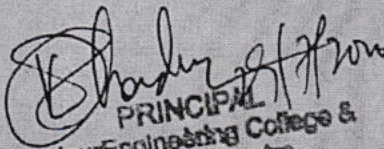
First Division/Honours Students

Total Student (2015-19)	:	1051.
Total Student Pass	:	820
First Division/Honours	:	816
Calculation	:	$100 * \frac{820}{1051}$
Percentage	:	78.02%
	:	78
	:	78/2

Points 39

QIV

Session 2020-21 (RTU)


PRINCIPAL
Jaipur Engineering College &
Research Centre
302022

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,
Tonk Road, Jaipur-302 022
Ph. No.0141-2770232, 2770120
Fax No.0141-2770803

National/International Conferences/Workshop/FDPs/STTPs Organized

14. National / International Conferences / Workshops/FDPs / STTPs organized – at JECRC, Jaipur

S. No.	Topic	Date	In association with	Experts	Category
1	Advancements and innovation in civil Engineering	05 March 2020	IJCRT		National Conference
2	Furistic Trends in Mechanical Engineering	5-6 March 20	NCFTME-20		National Conference
3	National Conference on Information Technology & security Applications 2020	7 March 2020	ACM chapter		National Conference
4	Recent Advancement in Communication, Optics and Nano-Science "RACON-2020"	March -5-6, 2020	OSA		National Conference
5	National Conference on Contemporary Issues in Computer Technology	March 7, 2020	CSI		National Conference
6	2nd national Conference on "Recent Trends and Smart Technologies in Electrical Engineering"	March 7, 2020	IJETAE		National Conference
7	Don't consume Excess Fuel, as Environment protection is our Responsibility	Jan 29, 2020	Ministry of Petroleum Natural Gas (MoPNG), GAIL India Ltd.	Major Deepak Gupta, DY Director, PCRA Mr Pankaj Shrivastava, DGM, Marketing GAIL Mr P.K Dey, GM, Training, GAIL	Workshop
8	One day hands on practice workshop on Angular JS node	18 Feb 2020	DVS Industrial Hub technologies Jaipur	Mr. Mahendra Pal, Trainer & Programmer	Workshop
9	IT Hackathon 3.0	26 Sept 2019			Workshop
10	VIRTUAL LAB SOFTWARE	20th Aug., 2019	Virtual Labs India	Mr. Ashish Ranjan and Mr. Rajat Kumar Jha	Workshop
11	IOT enabled energy efficient Systems	19th Feb., 2020	Techienest India Pvt Ltd	Mr. Siddharth Singh	Workshop
12	Applications of Machine Learning	24th Feb., 2020	Code Planet Technologies	Mr. Parth Maheswari	Workshop
13	Ethical Hacking	4th -5th	Cyber Cure	Mr. Sangeet Chopra	Workshop

		March, 2020	Technologies		
14	Workshop on Data Science	4th March, 2020	kvch-Oracle WDP, Noida	Mr. Manish Kumar (General Manager & Data Science Expert)	Workshop
15	Workshop on SALESFORCE.COM	2nd March, 2020	Technoglobe Pvt Ltd, Jaipur	Mr. Athar Ahmad (Technical Head & Trainer)	Workshop
16	Workshop on Ethical Hacking	2nd March, 2020	CyberCure Technologies Pvt. Ltd., Jaipur	Mr. Abhishek Bharti (Network Analyst)	Workshop
17	Workshop on Machine Learning with Data Science	23rd January, 2020	Technoglobe Pvt Ltd, Jaipur	Dr. Cherry jain (Business Head & Artificial Intelligence Trainer)	Workshop
18	Workshop on Digital Marketing	4th-5th October, 2019	Grass Solutions Pvt. Ltd., Jaipur	Mr. Abhay Ranjan (Digital Marketing Expert & Consultant)	Workshop
19	Workshop on Cyber Security	6th September, 2019	CYBEROPS InfoSec LLP, Jaipur	Mr. Anshul Patidar (Business Development Executive)	Workshop
20	Workshop on PYTHON with MACHINE LEARNING	22nd August, 2019	Techinest Pvt. Ltd., Jaipur	Mr. Siddharth Singh (Business Head & Artificial Intelligence Trainer)	Workshop
21	Workshop on Internet of things	23rd August, 2019	Ducat Education Pvt. Ltd., Noida	Mr. Furkhan Ali (Senior marketing Executive & IOT Expert)	Workshop
22	IOT in Manufacturing	6-10 Jan 2020	NITTTR, Chandigarh		FDPs STTPs
23	Student Evaluation	3-7 Feb 2020	NITTTR, Chandigarh		FDPs STTPs

Point 80

Document Attached:

QIV

Session 2020-21 (RTU)

		March, 2020	Technologies		
14	Workshop on Data Science	4th March, 2020	kvch-Oracle WDP, Noida	Mr. Manish Kumar (General Manager & Data Science Expert)	Workshop
15	Workshop on SALESFORCE.COM	2nd March, 2020	Technoglobe Pvt Ltd, Jaipur	Mr. Athar Ahmad (Technical Head & Trainer)	Workshop
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22	IOT in Manufacturing	6-10 Jan 2020	NITTTR, Chandigarh		FDPs STTPs
23	Student Evaluation	3-7 Feb 2020	NITTTR, Chandigarh		FDPs STTPs

Point 80

Document Attached:

QIV

Session 2020-21 (RTU)



PRINCIPAL
Jaipur Engineering College &
Research Centre

about JECRC Foundation

The National Society for Education Research and Development (NSERD) was set up and registered in the year 1999 in Jaipur with the major objective of providing quality education and research environment in Rajasthan. Keeping this objective in view the pioneers in the field of education implanted JECRC Foundation in the year 2000. Encouraged by its splendid achievements and overwhelming public patronage. The JECRC Foundation during 19 year of existence is amongst the most reputed educational groups in Higher and Technical Education in North India which has two large campuses with 10,000 students enrolled as on date in various courses alongside engineering courses, the major chunk of admissions being catered through JEE examinations. The engineering colleges approved by the AICTE, New Delhi and are affiliated to Rajasthan Technical University, Kota

about Conference

Civil engineering has a vast scope for research and innovation. New inventions and techniques have a large potential to cause a revolution in terms of sustainable construction, efficient transportation, better design techniques and more sophisticated infrastructure. This international conference intends to bring together leading researchers in this domain of interest from around the world. We believe this will lead to fruitful germination of collaborative research work. ICETCESD - 2020 at JECRC is a platform to showcase your talent in front of eminent professors, industrial professionals and talented students in a normal conference.

about Civil Engineering Department

The department of civil engineering is one of the pioneering departments of the institute. Over the years civil engineering department has grown tremendously. It requires variety of tools and techniques to solve the wide range of technical and managerial problems. Department has highly qualified faculty members engaged in teaching, research and development with the aim of achieving excellence in the fields. At present, the department runs with the vision and mission dedicated towards producing young prospective engineers who are industry ready and skill oriented by training them in various specific fields oriented verticals of civil engineering.

Chief Conference Patrons

Shri O.P. Agrawal, Chairman

Patron(s)

Shri M. L. Sharma, Vice Chairman

Shri Amit Agrawal, Director

Shri Arpit Agrawal, Director

Conference Chair

Prof. (Dr.) V. K. Chandna, Principal

Convener

Prof. (Dr.) Omprakash Netula, Head of Department

Co- Convener

Mr. Hetram Sharma

Organizing Secretaries

Er. Teekam Singh

Er. Jitesh Jain

Advisory committee

Prof. (Dr.) R.A. Gupta, V.C, RTU, Kota

Prof. (Dr.) A.K. Dwivedi, COE, RTU, Kota

Prof. (Dr.) A.K. Sinha, V.C, CSMU, Mumbai

Prof. (Dr.) Dhararam Buddhi, LPU, Punjab

Prof. (Dr.) Srinivas Chava, VR SEC, Vijaywada

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Dr. J.K Jain, MNIT, Jaipur

Dr. Pawan Kalla, MNIT, Jaipur

Dr. Neha Shrivastava, MNIT, Jaipur

Mr. Manish Jain, Dy. Director, JECRC

Prof. (Dr.) M. P Singh, JECRC

Dr. Sandeep Vyas, JECRC

Dr. Sanjay Gaur, JECRC

Dr. Prerak Bhardwaj, JECRC

Mr. Piyush Gautam, JECRC

Prof. (Dr.) Ashok Singh Shekhawat, JECRC

Prof. (Dr.) R.K Mangal, JECRC

Dr. Ruchi Mathur, JECRC



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



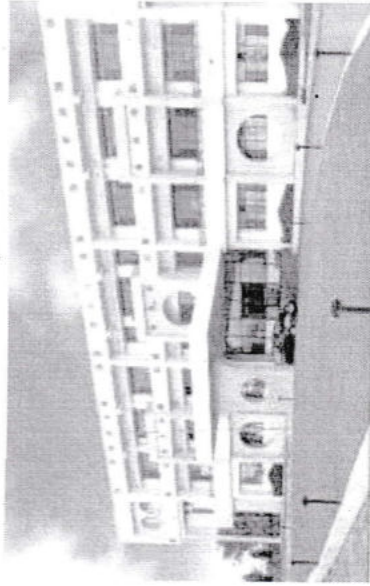
Second National Conference

On

Advancements and Innovations in Civil Engineering

(NCAAICE-2020)

5th March, 2020



In Association with



University Grants Commission



figshare



Organized by

Department of Civil Engineering

Jaipur Engineering College and Research Centre

Opp. EPIP Gate, Sitapura Industrial Area

Tonk Road, Jaipur -302022 Rajasthan

Website: www.jecrcconference.in

Conference Theme

- To escalate the awareness on environment in civil engineering
- To improve civil engineering's role on creating sustainable environment
- To make networks among fellow academician and practitioner
- To accommodate information spreading of scientific findings and achievements in civil engineer's society
- Water Conservation and Waste Water Management
- Hybrid and Composite structures
- Smart material and structures
- Structural Dynamic and Earthquake Engineering
- Structures in Severe Environment
- Disaster Mitigation and Restoration
- Assessment and Retrofitting
- Forensic Engineering
- Structural Health Monitoring
- Green Construction Material and Technology
- Construction Management

Guide line for Paper submission

Original and unpublished research work/case study on any one or more of the themes are invited from practicing engineers, academicians, R&D personels and consultants. The paper should conform to the following guidelines:

The official language for the conference is English for all purposes.

Abstract of the paper must be typed in a single space in maximum 300 words. The full text of the paper must not exceed 6 pages of A4 size in single space using Times New Roman font size 12 including abstract, appendices, tables, illustrations and photographs.

Quality research papers will be published in UGC Approved Journal based on selection of reviewing committee.

Keynote Speaker

Dr. Naveen BP Ph.D. (IISc)
Professor & HOD, Department of Civil Engineering
Amity University Haryana

Organizing committee

Mr. Yogendra Kr. Sharma
Mr. Yogesh Kr. Agarwal
Mr. Ashish Boraida
Mr. Sumit Saini
Mr. Teekam Singh
Mr. Akhil Maheshwari
Mr. Jitesh Kumar Jain
Mr. Pradeep Kumar Jain
Mr. Narendra Sipani
Mr. Jatin Gupta
Ms. Shivangani Khandelwal
Ms. Nida Khanam
Mrs. Brijlata Sharma
Mr. Sudhir Panwar
Mr. Mohammad Aaqib Khan

Mode Of Payment

Delegates are requested to send their Demand Drafts (DD) Drawn in favor of "Jaipur Engineering College and Research Centre", payable at Jaipur.

The registration fee can also be transferred online.

Account Name 'Jaipur Engineering College and Research Centre, Jaipur

A/C No: 50200006658098

IFSC Code: HDFC0001437

BANK NAME: HDFC

Important Dates

Last Date for	Date
Submission of Manuscript	1 st March, 2020
Acceptance Notification	3 rd March, 2020
Registration	5 th March, 2020

Registration Fees

Category	Amount
Research Scholar/Faculty (outside)	INR 900
Faculty/Student	INR 300
Industry Person	INR 1000

For More Information & Correspondence

Prof. (Dr.) Omprakash Netula

Head of Department Mob:+91-9414966589

Mr. Hetram Sharma

Assistant Professor Mob:+91-9414927179

Mr. Hitesh Nagar

Assistant Professor Mob:+91-7792098399

Mr. Jitesh Kumar Jain

Assistant Professor Mob:+91-9829906028

Location of JECRC Foundation

For JECRC Foundation location Kindly scan following QR Code:



4th National Conference

on

Futuristic Trends in Mechanical Engineering

NCFTME-2020

5-6 March 2020

Registration Form

Full Name:
Designation:
Affiliation with Address:
Pin Code:
Mob No:
Email:

Details of Registration Fees:

Amount Rs.only.
Draft No.: Dated
Issued by (Bank & Branch):
Accommodation Required: Y/N
Date:

Signature of Applicant

Name of Institute

Drawn in favour of "Jaipur Engineering College and Research Centre",
Payable at Jaipur.

The Registration fee can also be transferred online to **A/c No: 50200006658098**
HDFC Bank, Chaura Rasta Branch, Jaipur (IFSC – HDFC0001437) Account Name
Jaipur Engineering College and Research Centre", Jaipur

For Information and correspondence, please Contact:

Dr. Akhilesh Paliwal: +91-9509502363

Dr. Ravi Yadav: +91- 9782891969



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

4th National Conference

on

Futuristic Trends in

Mechanical Engineering
NCFTME-2020

5-6 March, 2020

Organized by

Department of Mechanical Engineering

Jaipur Engineering College & Research Centre

Opp. EPIP Gate, Sitapura Industrial Area
Tonk Road, Jaipur, Rajasthan-302022

Outcome of Conference

As JECRC is a grown up organization with 71 startups to its credit. NCFTME is aiming to promote students, research scholars and faculties members to present their preliminary idea that may be transformed into a product/ startup. This conference is being organized to bring researchers and experts from academia on a common platform to address the challenges and opportunities in the field of Science technology.

About JECRC

The JECRC Foundation having 19 year of existence, is amongst the most respected educational groups in Higher and Technical Education in North India which has 2 large campuses with 10,000 students enrolled as on date in various courses alongside engineering courses. The engineering colleges are approved by the AICTE, Delhi and are affiliated to the Rajasthan Technical University, Kota. The JECRC Foundation has now become a brand name in professional education in Rajasthan.

About Department

Mechanical Engineering Department, JECRC Foundation is one of the oldest one of the biggest departments of the institute. While managing this strength which is an urgent need of the nation, department is committed to well being and all round development of its students. The department has been on the pinnacle of all our achievements and developments in the field of various technologies over the few years. The incorrigible focus is on developing fundamental and intellectual knowledge amongst the students through outcome based education. Through all these efforts, the main is to create such manpower which will be able to meet the present and future demands of industry.

Conference Patrons

O.P. Agrawal, Chairman
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Conference Patron

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Dr. Manish Srivastava
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Organising Secretaries

Mr. Shrikant Bansal
Mr. Ashish Nagpal
Mr. Ravi Yadav
Mr. Akhilesh Paliwal

Themes of NCFTME-2020

- ☞ Industrial Engineering & OR
- ☞ Industry 4.0 and its Applications
- ☞ Robotics & Mechatronics
- ☞ Mechanics & mechanisms
- ☞ Smart Materials & Nano Technology
- ☞ Thermal Engineering
- ☞ CAD/CAM/CIM/CFD
- ☞ Renewable Energy
- ☞ Machine Design & Solid Mechanics
- ☞ Virtual manufacturing
- ☞ Automation
- ☞ Agile & Additive manufacturing
- ☞ Nano Technology
- ☞ Green manufacturing
- ☞ Surface Engineering
- ☞ Renewable Engineering
- ☞ Bio-Materials
- ☞ Optimization

Registration Fee

- ☐ Industry Persons: 1000/-
- ☐ Faculty Members: 800/-
- ☐ Students (Authors): 250/-
- ☐ Participants: 150/-

Important Dates

- ☐ Submission of Full Paper: 20/02/20
- ☐ Conformation of Acceptance: 25/02/20
- ☐ Last date of Registration: 01/03/20

Guideline for submission of paper

Authors are requested to submit their manuscript using Time New Roman with Font size 12pt in MS Word in IEEE format. Send your Paper on ncftme@jecrc.ac.in. Selected paper after review will be considered for publication in conference proceeding with ISBN No.-978-81-940543-1-3.

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About JECRC Foundation

The National Society for Education Research and Development was set up and registered in the year 1999 in Jaipur with the major objective of providing quality education and research environment in Rajasthan. Keeping this objective in view the pioneers in the field of education implanted JECRC Foundation in the year 2000. With the remarkable success the foundation achieved within a short span of time, today it has three institutions that conducts UG, PG and Ph.D programs in several disciplines duly approved by the UGC and AICTE, Government of India with the student strength exceeding 10000. The Foundation has an active collaboration with several industries. Our alumni have been placed in industries of repute and have also been pursuing higher studies abroad at prestigious universities. The foundation has the legacy of nurturing the essence of growth in education with the prime focus being holistic development of the students, thus becoming the most preferred choice for students with a variety of academic pursuits.

About IT Department

The department of Information Technology was established in 2001. The department aims at developing the technical skills among students. To accomplish this we organized many events like Hackathon, Ideathon, SIP expo, and many different seminars and workshops to enhance the skills and overall personality of students. To enhance the entrepreneurship skills and research areas IT department has established excellence in teaching and learning. The department not only focuses on technical skill but also provides them with areas with different educational opportunities and support groups which help in developing technical as well as non-technical awareness. The fundamental aim of department is to provide students with each and every opportunity.

About Conference

CITSA is a conference to be held in JECRC. It aims at bringing together the researchers and practitioners from academia, industry and government to deliberate on the algorithms, systems, applied, and research aspects of digital applications. National Conference "NCITSA-2020" is organized with a vision to address the various issues to promote creation of intelligent solutions in future. It is expected that researchers will bring new prospects for collaboration across disciplines and gain ideas facilitating novel concepts. NCITSA-2020 is a premier conference, organized by the Department of Information Technology on March 7, 2020 at JECRC, Jaipur.

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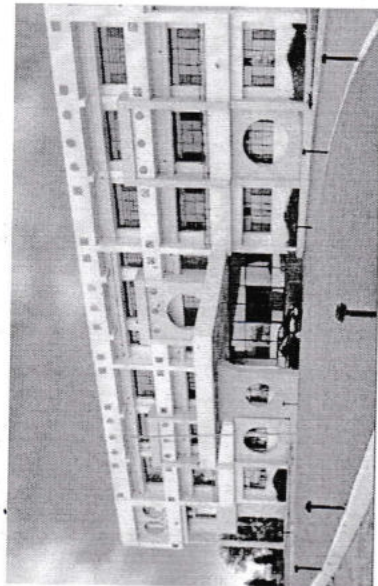
INTERNATIONAL SOCIETY FOR EDUCATION RESEARCH AND DEVELOPMENT



NCITSA

2nd National Conference On Information Technology & Security Applications (NCITSA-2020)

(ISBN NO. 978-81-940543-0-6)



Organized by

Department of Information Technology
Jaipur Engineering College and Research Centre, Jaipur
<http://www.jecrcconference.in/ncitsa/>

In Association with



Jaipur Engineering College and Research Centre
Shri Ram ki Nangal, via Sitapura RIICO
Tonk Road, Jaipur-302 022, Rajasthan
Ph No. 0141-2770120, 2770232

Objective of the Conference

- To provide an exceptional platform to academicians, researchers and students to converse and share the ideas.
- To meet and discuss the practical solutions, scientific results and methods in solving various problems with people who are actively involved in emerging research fields.
- To focus on the recent technological developments in all the areas of Information Technology.

Conference Tracks

- Track 1: Information Security
- Track 2: Big Data
- Track 3: Cloud Computing
- Track 4: Soft Computing
- Track 5: Virtual Communities and Social Networking
- Track 6: Artificial Intelligence
- Track 7: Computer applications
- Track 8: Machine Learning, Modeling & Simulation

Guidelines for Paper Submission

Prospective authors are invited to submit manuscripts reporting original unpublished research and recent developments in the topics related to the conference. It is required that the manuscript follows the standard IEEE camera-ready format. Regular papers should present novel perspectives within the general scope of the conference. The conference only accepts full manuscripts with maximum 6 pages.

Submission of paper must be original and should not have been previously published or under consideration for publication. All papers will be sent for peer review and the corresponding author will be notified of the outcome of the review process. At least one of the authors of each accepted paper must register for the conference and present their paper in person at the conference. All submissions are to be done electronically through email ID of NCITSA-2020

Important Dates

Last Date for	Date
Submission of Manuscript	28/02/2020
Acceptance Notification	02/03/2020
Submission of Camera Ready Paper	03/03/2020
Registration	04/03/2020

Keynote Speakers

- Abhilasha Vyas, Program coordinator, CSE, GSFC University, Vadodara
- Mr. Mehul Mahrishi, Asso. Prof., SKIT, Jaipur
- Mr. Shekhar, Associate professor, IT, JECRC University

Paper Publication Details

The submitted papers will go through a competitive review process and the accepted papers will be considered for oral presentation and published with proceeding:
ISBN NO. 978-81-940543-0-6

Paper Submission Link:

ncitsa@jecrc.ac.in

Registration Fees

Category	Amount
Research Scholars/Students	INR 700/-
Author from India	INR 800/-
Author from other countries	\$50
Attendee	INR 500/-

Participants should make their payment through online/ DD/ Cash, in favor of Jaipur Engineering College and Research Centre, payable at Jaipur and send to Organizing Secretary (NCITSA-2020) JECRC, Jaipur.

Online Payment Account Details

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Bank Name: ICICI Bank Ltd

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IFSC Code: ICIC0006748

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Mr. Piyush Gautam, Convener NCITSA-9414611785

Dr. Smita Agrawal, Convener NCITSA-9928023107

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Dr. V. K. Chandna, Principal

Jaipur Engineering College & Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp.

EPIP Gate, Tonk Road,

Jaipur- 302022 (Rajasthan)

Accommodation

Jaipur offers a wide range of accommodation to economy and luxury class hotels within 10 kms from the Conference Venue. Delegates are requested to book the accommodation in advance to get their preferred choice. Limited accommodation is available at nominal charges on first come first serve basis at JECRC Student Hostels. For this, kindly inform us by sending an e-mail by March 01, 2020

For JECRC Foundation location kindly scan following QR Code:



About JECRC Foundation Group

Jaipur Engineering College & Research Centre (JECRC) was established in the year 2000. The founders and the society are now generally referred to as the JECRC Foundation. Encouraged by its splendid achievements and overwhelming public patronage, it ventured into establishing JECRC University in the year 2012. JECRC University is conducting UG, PG and Doctoral programmes in diversified fields (Engineering & Technology, Applied Science, Law and Management) and has also set up centres of research. The JECRC foundation has now become a brand name in professional education in Rajasthan.

About ECE Department

Electronics & Communication Engineering department was established in the year 2000 with an idea to provide best technical expertise and placement opportunities to the under graduate students. The department has been continuously striving for excellence in engineering education. The department has always been on a high growth path to keep pace with the ever-increasing importance of the major disciplines of study and current technology trends. The programme emphasizes the basics of Electronics, Computers, Communication, Signal Processing, Instrumentation and other related relevant fields. In order to cope up with the requirement of industries, the department have excellent laboratories with latest equipments. The department has a team of highly motivated and dedicated faculty members to the cause of academics and striving to do the best in the interest of the college and the students. Most of the faculty members are actively involved in research work. Research work of faculties has been published in various journals and conferences of international repute. The department conducts regular technical activities like workshops, seminars, webinars and conferences under the umbrella of IETE and OSA student chapters. The department run student clubs and centre of innovative learning in the field of IOT and Robotics.

Research Areas Pursued by the Faculty Members

Wireless Communication, Microwave Engineering, Antennas, Digital Signal Processing, Image Processing, Analog Circuit Design, Mixed Mode System, Power Electronics, Optoelectronics, Optical Communication, Material Science and Engineering, NanoScience and Nanoelectronics, VLSI design, Wireless Sensor Networks, MEMS, Energy Science and Engineering, Semiconductor Devices.

About Conference

The National Conference "RACON-2019" is organized with a vision to address and provide solution to the various technical issues related to society. It is expected that researchers will bring new prospects for collaboration across disciplines and gain ideas facilitating novel concepts. The theme of this conference will motivate the researchers to adopt the outcome for implementation. The national Conference on **Recent Advances in Communication, Optics and Nanoscience-2020 (RACON-2020)** is a premier conference, organized by the Department of Electronics & Communication Engineering on March 6, 2019 at JECRC, Jaipur.

RACON-2020 aims to bring together the researchers, scientists, engineers, and research scholar in areas of Engineering and Technology, and it provides them a national forum for the dissemination of original research, new ideas and practical development experiences. The conference has prime focus on addressing the challenges in the field of engineering and science.



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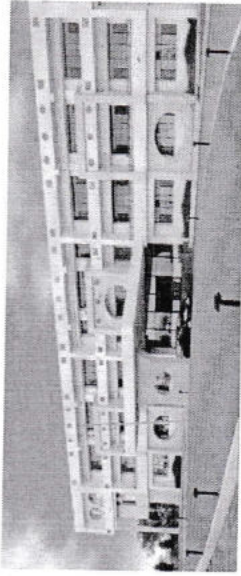
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National Conference
on
Recent Advances in
Communication, Optics and Nanoscience-2020

RACON-2020

March 6, 2020



Organized by
Department of Electronics & Communication Engineering

In Association with

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OSA
JECRC Foundation Jaipur

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2770120, 2770232, E-
mail: racon2019@gmail.com Website:
www.jecrcfoundation.com

Objective of Conference

- To provide an exceptional platform to the academicians, researchers and students to share their research ideas.
- To meet and discuss the practical outcome, scientific results and methods to provide probable solution to the problems of society.
- To focus on the recent technological developments in all the areas of Electronics and Communication Engineering.

Tracks

- Biomedical Engineering
- Communication Systems
- Data Communication Network
- Electronic Sensors
- Embedded System Technology
- Green Energy
- Internet of Things
- MEMS and Nanotechnology
- Microprocessor and Microcontroller Based Systems
- Microwave and Radar Technology
- MIMO Technology
- Modern Control Systems
- Network & Coupled Circuits
- Optical Communication
- Robotics and Neural Networks
- Speech/Signal/Image Processing
- VLSI Design
- Wireless Communication
- Wireless Sensor Networks
- Fabrication and Characterization
- Simulation and Modelling of Electronic Systems
- Network Analysis and Synthesis

Guidelines for Submission of Papers

Authors are requested to submit their research paper using Times New Roman format in font size 10 (MS Word), Two column format as specified by IJERT journal. The full-length papers of 4-6 pages should be mailed to racon2020@gmail.com. The paper should include an abstract (not exceeding 150 words) together with 4-6 Key words, figures, diagrams, tables, graphs and reference as prescribed in the format. Reviewed and selected papers will be published online in "International Journal of Engineering Research & Technology (IJERT) (ISSN: 2278-0181). Visit <https://www.ijert.org/downloads> for paper template.

Important Dates

Last Date for	Date
Submission of Manuscript	01/03/2020
Acceptance Notification	03/03/2020
Registration	05/03/2020

Registration Fees

Category	Amount*
Research Scholars/ Faculty (outside)	Rs. 900/-
Industry Persons	Rs. 300/-
*Amount for two participants only	

Payment Mode

Participants should make their payment through DD/NEFT/Cheque in the name of Jaipur Engineering College and Research Centre, Jaipur. If paid in cash, Contact Mr. Manish Yadav, Organizing Secretary (RACON-2020) JECRC, Jaipur.

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 Branch : Chaura Rasta , Jaipur
 A/C No. : 50200006658098
 IFSC Code : HDFC0001437

Contact

Dr. Rajesh Bathija +91-8619635046
 Mr. Manish Yadav +91-

Address for Correspondence

HOD ECE
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 Shri Ram Ki Nangal, Via Sitapura RIICO, Opp.
 EPIP Gate, Tonk Road,
 Jaipur- 302022 (Rajasthan)

Accommodation

Jaipur offers a wide range of accommodation to economy and luxury class hotels within 10 km from the Conference Venue. Delegates are requested to book the accommodation in advance to get preferred choice. Limited accommodation is available on payment basis at JECRC Student Hostels at nominal charges on first cum first serve basis. The request for accommodation can be sent to racon2020@gmail.com.



JAIPUR ENGINEERING COLLEGE
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National Conference

on

Recent Advances in

Communication, Optics and Nanoscience-2020

RACON-2020

March 6, 2020

- Name:
(In Capital Letters)
- Title of Paper:
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NOTE: Certificate will be given to registered participant presenting the paper.

About JECRC Foundation

The National Society for Education Research and Development was set up and registered in the year 1999 in Jaipur with the major objective of providing quality education and research environment in Rajasthan. Keeping this objective in view the founders in the field of education implanted JECRC Foundation in the year 2000. With the remarkable success the foundation achieved within a short span of time, today it has two institutions at conduct UG, PG and Ph.D programs in several disciplines approved by the UGC and AICTE, Government of India with the student strength exceeding 10000. The Foundation has active collaboration with several industries. Our alumni have been placed in industries of repute and have also been pursuing their studies abroad at prestigious universities. The foundation is the legacy of nurturing the essence of growth in education with the prime focus being holistic development of the students, thus becoming the most preferred choice for students with a variety of academic pursuits.

About CSE Department

The Department of Computer Science & Engineering was established in 2001. The Department aims at developing technical skills among students. To accomplish these many events have been organized like Hackathons, Ideathons, and many different seminars and workshops to enhance the skills and overall personality of students. To enhance the entrepreneurship skills research skills, the department has established excellence in teaching and learning. The department not only focuses on the technical skills but also provides different educational opportunities and support groups which help in creating technical as well as non-technical awareness. The fundamental aim of the department is to provide students opportunities at every pace.

About Conference

NCICT is a national conference to be held in JECRC. It aims at bringing together students, scholars, researchers, academicians, industry persons to deliberate on contemporary issues concerning the computer world and research aspects of emerging technologies and applications. NCICT-2020 is organized with a vision to address various issues to promote the development of the field in the future. It is expected that researchers will gain new prospects for collaboration across disciplines and gain insights into facilitating novel concepts. The first NCICT-2019 stood as a landmark conference, organized by the Department of Computer Science & Engineering on March 16, 2019, at JECRC, Jaipur. NCICT-2020 is keeping the legacy continue on March 7, 2020, at JECRC, Jaipur.

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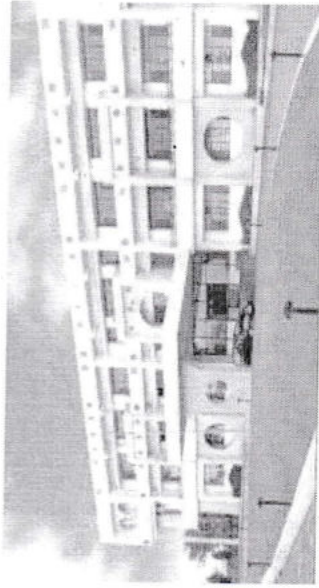
2nd National Conference On

Contemporary Issues in Computer Technology

(NCICT-2020)

ISBN No.: 978-81-940543-2-0

March 7, 2020



Organized by

Department of Computer Science & Engineering
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<http://www.jecrcconference.in/ncict/>

In Association with



Jaipur Engineering College and Research Centre
Shri Ram ki Nangal, via Sitapura RIICO,
Tonk Road, Jaipur Rajasthan - 302022,
PhNo. 0141-2770120, 2770232

Objective of Conference

- To focus on emerging technologies and developments in the area of Computer Engineering and Technology.
- To provide platform to students, scholars, academicians and industry persons to converse and share the ideas.
- To meet and discuss the practical solutions, scientific results and methods in solving various problems with people who are actively involved in emerging research fields.

Conference Tracks

1. Artificial Intelligence and Machine Learning
2. ICT & Information Security
3. Big Data and Data Analytics
4. Software Engineering
5. Smart Devices and M-commerce
6. Wireless and Spectrum Technologies
7. Internet of Things
8. Social Media and SEO
9. Hardware and Network Engineering

Guidelines for Paper Submission

Authors are invited to submit manuscripts reporting original unpublished research articles, review paper and paper concern to recent developments in the topics related to the conference. It is required that the manuscript follows the standard IEEE camera-ready format. Regular papers should present novel perspectives within the general scope of the conference. The conference only accepts full manuscripts with maximum of 6 pages.

Submission of the paper must be original and should not have been previously published or under consideration for publication. All papers will be sent for peer review and the corresponding author will be notified of the outcome of the review process. At least one of the authors of each accepted paper must be registered for the conference and present their paper in the conference. All submissions are to be done electronically through official conference e-mail.

Paper Publication Details

The submitted papers will go through a cutthroat review process and the accepted papers will be considered for oral presentation and published with proceeding:

ISBN No.: 978-81-940543-2-0

“Contemporary Issues in Computer Technology”

Paper Submission Link

All paper submission should be done electronically through official conference e-mail:

ncict2020@jecrc.ac.in

Payment Account Details

A/C Name : Jaipur Engineering College and Research Centre
Bank Name : HDFC BANK LIMITED
Branch : ALUDA HOUSE,
Chaura Rasta, Jaipur
A/C No. : 50200006658098
IFSC Code : HDFC0001437

Contact Person (s)

Dr. Sanjay Gour, Convener-NCICT [9784652469]
Ms. Priyanka Mitra, Co-Convener [9462645868]
Ms. Avani Sharma, Co-Convener [7597930499]

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Mr. Rajan Jha

Important Dates

Deadlines	Date
Submission of Manuscript	25/02/2020
Acceptance Notification	27/02/2020
Submission of Camera Ready Paper	29/02/2020
Registration	29/02/2020

Registration Fees

Category	Amount
Student	INR 500/-
Research Scholar / Academicians	INR 1000/-
Industry Person	INR 2000/-
Foreigner	\$ 50/-
Attendee	INR 500/-

Participants should make their payment through online /DD /Cash in favor of Jaipur Engineering College and Research Centre, payable at Jaipur and send to organizing secretary NCICT-2020 JECRC, Jaipur.

Address for Correspondence

Dr. Sanjay Gour, Convener, HOD CSE
Jaipur Engineering College & Research Centre
Shri Ram Ki Nangal, Via Sitapura RIICO,
Opp. EPIP Gate, Tonk Road,
Jaipur-302022(Rajasthan)

Location of JECRC Foundation

For JECRC Foundation location, kindly scan following QR Code:





JECRC Foundation



HINTEE - 2020

2nd National Conference
on
Recent Trends and Smart Technologies
in
Electrical Engineering (RTSTEE)
March 7, 2020

REGISTRATION FORM

1. Name:
2. Title of Paper:
.....
(In Capital Letters)
3. Organization:
4. Address (Correspondence):
.....
.....
5. Contact No.:
6. E-mail ID:
7. Category (Please Mark):
(i) Research Scholar/Student
(ii) Faculty
(iii) Industry Person
(iv) Participant
8. Registration Fee Detail:
Amount Rs.....
D.D. No.
Bank Name:

Signature of the Candidate



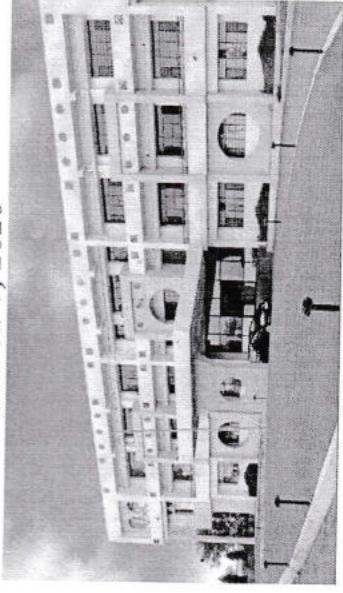
JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



HINTEE - 2020

2nd National Conference
on
Recent Trends and Smart Technologies in
Electrical Engineering
(RTSTEE-2020)
<http://www.jecrcconference.in>

March 7, 2020



In Association With



Convener
Dr. Prerak Bhardwaj(HOD, EE)

Organized by

Department of Electrical Engineering
Jaipur Engineering College and Research Centre
Shri Ram ki Nangal, Sitapura RIICO, Tonk Road
Jaipur - 302022

Email: rstee2020@jecrc.ac.in

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Shri Amit Agrawal (Director, JECRC Foundation Jaipur)
Shri Arpit Agrawal (Director, JECRC Jaipur)

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About JECRC Foundation

JECRC Foundation is one of the leading educational groups in North India for nurturing the essence of growth in education. Some of its best education group, with institutes for engineering, management and pure & applied sciences are:

- Jaipur Engineering College & Research Centre (JECRC)
- JECRC University

About Jaipur Engineering College and Research Centre (JECRC)

The JECRC Engineering College was the first venture of the JECRC foundation in the league of the best colleges for B.Tech in Rajasthan. This institute has been set up in the year 2000. The JECRC has a well-qualified and experienced faculty; excellent management and infrastructure that ensure academic excellence and overall development of its students. The JECRC is the most preferred choice amongst the aspiring students for B.Tech. Programs. This is evident from the recent trends witnessed during the RPET and AIEEE/JEE counselling. The institute has well-equipped laboratories, library and hostel facilities for girls and boys. The institute with its rich faculty resources has strived to provide value added high quality education with practical skills to provide all round professional competence. The Institute offers B.Tech degree courses in six disciplines, namely, Computer Science, Electronics and Communication, Electrical, Information Technology, Civil, and Mechanical Engineering.

About EE Departments

Electrical Engineering (EE) is one of the major engineering department of JECRC. The EE Dept. includes number of laboratories with a diversified variety of equipment. Being the core branches, having laboratories focusing on fundamental and some advance aspects of Electrical Engineering. In order to cope up with the requirement of industries, the departments also have laboratories with latest technologies. Students have an open access in the laboratories, to understand as well as apply their knowledge to explore their engineering skills. The departments have team of highly motivated and dedicated faculty members to the cause of academics and striving to do the best in the interest of the college and the students. Most of the faculty members are actively involved in research work and regularly publish their research papers in Journals and Conferences.

Research Areas Pursued by the Faculty Members

Power System Stability, Control System, Electrical Machines, FACTS Devices, Power Quality & Management, Power Electronics, etc.

About Conference

RTSTEE-2020 is a one day conference organized to provide a platform to the researchers to present their researches. Its motive is to address the recent innovative ideas and smart solutions to enhance the knowledge domain in the field of electrical engineering. It is expected that researchers will bring new prospect for collaboration across disciplines and gain ideas facilitating novel concepts. The theme of this conference will motivate the researchers to adopt the outcome for implementation.

Objective of the Conference

- To provide an exceptional platform to the academicians, researchers and students.
- To meet and discuss the practical solutions, scientific results and methods in solving various problems with people who are actively involved in emerging research fields.
- To focus on the recent technological developments in all the areas of Electrical Engineering

Paper Submission Guidelines

The abstract of the paper should have times new roman font style, font size 10 with single spacing. It must include author(s) name, affiliation, and contact information followed by an abstract of not more than 200 words. The full paper will be submitted as per the standard IEEE template. The full paper should not have more than six pages. All registered papers will be included in conference proceeding and indexed on www.jecrcconference.in. The best papers selected in the conference are considered for publication in the UGC approved Journals.

Important Dates

Events	Dates
Last date for receiving full length paper	29/02/2020
Acceptance Notification	02/03/2020
Last date for camera ready paper	03/03/2020
Last date for registration	04/03/2020

Registration Fees Details

Category of Participant	Registration Fee
Research Scholar/Student	Rs. 750/-
Faculty	Rs. 1000/-
Industry Person	Rs. 2000/-
Participation Only	Rs. 250/-

Guidelines for submission of Paper

Authors are requested to submit their manuscript using Time New Roman with Font size 12pt in MS Word in IEEE format at rtstee2020@jecrc.ac.in. Full length paper should not exceed more than six pages.

Payment Method

Participants should make their payment through net banking / DD/ cash payable at Jaipur Engineering College and Research Centre, Jaipur and send a copy of receipt on e-mail rtstee2020@jecrc.ac.in before 4th March, 2020.

Online Payment Account Details

A/C Name: JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE
Bank Name: HDFC BANK
Branch: HDFC BANK, CHAURA RASTA, JAIPUR
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IFSC Code: HDFC 0001437

Call for Papers

- Control Systems
- Electrical power conversion
- Electric Machines
- Electric Drives
- Internet of Things
- Microprocessor and Microcontroller based technology
- Non-Conventional Energy Resources
- Power Electronics
- Power Quality
- Reliability Analysis
- Robotics and Neural Networks
- Smart Grid Technology
- Transmission Lines
- Microgrid
- Wireless Sensor Networks

Paper is to be submitted at: rtstee2020@jecrc.ac.in

Mailing Address

Dr. Prerak Bhardwaj
HoD EE Dept.
Jaipur Engineering College and Research Center
Shri Ram ki Nangal,
Sitapura RIICO,
Tonk Road,
Jaipur-302 022



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JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



पेट्रोलियम संरक्षण अनु

This Certificate of Appreciation is being Presented

For active Participation in the Presentation

under the theme " Indhan Adhik Na Khapaayein

Aao Paryavaran Bachaayein "

under Saksham 2020 Event to

at Jaipur Engineering College and Research Centre, Jaipur

February 2020

Major Deepak (

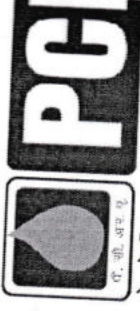
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JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



पेट्रोलियम संरक्षण अनु

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Presented For active Participation in the Debate
On the topic of " Indhan Adhik Na Khapaayein Aao Paryavaran
Bachaaeyein "
under Saksham 2020 event to*

*at Jaipur Engineering College and Research Centre, Jaipur
February 2020*

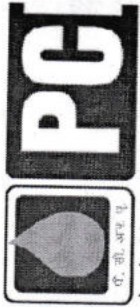
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In recognition of the efforts made in promoting events On the topic
of " Indhan Adhik Na Khapaayein Aao Paryavaran Bachaayein "

Under Saksham 2020

to

at Jaipur Engineering College and Research Centre, Jaipur

February 2020

Major Deepak

Dy. Director, I





एन. सी. ई. आर. ओ. यूपी. सी. ई. आर. ओ. यूपी. सी. ई. आर. ओ. यूपी.



JAIPIR ENGINEERING COLLEGE
AND RESEARCH CENTRE



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of " Indhan Adhik Na Khapaayein Aao Paryavaran Bachaayein "

Under Saksham 2020

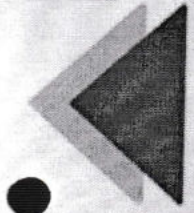
to

at Jaipur Engineering College and Research Centre, Jaipur

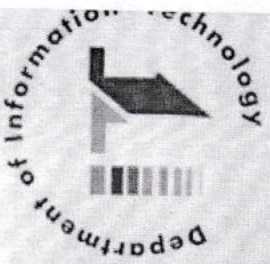
February 2020

Major Deepak

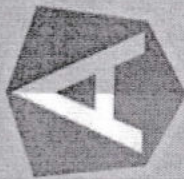
Dy. Director, I



INDUSTRIAL HUB
TECHNOLOGY PVT LTD



"One day hands-on practice workshop on Angular JS node"



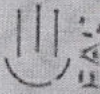
Angular JS

Date : 18 feb 2020 Time : 9:00am to -3:30 pm

Organized by : Department of Information Technology

In Association with : DVS Industrial Hub Technology

Powered by:



Department of Information Technology



JECRC FOUNDATION



Department of
Information Technology
is organizing



IT HACKATHON

IT HACKATHON 3.0

TIME:

9:00 AM - 3:30 PM

VENUE:

C-BLOCK

DATE:

26th SEP, 2019

IN ASSOCIATION WITH:



JECRC
UNIVERSITY



WORKSHOP REPORT OF VIRTUAL LABS



A one-day workshop on Virtual Labs was organized successfully on **20/08/2019** at **Jaipur Engineering College and Research Centre, Jaipur** for faculty members and students from respective disciplines (CSE/IT, ECE, EE, ME and First year) by Virtual Labs team, IIT Delhi. Virtual Labs mentors for this workshop were **Mr. Ashish Ranjan and Mr. Rajat Kumar Jha**. Total **473** students and **6** faculty members attended the workshop.

The detailed report of the workshop is given below:

Session	Time	Discipline	Experiments Demonstrated	No. of Experiments performed (A)	No of Students attended (B)	No of Faculties attended (C)	Hands on Usage
1	09.30 - 12.30	ME and ECE	<ul style="list-style-type: none">• Characterize the temperature sensor• Characterize the LVDT• 3D scanning• Impact test on cantilever• Modal analysis• Position analysis of Grash of four bar mechanism• Position analysis of NonGrash of four bar mechanism• VI characteristics of a diode• Study of sampling theorem, effect of undersampling	8	152	4	1248
						Total	1248
						A*(B+C)	

Session	Time	Discipline	Experiments Demonstrated	No of Students attended (X)	No of Faculties attended (Y)
1	11.30 - 12.30	ECE, EE, ME & CSE/IT	<ul style="list-style-type: none"> • Kirchoff's Law • Acid Base Titration • Rotating magnetic field behavior in two coils 	161	1
2	01.30 - 03.00	ECE, EE, ME & CSE/IT	<ul style="list-style-type: none"> • Kirchoff's Law • Acid Base Titration • Rotating magnetic field behavior in two coils • Rotating magnetic field behavior in three coils 	160	1
Total attendees (X+Y)				323	

**NOTE: Photographs of this workshop will be submitted separately.*

Nodal Coordinator

Head of the Institute



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE, JAIPUR



IETE Student's Forum (ISF), JECRC

One day workshop

on

"IoT Enabled Energy Efficient Systems"

Feb. 19, 2020





Student Chapter

OSA

JECRC Foundation Jaipur



IETE Students Forum (ISF)-JECRC

&

OSA Student Chapter-JECRC

Organize One day workshop

on

“Machine Learning With Python”

Feb. 24, 2020

WORKSHOP ON ETHICAL HACKING

Event : Workshop on **ETHICAL HACKING**
Category : Workshop
Area : Computer Networks
Date & Time : Monday, Mar. 4th-5th, 2020 12:30 PM to 3:30 PM
Venue : Seminar Hall, C-Block, JECRC, Jaipur

Expert : Mr. Sangeet Chopra
Well Known Ethical Hacker
Senior Network Analyst
CyberCure Technologies Pvt. Ltd., Ghaziabad

Contact: +91-9555559979

E-mail: abhi.bharti@cybercure.in

Company Profile : Cyber Cure Technologies "Leading the way in Information Security", founded by a group of security experts with the keen motive of Spreading awareness about the Information Security and Safeguarding the upcoming future of India from Digital Frauds.

At Cyber Cure, students are brought face to face with the growing Technological changes, their consequences & related threats by way of short sessions, training and are also provided long term training programs. Our experienced and qualified professionals help students gain 'hands on' experience and in-depth practical knowledge.

Cyber Cure Technologies being a knowledge platform also believes in sharing its domain expertise through its various programs such as workshops, guest-lectures and many more.

We have a partnership cell to incubate with a Technical Institute or college as focal point for better interaction between the institution and industry and to develop industry oriented minds and skill sets in upcoming graduates.

Company Address : CyberCure Technologies Pvt. Ltd., CS-4, 2nd Floor, Chandni Plaza
Gyan Khand -1, Indirapuram, Ghaziabad(NCR) -201014
Company Contact : +91-9555550880

E-mail: info@cybercure.in

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

WORKSHOP ON DATA SCIENCE

Event : Workshop on DATA SCIENCE
Category : Workshop
Area : Machine Learning
PO's Covered : PO3, PO5, PO6, PO10
PSO Covered : PSO2
Date & Time : Wednesday, March4th , 2020 12:30 PM to 3:30 PM
Venue : IBM Lab, A-Block, JECRC, Jaipur

Expert 1 : Mr. Manish Kumar
General Manager & Data Science Expert
Kvch-Oracle WDP, Noida

Contact: +91-9625923960
E-mail:manish@kvch.in



Expert 2 : Mr. SourabhTaneja
Senior Software Developer and Trainer
Kvch-Oracle WDP, Noida

Contact: +91-9050589858
E-mail: saurabh@kvch.in



Company Profile : The Oracle Workforce Development Program (WDP) helps educational institutions around the world prepare a new generation of IT specialists to enter the workforce with the most in-demand Oracle Skills.

By enabling you to offer authorized Oracle Training Content as a part of your existing degree programs, students can learn those desirable job skills required for increasingly competitive work environment. The program also addresses the growing shortage of skilled employees in the global technology industry by allowing you to offer Oracle authorized training.

KVCH was established in 1991. KVCH is committed to impart industry oriented training programs to produce world class technically sound manpower so that they can meet the industry requirements. We are Oracle WDP Partner for conducting the Industrial Training program on Live Projects

Company Address : C-109 , Sector -2 Noida -201301 U.P. (INDIA)

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

WORKSHOP ON SALESFORCE.COM

Event : Workshop on SALESFORCE.COM
Category : Workshop
Area : Cloud Technology
PO's Covered : PO3, PO5, PO6, PO10
PSO Covered : PSO2
Date & Time : Monday, Mar. 2nd, 2020 09:00 AM to 12:00 PM
Venue : IBM Lab, A-Block, JECRC, Jaipur

Expert : Mr. Athar Ahmad
Technical Head & Trainer
TechnoglobePvt. Ltd., Jaipur

Contact: +91-8290997826
E-mail:athar1916@hotmail.com



Company Profile : **Technoglobe** (International Accredited Organization IAO Authorized Institution) is a Flagship of VSM Infotech which is a Government of Rajasthan registered & ISO 9001:2008 certified offshore Software Development & IT Training and Placement Company established in 2001. We are the same company that has driven TATA-CMC & also HCL Learning Ltd in Jaipur from year 2005 to 2016.

Technoglobe is authorized partner of HPE (Hewlett Packard Enterprise), MICROSOFT, ADOBE, AUTODESK, COMPTIA, IIJT-TEAMLEASE & MONSTER.COM

Technoglobe employs highly qualified professionals with Ph.D, M.Tech, B.Tech, MCA, BCA, BBA, MBA and many other streams. We have a highly qualified and experienced team comprising education experts, subject matter experts, instructional designers, quality experts, Academic advisors, experienced Placement officers, Project Managers, skillful trainers & Team leaders.

Company Address : **Gopalpura Bypass (HO)**
405, Bhandari Hospital Corner, Jaipur. Rajasthan (INDIA) Mob: 9928556083

Company Contact : +91-9829140090, +91- 9928556083

E-mail: training.technoglobe@gmail.com

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

WORKSHOP ON ETHICAL HACKING

Event : Workshop on **ETHICAL HACKING**
Category : Workshop
Area : Computer Networks
PO's Covered : PO3, PO5, PO6, PO10
PSO Covered : PSO2
Date & Time : Monday, Mar. 2nd, 2020 12:30 PM to 3:30 PM
Venue : IBM Lab, A-Block, JECRC, Jaipur
Expert : Mr. AbhishekBharti
Network Analyst
CyberCure Technologies Pvt. Ltd. , Jaipur

Contact: +91-9555559979
E-mail: abhi.bharti@cybercure..in



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Cyber Cure Technologies being a knowledge platform also believes in sharing its domain expertise through its various programs such as workshops, guest-lectures and many more.
We have a partnership cell to incubate with a Technical Institute or college as focal point for better interaction between the institution and industry and to develop industry oriented minds and skill sets in upcoming graduates.

Company Address : CyberCure Technologies Pvt. Ltd. , CS-4, 2nd Floor, Chandni Plaza
GyanKhand -1, Indirapuram, Ghaziabad(NCR) -201014
Company Contact : +91-9555550880

E-mail: info@cybercure.in

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

WORKSHOP ON MACHINE LEARNING with DATA SCIENCE

Event : Workshop on **MACHINE LEARNING with DATA SCIENCE**
Category : Workshop
Area : Machine Learning
PO's Covered : PO3, PO5, PO6, PO10
PSO Covered : PSO2
Date & Time : Thursday, Jan. 23rd, 2020 09:00 AM to 3:30 PM
Venue : IBM Lab, A-Block, JECRC, Jaipur
Expert : Dr. Cherry Jain
Business Head & Artificial Intelligence Trainer
Technoglobe Pvt. Ltd., Jaipur

Contact: +91-9829140090
E-mail: cherry.jain07@gmail.com



Company Profile : **Technoglobe** (International Accredited Organization IAO Authorized Institution) is a Flagship of VSM Infotech which is a Government of Rajasthan registered & ISO 9001:2008 certified offshore Software Development & IT Training and Placement Company established in 2001. We are the same company that has driven TATA-CMC & also HCL Learning Ltd in Jaipur from year 2005 to 2016.

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Technoglobe employs highly qualified professionals with Ph.D, M.Tech, B.Tech, MCA, BCA, BBA, MBA and many other streams. We have a highly qualified and experienced team comprising education experts, subject matter experts, instructional designers, quality experts, Academic advisors, experienced Placement officers, Project Managers, skillful trainers & Team leaders.

Company Address : **Gopalpura Bypass (HO)**
405, Bhandari Hospital Corner, Jaipur. Rajasthan (INDIA) Mob: 9928556083

Company Contact : +91-9829140090, +91- 9928556083

E-mail: training.technoglobe@gmail.com

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

2-Day WORKSHOP ON DIGITAL MARKETING

Event	: Workshop on Digital Marketing
Category	: Workshop
Area	: Computer Networking
PO's Covered	: PO3, PO5, PO6, PO10
PSO Covered	: PSO1
Date & Time	: 04-05 October, 2019 9:00 AM to 3:00 PM
Venue	: IBM Lab, A-Block, JECRC, Jaipur
Expert	: Mr. AbhayRanjan Digital Marketing Expert & Consultant Grras Solutions Pvt. Ltd., Jaipur

Website: www.abhayranjan.com
Contact: +91-9929096928
E-mail: abhayranjan53@gmail.com



Trainer Profile:

AbhayRanjan is Digital Marketer, Influencer, Trainer, Motivational Speaker, Youtuber & Blogger based at Jaipur. He has five years of experience in digital marketing. He has trained around 200+ trainee on the field of digital marketing. Currently, He is managing many online ventures like SEOCompanyJaipur.com, Digicite.com, ExamScale.com. He has a strong presence over the internet and also, he is very active on the internet. He has answered 500+ questions on Quora, out of them; many are top answers and come in Quora digest. He has created 100+ videos on YouTube about digital marketing. He has written 100+ blog posts. He has also a good presence on Instagram and LinkedIn. He blogs about digital marketing tips at his blog AbhayRanjan.com.

As a digital marketing trainer, He delivers quality digital marketing training to students, professionals, housewives & who so ever wants to make a career in digital marketing or wants to grow his business online, or wants to do personal branding.

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

WORKSHOP ON CYBER SECURITY

Event : Workshop on Cyber Security
Category : Workshop
Area : Computer Networking and Cyber Security
PO's Covered : PO3, PO5, PO6, PO10
PSO Covered : PSO1
Date & Time : Friday, Sept. 06th, 2019 10:00 AM to 1:00 PM
Venue : IBM Lab, A-Block, JECRC, Jaipur

Expert 1 : Mr. Anshul Patidar
Business Development Executive
CYBEROPS InfoSec LLP, Jaipur

Contact: +91-7976801165
E-mail: anshul@cyberops.in



Expert 2 : Mr. Palash Verma
Information Security Analyst
CYBEROPS InfoSec LLP, Jaipur

Contact: +91-9116117170
E-mail: palash@cyberops.in



Company Profile:

Cyberops is India's leading organization in the field of Information security. Advancement in technology and interconnected business ecosystems has combined to increase exposure to cyber attacks. We aim to digitally shield the cyberspace by offering various products and services. We are hovering to influence our proficiency and global footprint in the field of information security and cyber crime investigation.


We foster certified trainings on Information Security and provide penetration testing for security audits, and Cyber Crime Investigation services for various sectors to meet their specific needs.

Company Address : 1-A, Vishveshwarya Nagar, Gopalpura Bypass, Jaipur-302018, Rajasthan, India

Company Contact : 0141- 2763411 / +91- 98875 06687 **E-mail:** training@cyberops.in

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

WORKSHOP ON INTERNET OF THINGS

Event	:	Workshop on Internet of things	
Category	:	Workshop	
Area	:	Embedded System	
PO's Covered	:	PO2, PO3, PO5, PO6, PO10	
PSO Covered	:	PSO2	
Date & Time	:	Friday, Aug. 23 rd , 2019 09:00 AM to 3:30 PM	
Venue	:	IBM Lab, A-Block, JECRC, Jaipur	
Expert	:	Mr. Furkhan Ali Senior marketing Executive & IOT Expert Ducat Education Pvt. Ltd. , Noida Contact: +91-9871055180 E-mail: furkhanaliducat@gmail.com	

Company Profile:

Getting a job is as difficult as beating the crowd because being in the corporate world demands a lot from the applicant because of which the applicants are putting their best, which results in the increment of difficulty level. You can see each and every thing is connected but the solution of this problem is either spending years to reach to a desired position or come to Ducat. At Ducat we provide the entire necessary computer training which helps the newbie's and also the experienced workers so that they can achieve better recognition in this competitive world.

WHAT TYPES OF SERVICES ARE OFFERED BY DUCAT?

Ducat provides the best available programs which helps in enhancing the technical skills which seems to be beneficial for all the applicants.

Software Development: We provide the best and latest IT software training which helps all the fresher and the corporate to understand well and give them the knowledge to go hand in hand with the latest technologies. This does not only helps the companies but also increases the self-level to deal with all the necessary software.

Instructor led campus: Ducat helps all the new instructors to get the best exposure to show their talent in right way.

Workshops and Placement Service: At Ducat, workshops are held to increase the

understanding level because theoretical values are always not enough and workshops helps in getting the practical knowledge which results in better understanding. As everything leads to the placement because if the institute does not provide placement services then it is ultimately bad for the applicants but we provide the best placement services and for that we give our best to give you the best.

**JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE, JAIPUR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

WORKSHOP ON PYTHON WITH MACHINE LEARNING

Event : Workshop on PYTHON WITH MACHINE LEARNING
Category : Workshop
Area : Artificial Intelligence
PO's Covered : PO3, PO5, PO6, PO10
PSO Covered : PSO2
Date & Time : Friday, Aug. 22nd, 2019 09:00 AM to 3:30 PM
Venue : IBM Lab, A-Block, JECRC, Jaipur
Expert : Mr. Siddharth Singh
Business Head & Artificial Intelligence Trainer
Techinest Pvt. Ltd., Jaipur

Contact: +91-9251494002
E-mail:techienest.siddharth@gmail.com



Company Profile:

TechieNest is a certified ISO 9001:2008, technology service provider and training organization. The soul mission of founders is to facilitate the education, research and development program; all under one roof. In a very short span of time our team has successfully delivered the impactful service to more than 350 colleges, including the most prestigious institutions of India, such as IIT Mumbai, IIT Delhi and all the NITs. All over the India, with our 6 centers, we are renowned for our own manufacturing unit and unique content. TechieNest is moving ahead with an ideology where practical and theory are equally emphasized. In the vast growing 'Technical Era' we are rising with a mission to expand the set boundaries of the 'techie-brains' to Explore, Invent and Innovate!

Company Address : Plot No. 262, Muktanand Nagar, Opp. Pooja Tower, Gopalpura Mode, Jaipur (302018), Rajasthan (India)

Company Contact : +91-9251494002, +91-7340033091/94 **E-mail: query@techienest.in**

Departmental Organizer:

1. Mr. Kanishk Jain (Assistant Professor, CSE Deptt.)
2. Mr. AshishAmeria (Assistant Professor, CSE Deptt.)

About JECRC

The National Society for Education Research and Development was set up and registered in the year 1999 in Jaipur with the major objective of providing quality education and research environment in Rajasthan. Jaipur Engineering College & Research Center (JECRC) is established in Jaipur in the year 2000. Encouraged by its splendid achievements and overwhelming public patronage it ventured into establishing a second college JECRC UDML College of engineering in the year 2007. The JECRC foundation has now become a brand name in professional education in Rajasthan. The founders and the society are now generally referred to as the JECRC Foundation.

JECRC University was established in the year 2012 and conducting UG, PG and Doctoral programmes in diversified fields (Engineering & Technology, Applied Science, Law and Management) and has also set up centers of research

Department of Mechanical Engineering

It is one of the oldest departments of the institute, offering a fine blend of experience and innovation in teaching in UG. The department provides a life-long learning experience, through its state of art laboratories, vast courses, and industry-orientation. A vast collaborative framework with reputed universities world over, the department offers ample opportunities for individual growth.

About Jaipur

Jaipur, the Pink City, is situated at a distance of around 260 Km from New Delhi. Known for its town planning, rich culture and architectural marvels as forts, palaces and temples, it offers a multitude of interesting places and attractions for recreation. Vibrant color, lively folk, music and dance performances mark the celebrations of every religious occasion and every change of season.

Objectives of the Course

The objective of this course is to give relevant knowledge about optimization techniques, theoretical aspects and their uses in engineering fields

Course Content

- Introduction of Internet of Things
- Hardware/Protocol Elements of IOT for manufacturing.
- Machine Learning for Intelligent IoT
- Analytic Engine for IoT.
- A few Common IoT Systems for manufacturing.

ICT BASED SHORT TERM COURSE

On

Internet of Things in
Manufacturing

06-10 January, 2020

Organized by



Department of Mechanical Engineering

Jaipur Engineering College & Research Centre

Opp. EPIP Gate, Sitapura Industrial Area,
Tonk Road, Jaipur- 302022 Rajasthan

Ph No. - 0141-2770120, 2770232

Website: www.jecrcfoundation.com

In Association with



National Institute of Technical Teachers
Training & Research (NITTR) Chandigarh

ICT based Short Term Course on
"Internet of Things in Manufacturing"
06-10 January 2020

Organized by
Department of Mechanical Engineering
Jaipur Engineering College and Research
Centre, Jaipur

Application Form

Full Name: _____
Designation: _____
Department: _____
Qualification: _____
Specialization: _____
Organization: _____
Address: _____
Pin Code: _____
Phone No. _____
Mob No. _____
Email: _____
Date: _____

Note.: Signature of Applicant

1. The selection is based on first come – first serve basis (limited seats available).
2. All participants must have to register themselves.
3. No TA/DA will be paid to the participants.
4. This application form should reach JECRC, Jaipur latest by **01/01/2020**.
5. Application without the approved letter will not be entertained.

SPONSORSHIP CERTIFICATE

The applicant will be permitted to participate in the above programme, if selected. Further, I have personally talked to the applicant and he/she seemed to be sure to attend the course, in case the admission is offered to him/her.

Date :

Signature and stamp of
the Head of the Institution

(Please mail your completely filled Application form at hemantbansal.me@jecrc.ac.in latest by **01/01/2020**)

Target Audience

The program is targeted towards the faculty of Mechanical, Civil, Automobile Engineering and Polytechnic Colleges.

Resource Persons

Faculty from NITTTR Chandigarh and experts/ academicians from IITs & NITs.



Scan to Register

Patron

Shri O.P. Agrawal, Chairman
Shri M.L. Sharma, Vice Chairman
Shri Amit Agrawal, Director
Shri Arpit Agrawal, Director

Advisory Committee

Dr. V.K.Chandna, Principal
Shri Manish Jain, Deputy Director
Shri O.P. Jain, Sr. Advisor
Shri P.K. Tiwari, Sr. Advisor
Prof. S.N. Gupta, Sr. Advisor
Prof.(Dr.)A.Williamson, Registrar

Head of the Department (ME)

Dr. M. P. Singh

Course Coordinators

Mr. Hemant Bansal (9461459852)
Mr. Lalit Kumar Sharma (9413417182)

Organising Committee

Dr. Fauzia Siddiqui
Dr. Bhuvnesh Bhardwaj
Dr. Manish Shrivastav
Dr. Rishi Pareek
Dr. Manmohan Siddh
Mr. Kuldeep Sharma
STC Administrator
Mr. Ram Singh (09887712330)
Mr. Gopal Tiwari (08890750291)

About JECRC

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JECRC University was established in the year 2012 and conducting UG, PG and Doctoral programmes in diversified fields (Engineering & Technology, Applied Science, Law and Management) and has also set up centers of research

Department of Applied Science

It is one of the oldest departments of the institute, offering a fine blend of experience and innovation in teaching in UG. The department provides a life-long learning experience, through its state of art laboratories, vast courses, and industry-orientation. A vast collaborative framework with reputed universities world over, the department offers ample opportunities for individual growth.

About Jaipur

Jaipur, the Pink City, is situated at a distance of around 260 Km from New Delhi. Known for its town planning, rich culture and architectural marvels as forts, palaces and temples, it offers a multitude of interesting places and attractions for recreation.. Vibrant color, lively folk, music and dance performances mark the celebrations of every religious occasion and every change of season.

Objectives of the Course

The objective of this course is "what is student – teacher evaluation.

Course Content

- How do we evaluate students
- Why is student evaluation important.
- Resources on interpreting.
- What are the student evaluation.
- What ways do you assess students.
- How are the course units evaluated.
- Student evaluation method.
- Student evaluation of teacher effectiveness. .

ICT BASED SHORT TERM COURSE

On

Student Evaluation

03-07 February, 2020

Organized by



Department of Applied Science

Jaipur Engineering College & Research Centre

Opp. EPIP Gate, Sitapura Industrial Area,
Tonk Road, Jaipur- 302022 Rajasthan

Ph No. - 0141-2770120, 2770232

Website: www.jecrcfoundation.com

In Association with



**National Institute of Technical Teachers
Training & Research (NITTR) Chandigarh**

ICT based Short Term Course on
"Student Evaluation"
03-07 February 2020
Organized by

Department of Applied Sciences
Jaipur Engineering College and Research
Centre, Jaipur

Application Form

Full Name: _____
Designation: _____
Department: _____
Qualification: _____
Specialization: _____
Organization: _____
Address: _____
Pin Code: _____
Phone No. _____
Mob No. _____
Email: _____

Date: _____

Signature of Applicant

Note.:

1. The selection is based on first come – first serve basis (limited seats available).
2. All participants must have to register themselves.
3. No TA/DA will be paid to the participants.
4. This application form should reach JECRC, Jaipur latest by **01/02/2020**.
5. Application without the approved letter will not be entertained.

SPONSORSHIP CERTIFICATE

The applicant will be permitted to participate in the above programme, if selected. Further, I have personally talked to the applicant and he/she seemed to be sure to attend the course, in case the admission is offered to him/her.

Date :

Signature and stamp of
the Head of the Institution

(Please mail your completely filled Application form at vishalsaxena.math@jecrc.ac.in or manojpathak.phy@jecrc.ac.in latest by **01/02/2020**)

Target Audience

The program is targeted towards the faculty of all Engineering and applied sciences .

Resource Persons

Faculty from NITTR Chandigarh and experts/ academicians from IITs & NITs.



Scan to Register

Patron

Shri O.P. Agrawal, Chairman
Shri M.L. Sharma, Vice Chairman
Shri Amit Agrawal, Director
Shri Arpit Agrawal, Director

Advisory Committee

Dr. V.K.Chandna, Principal
Shri Manish Jain, Deputy Director
Shri O.P. Jain, Sr. Advisor
Shri P.K. Tiwari, Sr. Advisor
Prof. S.N. Gupta, Sr. Advisor
Prof.(Dr.)A. Williamson, Registrar

Head of the Department (Applied Science)

Dr. Ruchi Mathur
Dr. Barkha Shrivastava

Course Coordinators

Dr. Vishal Saxena (8209878088)
Mr. Manoj Pathak (9414454735)

Organising Committee

Dr. R. K. Mangal
Dr. Ruchida Barman
Dr. Umesh Pareek
Dr. Ashok Singh Shakhawat
Dr.S. K. Dixit
Dr. Seema Joshi

STC Administrator

Mr. Ram Singh (09887712330)
Mr. Gopal Tiwari (08890750291)

Jaipur Engineering College and Research Centre

Shri Ram Ki Nangal, Via Sitapura RIICO, Opp. EPIP Gate,
Tonk Road, Jaipur-302 022
Ph. No.0141-2770232, 2770120
Fax No.0141-2770803

National/International Conferences/Workshop/FDPs/STTPs Attended

15. National / International Conferences / Workshops/FDPs / STTPs Attended – at JECRC, Jaipur

S.No	Name of Faculty	Type National/ International Conference/ Workshop/ FDPs	Title of Conference	Organizer	Sponsored agency	Date	Year
1	Dr Sanjay Gour	International	4th international conference on Information and Communication technology for Competitive Strategies (ICTCS 2019)	B N University Udaipur	CSI India , The Institution of Engineers, India , ACM chapter Udaipur and	December 13-14 , 2019	2019
2	Dr Sanjay Gour	International	Importance of Interdisciplinary Studies in Higher Education	University of Technology, Jaipur	CSI India , The Institution of Engineers, India , ACM chapter Udaipur and	December 26-27 , 2020	2019
3	Dr Sanjay Gour	National	Analytical aspect of dynamics	Central University of Himanchal pradesh	International Academy of Physical Sciences	November , 22-23, 2019	2019
4	Dr. Vijeta Kumawat	National	National Conference on Contemporary Issues in Computer Technology - 2019	JECRC College Jaipur, Rajasthan	CSI India	March 06, 2020	2020
5	Dr. Vijeta Kumawat	International	International Conference on Strategic Innovation and Emerging Perspectives for Global Business Scenario	The Quaide Milleth College for Men		August 21, 2019	2019
6	Abhishek Jain	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
7	Richa Sharma	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
8	Anima Sharma	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020

9	Pradeep Kr. Sharma	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
10	Anoop Kumar Mehta	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
11	Tanya Shruti	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
12	Rajan Kr. Jha	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
13	Priyanka Mitra	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
14	Suniti Chouhan	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
15	Amit Mithal	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
16	Neha Solanki	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	March 07, 2020	2020
17	Kanishk Jain	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	07-Mar-20	2020
18	Sweety Singhal	International	Bagged random forest approach to classify sentiments based on technical words	Arya college, Jaipur, Rajasthan	TEQIP III RTU (ATU)	June 08-09, 2019	2019
19	Sweety Singhal	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	07-Mar-20	2020
20	B.Umama heswari	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	07-Mar-20	2020

21	B.Umama heswari	International	International Conference on Strategic Innovation and Emerging Perspectives for Global Business Scenario	The Quaide Milleth College for Men		21-Aug- 19	2019
22	Abhishek Dixit	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	07-Mar- 20	2020
23	Sachin Gupta	National	National Conference on Contemporary Issues in Computer Technology - 2020	JECRC College Jaipur, Rajasthan	CSI India	07-Mar- 20	2020
24	Dr. Nilam Choudhar y	National	National Conference on Contemporary Issues in Computer Technology - 2019	JECRC College Jaipur, Rajasthan	CSI India	06-Mar- 20	2020
25	Mr. Naveen Kumar Kedia	International	2nd International Conference on Communication & Computational Technologies –ICCCT 2019”	RIET Jaipur Rajasthan India	TEQUIP-III (ATU)	30–31 August	2019
26	Ms. Shikha Shrivastav a	National	33rd National Convention of Computer Engineers and National Conference	The Institution of Engineers(I ndia)		15-16 February	2020
27	Dr Tripati Gupta	National	Recent Advancements in Computational mathematics and Engineering sciences	RTU and VIT, Jaipur	TEQIP-III	9/11/2019 to10/11/2 019	2019
28	Dr Tripati Gupta	National	Recent Applications of Applied Sciences & Humanities	Gov. College Satnail	NA	June 7, 2020	2020
29	Dr Tripati Gupta	International	Recent Applications in Science and Engineering Post Covid-19	Shivalik College of engg., Dehradun	NA	June 20, 2020	2020
30	Dr. Barkha Shrivastav a	International	14th India -Japan International Conference on Sustainable Development Goals	Biyani Shikshan Samiti, Jaipur, Rajasthan, India	JAIST, KYUSHU University, Well Group	Sept. 23- 25, 2019	2019
31	Ms. Rekha Vijay	International	14th India -Japan International Conference on Sustainable Development Goals	Biyani Shikshan Samiti, Jaipur, Rajasthan, India	JAIST, KYUSHU University, Well Group	Sept. 23- 25, 2019	2019
32	Dr Sanjay Gour	Workshop	Assessment in Computer Science and Engineering with focus on examination reforms recommended by AICTE	poornima College of engineering , Jaipur	Manipal University and ACM India	August 2020	2019
33	Tanya Shruti	Workshop	Machine Learning and Deep Learning	Forsk Coding school Jaipur		10-19 Februaey 2020	2020
34	Suniti Chouhan	Workshop	LaTeX training	S. S. Jain Subodh Girls College	Spoken Tutorial Project, IIT Bombay	January 2020	2020

35	Sweety Singhal	Workshop	E-Learning	Manjra Charitable Trust's, Smt SushilaDevi Deshmukh Senior College, Latur	EdFly	27th May 2020	2020
36	Dr. Nilam Choudhary	Workshop	Automation anywhere workshop of RPA	JECRC University	Automation Anywhere	2-4 October 2019	2019
37	Dr. Nilam Choudhary	Workshop	One Day Teachers training workshop	JECRC University	RTU	24 Feb. 2020	2020
38	Pradeep Kr. sharma	Workshop	Digital Marketing	GRRAS Sol. Pvt. Ltd.		6th October 2019	2019
39	Abhishek Dixit	Workshop	RPA Essential level Workshop	JECRC University	Automation Anywhere	2-4 October 2019	2019
40	Abhishek Dixit	Workshop	RPA Advanced level training	JECRC College, Online mode	Automation Anywhere	25 May. 2020	2020
41	Dr M.P Singh	Workshop	WORKSHOP ON EXAM REFORMS	NITTTR Chandigarh	AICTE	09 to 11 Dec	2019
42	Dr Fauzia Siddiqui	Workshop	Teachers Training Workshop	RTU	TEQIP-III	24 Feb	2020
43	J. P. Mishra	Workshop	Plagiarism, Research, Ethics & Patent (PREP 2020)	DoR, Manipal University	NA	25-27 Jun	2020
44	Shweta Saxena	Workshop	"Beyond The Boundries:reinventing Horizons"	SKIT Jaipur		16-20 may	2020
45	Kusum Yadav	Workshop	"Beyond The Boundries:reinventing Horizons"	SKIT Jaipur		16-20 may	2020
46	Kusum Yadav	WORKSHOP	Mobile Network Security & Smart Antenna	Electronics Department , Poornima College of Engg.	DST , Rajasthan	6-7 March	2020
47	Shikha Shrivastava	Workshop	"Beyond The Boundries:reinventing Horizons"	SKIT Jaipur		16-20 may	2020
48	Shikha Shrivastava	WORKSHOP	Mobile Network Security & Smart Antenna	Electronics Department , Poornima College of Engg.	DST , Rajasthan	6-7 March	2020
49	Mr.Piyush Gautam	Workshop	"Beyond The Boundries:reinventing Horizons"	SKIT Jaipur		16-20 may	2020
50	Brijesh Kumar Singh	Workshop	"Beyond The Boundries:reinventing Horizons" Education 4.0	SKIT Jaipur		16-May	2020
51	Brijesh Kumar Singh	Workshop	"Beyond The Boundries:reinventing Horizons" Industry 4.0	SKIT Jaipur		17-May	2020
52	Brijesh Kumar Singh	Workshop	"Beyond The Boundries:reinventing Horizons" fly high: innovations and startups	SKIT Jaipur		18-May	2020

53	Brijesh Kumar Singh	Workshop	"Beyond The Boundries:reinventing Horizons" the power of collaboration	SKIT Jaipur		19-May	2020
54	Brijesh Kumar Singh	Workshop	"Beyond The Boundries:reinventing Horizons" back to basics	SKIT Jaipur		20-May	2020
55	Dr. Rekha Mithal	Workshop	Gender Equality and Women Rights	RTU Kota	TEQIP-III	July 3-4, 2020	2020
56	Dr. Ruchi Mathur	Workshop	Workshop on "Indian Knowledge System"	All India Council for Technical Education	AICTE	June 9-13, 2020	2020
57	Dr. Ruchi Mathur	Workshop	Student Evaluation	NITTTR Chandigarh		February 3-7, 2020	2020
58	Dr. Ruchi Mathur	Workshop	National teachers training	RTU		Feb 24, 2020	2020
59	Dr. Ruchi Mathur	Workshop	TEQIP IIIrd Three days FDP on Interdisciplinary Outlook in Engineering Sciences	VIT University, Jaipur		26th to 28th sept 2019	2020
60	Dr Tripati Gupta	Workshop	TEQIP IIIrd Three days FDP on Interdisciplinary Outlook in Engineering Sciences	VIT University, Jaipur		26th to 28th sept 2019	2019
61	Dr Tripati Gupta	Workshop	Student Evaluation	NITTTR Chandigarh		February 3-7, 2020	2020
62	Dr. Sunil kumar Srivastava	FDP/WORKSHOP	Data Science And AI	MIET, Greater Noida		May 25-29, 2020	2020
63	Dr. Sunil kumar Srivastava	FDP/WORKSHOP	Mastering and Art Handling, Post covid challenges for Sustainable Development	Adayalampattu Phase II campus, Maduravol, Chennai		May 19-23, 2020	2020
64	Dr. Sunil kumar Srivastava	WORKSHOP	Creation and use of HTML based Quiz for content and OER	Educational learning centre, Nagpur		May 18, 2020	2020
65	Dr. Vishal Saxena	Workshop	TEQIP IIIrd Three days FDP on Interdisciplinary Outlook in Engineering Sciences	VIT University, Jaipur	TEQIP III	26th to 28th sept 2019	
66	Dr. Vishal Saxena	Workshop	National teachers training	NITTTR Chandigarh		February 3-7, 2020	
67	Dr. Kashish Parwani	Workshop	Student Evaluation	NITTTR Chandigarh		February 3-7, 2020	2020

68	Dr. Kashish Parwani	Workshop	TEQIP IIIrd Three days FDP on Interdisciplinary Outlook in Engineering Sciences	VIT University, Jaipur		26th to 28th sept 2019	2020
69	Dr Sarita Poonia	National Level Workshop	Image classification using Matlab	JAIN Deemed university Bangalore	NA	24-May-20	2020
70	Name of Faculty	Workshop/FDP/S TTP	Title of Workshop/FDP/STTP	Organizer	Sponsered agency	Date	Year
71	Dr Sanjay Gour	FDP	Digital marketing	CAD DESK , jaipur	CAD DESK, JAIPUR	17 to 20th December 2019	2019
72	Dr Sanjay Gour	FDP	hands-on practice on AR-VR Technologies	RTU, Kota and Geetanjali Institute of technical Studies, Udaipur	TEQIP-III	17 to 21 june 2019	2019
73	Dr. Vijeta Kumawat	FDP	JAVA	Sinhgad Academy of Engineering , Pune	IIT Bombay Spoken Tutorial	4 May-15 May 2020	2020
74	Dr. Vijeta Kumawat	FDP	Python and Fuzzy System	JSPM Narhe Technical Campus, Pune.	IIT Bombay Spoken Tutorial	18 May to 23 May 2020	2020
75	Dr. Vijeta Kumawat	FDP	FDP on LaTeX	Poomima University	Spoken Tutorial, IIT Bombay,	4th May, 2020 to 8th May, 2020	2020
76	Dr. Vijeta Kumawat	FDP	FDP on Interdisciplinary Outlook in Engineering Science	VIT, jaipur	TEQUIP-III	26-28 Sep 2020.	2020
77	RICHA SHARMA	FDP	MACHINE LEARNING & DEEP LEARNING	FORSK TECHNOLOGY		10/02/2020-19/02/20	2020
78	RICHA SHARMA	FDP	FDP on "Use of MATLAB in technical education"	Regional College of Engineering , Jaipur	TEQIP-III	27/09/19-20/09/19	2019
79	ANIMA SHARMA	FDP	MACHINE LEARNING & DEEP LEARNING	FORSK TECHNOLOGY		10/02/2020-19/02/20	2020

80	Tanya Shruti	FDP	Python Programing and Concepts	Forsk Coding School, Jaipur		9-13 DEC 2019	2019
81	Tanya Shruti	FDP	Cloud Computing using AWS	Trinty college of research, pune		3-7 June 2020	2020
82	Tanya Shruti	FDP	Python and Emerging Trends in Machine Learning	Forsk Coding School, Jaipur		2-6 June 2020	2020
83	Tanya Shruti	FDP	Latex Training	S S jain Subodh Girls College	IIT Bombay, funded by the National Mission on Education through ICT, MHRD, Govt. of India	25-29 May 2020	2020
84	Tanya Shruti	FDP	Java Programming	Anantrao Pawar College of Engineering & Research, Pune	IIT Bombay organized by Department of Information Technology	26-30 May 2020	2020
85	Manju Vyas	FDP	FDP on Foundation Program on Programming Fundamentals & Object Oriented Concepts using Python by Infosys under Infosys Campus Connect from 22 June 2020-29 June 2020.	Infosya		22-29 June 2020	2020
86	Manju Vyas	FDP	Faculty Training Programme on "Machine Learning & Deep Learning" conducted by Forsk Coding School, held between 10th-19th Feb 2020.	Forsk Coding School, Jaipur		10-19 feb 2020	2020
87	Rajan Kr. Jha	FDP	Two weeks FDP on JAVA organized by Sinhgad Academy of Engineering, Pune from 4 May-15 May 2020 in association with IIT Bombay Spoken Tutorial.				
88	Rajan Kr. Jha	FDP	One Week FDP on Python 3.4.3 Organized by RCPET Institute of Management Research and Development Shirpur from 21st April- 26 April 2020 in Association with IIT Bombay Spoken Tutorial .				
89	Rajan Kr. Jha	FDP	Faculty Development Programme on LaTeX from 4th May to 8th May 2020 organized by Poornima University Jaipur in association with Spoken Tutorial IIT Bombay.				
90	Rajan Kr. Jha	FDP	FDP On Cloud Computing using AWS from 3rd to 7th June 2020 Organized by Trinity college of engg. & Research Pune.				
91	Priyanka Mitra	FDP	Usage of Technology in Covid 19	Terna Engineering College, Nerul, Navi Mumbai		28 May-2 June 2020	2020

92	Priyanka Mitra	FDP	Cloud Computing using AWS	Trinity college of research, pune		3-7 June 2020	2020
93	Priyanka Mitra	FDP	Python and Emerging Trends in Machine Learning	Forsk Coding School, Jaipur		2-6 June 2020	2020
94	Suniti Chouhan	FDP	Cloud Computing using AWS	Trinity College of Engineering & Research, Pune		3-7 June 2020	2020
95	Suniti Chouhan	FDP	Java Programming	Anantrao Pawar College of Engineering & Research, Pune		26th-30th May	2020
96	Suniti Chouhan	FDP	R programming	school of IT IMS Noida	spoken tutorial , IIT Bombay.	25th – 29th may	2020
97	Suniti Chouhan	FDP	python programming concept and covered curriculum of RTU/BTU-python Lab	Forsk Coding School, Jaipur		9-13 december 2019	2019
98	Amit Mithal	FDP	IoT in Manufacturing	NITTTR & JECRC		6-10 Jan 2020	2020
99	Amit Mithal	FDP	Student Evaluation	NITTTR & JECRC		3-7 Feb 2020	2020
100	Neha Solanki	FDP	Student Evaluation	NITTTR		3-7 Feb 2020	2020
101	B.Umama heswari	FDP	JAVA	Sinhgad Academy of Engineering , Pune	IIT Bombay Spoken Tutorial	4 May-15 May 2020	2020
102	B.Umama heswari	FDP	Python and Fuzzy System	JSPM Narhe Technical Campus, Pune.	IIT Bombay Spoken Tutorial	18 May to 23 May 2020	2020
103	B.Umama heswari	FDP	FDP on LaTeX	Poornima University	Spoken Tutorial, IIT Bombay,	4th May, 2020 to 8th May, 2020	2020

104	B.Umama heswari	FDP	R programming	school of IT IMS Noida	spoken tutorial , IIT Bombay.	25th – 29th may	2020
105	Dr Sanjay Gour	FDP	IoT in Manufacturing	NITTTR		6th to 10th january	2020
106	Dr. Nilam Choudhar y	FDP	JAVA	Sinhgad Academy of Engineering , Pune	IIT Bombay Spoken Tutorial	4 May-15 May 2020	2020
107	Dr. Nilam Choudhar y	FDP	Python and Fuzzy System	JSPM Narhe Technical Campus, Pune.	IIT Bombay Spoken Tutorial	18 May to 23 May 2020	2020
108	Dr. Nilam Choudhar y	FDP	FDP on LaTeX	Poornima University	Spoken Tutorial, IIT Bombay,	4th May, 2020 to 8th May, 2020	2020
109	Dr. Nilam Choudhar y	FDP	FDP on Interdisciplinary Outlook in Engineering Science	VIT, jaipur	TEQUIP-III	26-28 Sep 2020.	2020
110	Dr. Nilam Choudhar y	FDP	Recent Advancements in Software Intensive Systems: Machine Learning and Cyber Security Perspectives"	IIT Roorkee	SPARC Project of IIT Roorkee	23-27 December 2019	2019
111	Pradeep Kr. Sharma	FDP	Are you IoT ready? Join Configuration of Smart Home using CISCO Packet Tracer	JAIN University	CISCO Networking Academy	23 May 2020	2020
112	Pradeep Kr. Sharma	FDP	FDP on Cyber Security	Velagapudi Ramakrishn a Siddhartha Engineering College	SUPARAJA Technologies	23-27 May 2020	2020
113	Pradeep Kr. Sharma	FDP	Faculty Awareness program on NBA accreditation Process	SNJB College of Engineering		17 May 2020	2020
114	Abhishek Dixit	FDP	RPA Design and Development v1.0 Educator Readiness program	UiPath		11-20 May, 2020	2020
115	Abhishek Dixit	FDP	MACHINE LEARNING & DEEP LEARNING	Forsk Coding School, Jaipur		10th-19th February	2020

116	Dr M.P Singh	FDP	WhatsApp Outcome Based Education Faculty Development Program	D Y Patil College of Engineering , Akurdi Pune	ISTE India	March 24 to April 14	2020
117	Dr M.P Singh	FDP	Inculcating Universal Human Values in Technical Education	All India Council for Technical Education	AICTE	3-7 May,	2020
118	Dr M.P Singh	FDP	Hands On Practice on 3D Printing Technology	Poomima College of Engineering	RTU	27-31 Aug	2019
119	Dr M.P Singh	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
120	Dr M.P Singh	FDP	Advance Material Research	BIET & Indian Ceramic Society	ISTE	15-19 June	2020
121	Dr Fauzia Siddiqui	FDP	WhatsApp Outcome Based Education Faculty Development Program	D Y Patil College of Engineering , Akurdi Pune	ISTE India	March 24 to April 14	2020
122	Dr Fauzia Siddiqui	FDP	Corrosion and its Control	DYPIEMR, Akurdi,Pune -44	ARCIST,Vandalur, Chennai	2-4 June	2020
123	Dr Fauzia Siddiqui	FDP	Design,Thinking ,Innovation & IPR	BVOCE, Navi Mumbai	ISTE India	9-13 Dec	2019
124	Dr Fauzia Siddiqui	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
125	Dr Bhuvnesh Bhardwaj	FDP	WhatsApp Outcome Based Education Faculty Development Program	D Y Patil College of Engineering , Akurdi Pune	ISTE India	March 24 to April 14	2020
126	Dr Bhuvnesh Bhardwaj	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
127	Dr Bhuvnesh Bhardwaj	FDP	Advance Material Research	BIET & Indian Ceramic Society	ISTE	15-19 June	2020

128	Dr Manish Shrivastava	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
129	Dr Manmohan Singh	FDP	Control Applications of Renewable Energy Systems - Recent Trends and Future Aspects	INVERTIS UNIVERSITY	Invertis University, Bareilly	22-27 June	2020
130	Mr Hemant Bansal	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
131	Dr Rishi Pareek	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
132	Mr Akhilesh Paliwal	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
133	Mr Dayal S Rathore	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
134	Mr Akhil vijay	FDP	Academic leadership, Teaching & learning Methods, Research plan, Patents etc	Shri Nehru Mahavidyalaya	SNMVIT, Coimbatore	8-15 June	2020
135	Mr Akhil vijay	FDP	IOT in Manufacturing	JECRC(NIT TTR Chandigarh)	AICTE	6-10 Jan	2020
136	Mr Akhil vijay	FDP	REJUVENATION OF BODY, MIND & SOUL	Ethiraj College, Madras	ETHIRAJ	15-19 June	2020
137	Mr Akhil vijay	FDP	Mechanical Behaviour of advanced material & its scope for Engineering Application	SVCE, Anna University, Palanur	SVCIE	10-14 June	2020
138	Mr Akhil vijay	FDP	Technological Advances in power switching converters for RES & FT for E-vehicles	Bapatla Engineering College	ISTE	1-5 June	2020
139	Mr Akhil vijay	FDP	Advanced Material Research	BIET & Indian Ceramic Society	ISTE	15-19 June	2020

140	Mr Akhil vijay	FDP	Artificial Intellenge	VBEC	NYC India	22-26 May	2020
141	Mr Akhil vijay	FDP	Environmental Sustainability and Green Energy	GW CET,IQ AC ,Nagpur	GW CET	29 JUNE-3 JULY	2020
142	Dr. S.K. Singh	FTP	Neural Networks and Deep Learning	Coursera, USA	Coursera	08-Jun	2020
143	Dr. S.K. Singh	FTP	Structuring Machine Learning Projects	Coursera, USA	Coursera	06-Jun	2020
144	Dr. S.K. Singh	FDP	Student Evaluation (Module-III: IPD)	Education and Educational Management Department	NITTTR, Chandigarh	03-07 Feb	2020
145	Dr. S.K. Singh	FTP	Cyber Security	CMR Engg. College, Hyderabad	NA	26-27 May	2020
146	Dr. S.K. Singh	FDP	Beyond the Boundaries :Reinventing horizons	SKIT, Jaipur	NA	16-20 May	2020
147	Dr. S.K. Singh	FDP	Latest trends and Challenges in IT industry	R M D Engineering College	NA	15-20 Jun	2020
148	Dr. Vinita Mathur	FTP	Introduction to Programming with MATLAB	Vanderbilt University	Coursera, USA	10-Jun-20	2020
149	Dr. Vinita Mathur	FTP	Smart Device & Mobile Emerging Technologies	Yonsei University	Coursera, USA	16-Jun-20	2020
150	Dr. Vinita Mathur	FTP	Internet of Things: Multimedia Technologies	UCSanDiego	Coursera, USA	01-Jun-20	2020
151	Dr. Vinita Mathur	FTP	Electrodynamics: An Introduction	KAIST	Coursera, USA	17-May-20	2020

152	Dr. Vinita Mathur	FTP	Wireless Communications for Everybody	Yonsei University	Coursera, USA	18-May-20	2020
153	Dr. Vinita Mathur	FDP	LaTeX	S. S. Jain Subodh Girls College	MHRD	25-29 May	2020
154	Dr. Vinita Mathur	FDP	Digital Image Processing with Research Methodology	Karpagam College of Engineering, Coimbatore	Computer Society of India	15-19 Jun	2020
155	Dr. Parul Tyagi	FTP	Introduction to Programming with MATLAB	Vanderbilt University	Coursera, USA	10-Jun-20	2020
156	Dr. Parul Tyagi	FDP	Electrodynamics: An Introduction	KAIST	Coursera, USA	17-May-20	2020
157	Dr. Parul Tyagi	FTP	Smart Device & Mobile Emerging Technologies	Yonsei University	Coursera, USA	11-Jun-20	2020
158	Dr. Parul Tyagi	FTP	Introduction to the Internet of Things and Embedded Systems	UCI, Irvine	Coursera, USA	21-May-20	2020
159	Dr. Parul Tyagi	FTP	Internet of Things: Multimedia Technologies	UCSanDiego	Coursera, USA	01-Jun-20	2020
160	Dr. Parul Tyagi	FTP	Wireless Communications for Everybody	Yonsei University	Coursera, USA	18-May-20	2020
161	Dr. Parul Tyagi	FDP	LaTeX	S. S. Jain Subodh Girls College	MHRD	25-29 May	2020
162	Dr. Parul Tyagi	FDP	Digital Image Processing with Research Methodology	Karpagam College of Engineering, Coimbatore	Computer Society of India	15-19 Jun	2020
163	Dr. Parul Tyagi	FDP	Digital Transformation	AISSMS College of Engineering, Pune-		11-13 Jun	2020

164	S.S Manaktala	FDP	Student Evaluation	Education and Educational Management Department	NITTTR, Chandigarh	03-07 Feb	
165	Neha Singh	FDP	MIGRATION OF IT INFRA USING CLOUD	PIET, Jaipur	Department of Applied Science under IQAC	20-21 May	2020
166	Neha Singh	FTP	Introduction to Programming with MATLAB	Vanderbilt University	Coursera, USA	10-Jun-20	2020
167	Neha Singh	FDP	Electrodynamics: An Introduction	KAIST	Coursera, USA	17-May-20	2020
168	Neha Singh	FTP	Smart Device & Mobile Emerging Technologies	Yonsei University	Coursera, USA	11-Jun-20	2020
169	Neha Singh	FTP	Introduction to the Internet of Things and Embedded Systems	UCI, Irvine	Coursera, USA	21-May-20	2020
170	Neha Singh	FTP	Internet of Things: Multimedia Technologies	UCSanDiego	Coursera, USA	09-Jun-20	2020
171	Neha Singh	FTP	Wireless Communications for Everybody	Yonsei University	Coursera, USA	18-May-20	2020
172	Neha Singh	FDP	LaTeX	S. S. Jain Subodh Girls College	MHRD	25-29 May	2020
173	Devesh Gupta	FDP	Student Evaluation (Module-III: IPD)	Education and Educational Management Department	NITTTR, Chandigarh	03-07 Feb	2020
174	Devesh Gupta	FDP	Artificial Intelligence	Jindal Inst of engg and tech.	NYCI & Brainovision solution Pvt.Ltd.	22-26 May	2020
175	Devesh Gupta	FDP	Latex	anand international College of engg	Spoken Tutorial, IIT Bombay	19-23 May	2020

176	Devesh Gupta	FDP	Beyond the Boundaries :Reinventing horizons	SKIT, Jaipur	NA	16-20 May	2020
177	Yogita	FDP	Student Evaluation (Module-III: IPD)	Education and Educational Management Department	NITTTR, Chandigarh	03-07 Feb	2020
178	Yogita	FTP	Machine Learning and Deep Learning	Forsk coding school	NA	10-19 Feb	2020
179	Yogita	FDP	FDP on "Python and Emerging trends in machine learning"	Forsk coding school	NA	02-06 Jun	2020
180	Yogita	FDP	Beyond the Boundaries :Reinventing horizons	SKIT, Jaipur	NA	16-20 May	2020
181	Yogita	FDP	PERL SCRIPTING	LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY	IIT Bombay	10-14 Jun	2020
182	Yogita	FDP	E-Learning and ICT Tools for Effective Teaching- Learning	ARAVALI COLLEGE OF ADVANCED STUDIES IN EDUCATION PALLI, FARIDABAD	NA	08-13 Jun	2020
183	Manish Yadav	FDP	Electric Vehicle Technology	EE Department, JERCRC Jaipur	NITTTR, Chandigarh	26-30 Aug	2019
184	Manish Yadav	FDP	Student Evaluation (Module-III: IPD)	Education and Educational Management Department, JECRC Jaipur	NITTTR, Chandigarh	03-07 Feb	2020
185	J. P. Mishra	FDP	Python Programming with Industry Perspective	MNIT Jaipur	MeitY, GOI	02-06 Dec	2019
186	J. P. Mishra	FTP	Wireless Communications for Everybody	Yonsei University	Coursera, USA	27-Apr-20	2020

187	J. P. Mishra	.FTP	Introduction to the Internet of Things and Embedded Systems	UCI, Irvine	Coursera, USA	28-Apr-20	2020
188	J. P. Mishra	FTP	Introduction of FPGA Design for Embedded System	University of Colorado Boulder	Coursera, USA	05-Jun	2020
189	Ashish Kumar	FDP	Data Sciences	NIT, UK	AICTE Training And Learning (ATAL) Academy FDP	14-18 Oct	2019
190	Ashish Kumar	FDP	Robotics	MNIT, Jaipur	AICTE Training And Learning (ATAL) Academy FDP	16-20 Dec	2019
191	Girraj Sharma	FDP	Beyond the Boundaries :Reinventing horizons	SKIT, Jaipur	NA	16-20 May	2020
192	Girraj Sharma	FDP	"Antenna Trends"	MNIT, Jaipur	MeitY, GOI	01-05 Jul	2020
193	Girraj Sharma	FDP	Internet of things	NIT, Bhopal	AICTE Training And Learning (ATAL) Academy FDP	04-08 May	2020
194	Mamta Rani	FDP	Student Evaluation (Module-III: IPD)	Education and Educational Management Department, JECRC Jaipur	NITTTR, Chandigarh	03-07 Feb	2020
195	Mamta Rani	FTP	Machine Learning and Deep Learning	Forsk coding school	NA	10-19 Feb	2020
196	Anju Rajput	FDP	LaTeX	St.Joseph Institute of Technology Chennai	Spken tutorial IIT Bombay	17-19 May	2020
197	Anju Rajput	FTP	Python Data Structure	University of Michigen	Coursera	03-May	2020
198	Anju Rajput	FTP	Online Training:Electronic System Design Flow - Architecture & Schematic Design Capture using OrCAD PSpice	Entuple Technologies, Bangalore	NA	04-Jun-20	2020

199	Anju Rajput	FDP	Methologies and challenges in Digital IC & Memory Design	MNIT, Jaipur	AICTE	11-15DEC-2019	2019
200	Tripti Dua	FDP	Methologies and challenges in Digital IC & Memory Design	MNIT, Jaipur	AICTE	11-15DEC-2019	2019
201	Nishi Atray	FDP	Student Evaluation (Module-III: IPD)	Education and Educational Management Department, JECRC Jaipur	NITTTR, Chandigarh	03-07 Feb	2020
202	Nishi Atray	FDP	Artificial Intelligence & Machine Learning and Its Application	NIT Patna	MeitY, GOI	18-24 May	2020
203	Dr Prerak Bhardwaj	FDP	Real-time Protection of Modern Power Systems (RPMS-2020)	Department of Electrical & Electronics Engineering, KITSW	KITSW in association with IEI - Warangal Local Centre	June' 23 - 27, 2020	2020
204	Dr Prerak Bhardwaj	STTP	Research Opportunities in Power Electronics	Department of EEE, Tirumula College of Engineering	Tirumula College of Engineering	June' 26-30, 2020	2020
205	Dr Prerak Bhardwaj	FDP	Electrical Vehicle Technology	NITTR		26-08-2019 to 30-08-2019	2019
206	Dr Prerak Bhardwaj	FDP	Challenges in Grid Integration with Renewable Energy Sources	GEC Bikaner and NIT Kurukshtra	TEQIP-3	June'22-26, 2020	2020
207	Atul Kulshrestha	FDP	Capacity Building for implementation of Energy Conservation Building Code	RRECL, Jaipur		August' 5-6, 2019	2019
208	Atul Kulshrestha	FDP	Challenges in Grid integration with Renewable energy sources	GEC Bikaner and NIT Kurukshtra	TEQIP-3	June'22-26, 2020	2020
209	L.Senthil	FDP	Insight of Data Science, Automation, Project Management in industrial and commercial Environment	KSRM college of Engineering, Kadapa, AP		16-06-2020 to 20-06-2020 (5 Days)	2020
210	L.Senthil	FDP	MATLAB Software for Power Electronics-Hands on Training	Arasu Engineering College Kumbakonam, Tamil Nadu		30-05-2020	2020

211	Sonali Chadha	FDP	Insight of Data Science, Automation, Project Management in industrial and commercial Environment	KSRM college of Engineering ,Kadapa,AP		16-06-2020 to 20-06-2020 (5 Days)	2020
212	Sonali Chadha	STTP	Energy Economics and Environment and Policy	Asian Development Bank		19th april 2020	2020
213	Jisha Varghese	FDP	MATLAB Software for Power Electronics-Hands on Training	Arasu Engineering College Kumbakonam, Tamil Nadu		30-05-2020	2020
214	Neha Agrawal	FDP	ELECTRICAL Vehicle Technology	JECRC		26-8-2019 to 30-8-2019	2019
215	Ritu Soni	FDP	Image classification using MATLAB	Jain deemed to be university, Bangalore		24th may 2020	2020
216	Sunil Kumar Sharma	FDP	ELECTRICAL Vehicle Technology	NITTTR		26-8-2019 to 30-8-2019	2019
217	Shailendra Shrivastava	FDP	Electrical Vehicle Technology	NITTTR		26-08-2019 to 30-08-2019	2019
218	Shweta Saxena	FDP (STC)	Student Evaluation (Module - III:IPD)	NITTTR Chandigarh		Feburary 3-7	2020
219	Shweta Saxena	FDP	online Faculty developemnt program on cyber Security	Velagapudi Ramakrishna Sidhartha Engineering College	CSI	23-27 may	2020
220	Shweta Saxena	FDP	Machine Learning & Deep Learning	Forsk Technologies pvt. ltd.		10-19 february	2020
221	Kusum Yadav	FDP	IOT in Manufacturing	JECRC(NITTTR Chandigarh)	AICTE	6-10 Jan	2020
222	Kusum Yadav	FDP	Student Evaluation (Module - III:IPD)	JECRC(NITTTR Chandigarh)	AICTE	Feburary 3-7	2020

223	Kusum Yadav	FDP	"Python & Emerging Trends in Machine Learning"	Forsk Coding School, Jaipur		02 June to 06 June, 2020	2020
224	Kusum Yadav	FDP	Python Programming Concept	Forsk Coding School, Jaipur		9-13 december	2019
225	Kusum Yadav	FDP	MIGRATION OF IT INFRA USING CLOUD	PIET, Jaipur		May 20-21, 2020.	2020
226	Kusum Yadav	FDP	Latex	School of Computer Science & Engg. Poornima University	Spoken Tutorial, IIT Bombay	4th-8th May	2020
227	Priya Gupta	FDP	Student Evaluation (Module - III:IPD)	JECRC	NITTTR Chandigarh	February 3-7	2020
228	Shikha Shrivastava	FDP	IOT in Manufacturing	JECRC(NITTTR Chandigarh)	AICTE	6-10 Jan	2020
229	Shikha Shrivastava	FDP	"Machine Learning and Deep learning"	Forsk Coding School, Jaipur		10th-19th Feb	2020
230	Shikha Shrivastava	FDP	Python Programming Concept	Forsk Coding School, Jaipur		9-13 december	2019
231	Shikha Shrivastava	FDP	Latex	School of Computer Science & Engg. Poornima University	Spoken Tutorial, IIT Bombay	4th-8th May	2020
232	Deepika Bansal	FDP	Student Evaluation (Module - III:IPD)	NITTTR Chandigarh	AICTE	February 3-7	2020
233	Deepika Bansal	FDP	"Python & Emerging Trends in Machine Learning"	Forsk Coding School, Jaipur		02 June to 06 June, 2020	2020
234	Deepika Bansal	FDP	Data Science Specialization with Big Data	REGex Software Services	ISO certified	22 June 27 June 2020	2020

235	Mr.Piyush Gautam	FDP	" Python & Emerging Trends in Machine Learning"	Forsk Coding School,Jaipur		02 June to 06 June ,2020	2020
236	Mr.Piyush Gautam	FDP	Python Programming Concept	Forsk Coding School,Jaipur		9-13 december	2019
237	Mr.Piyush Gautam	FDP	MIGRATION OF IT INFRA USING CLOUD	PIET, Jaipur		May 20-21, 2020.	2020
238	Mr.Piyush Gautam	FDP	" Machine Learning and Deep learning"	Forsk Coding School,Jaipur		10th-19th Feb	2020
239	Brijesh Kumar Singh	FDP	Migration of IT infra using Cloud	Department of applied science under IQAC,PIET jaipur		20-21 may,2020	
240	Dr. Omprakash Netula	FDP	One Week National Faculty Development Program on SciLab and LaTeX by UoR and IIT Bombay Spoken Tutorial,	University of Rajasthan	IITB	From 9 June to 15 June 2020.	2020
241	Dr. Rekha Mithal	FDP	Student Evaluation	NITTTR Chandigarh		Feb. 3-7. 2020	2020
242	Dr Tripathi Gupta	FDP	Latex & scilab	UOR&spoken Tutorial Project, IIT Bombay	MHRD	June 9-15,2020	2020
243	Dr. Sunil kumar Srivastava	FDP	Student Evaluation	NITTTR Chandigarh	AICTE reconised	February 3-7, 2020	2020
244	Dr. Sunil kumar Srivastava	FDP	IoT in Manufacturing	NITTTR Chandigarh	AICTE reconised	jan 6-10, 2020	2020
245	Dr. Sunil kumar Srivastava	FDP	Data Science And AI	MIET, Greater Noida		May 25-29, 2020	2020
246	Dr. Sunil kumar Srivastava	FDP	Mastering and Art Handling,Post covid challengesfor SustainableDevelopment	Adayalampattu Phase II campus, Maduravol, Chennai		May 19-23, 2020	2020

247	Dr Sarita Poonia	FDP	Interdisciplinary Outlook in Engineering Sciences	VIT, Jaipur	TEQIP III	26-28 Sep 2019	2019
248	Dr Sarita Poonia	FDP	Machine Learning & deep Learning	FORSK CODING SCHOOL	NA	10-19 Feb 2020	2020
249	Dr Sarita Poonia	FDP	Python & Emerging trends in Machine Learning	FORSK CODING SCHOOL	NA	2-6 June 2020	2020
250	Dr Tripathi Gupta	FDP	TEQIP IIIrd Three days FDP on Interdisiplinary outlook in engineering sciences	NITTTR Chandigarh		February 3-7, 2020	2020
251	Dr Tripathi Gupta	FDP	Students evolution (Module III)	NITTTR Chandigarh		June 9-15,2020	2020
252	Dr. Sarita poonia	FDP	Student Evaluation	NITTTR Chandigarh	AICTE reconised	February 3-7, 2020	2020
253	Dr. ruchi mathur	FDP	Student Evaluation	NITTTR Chandigarh	AICTE reconised	February 3-7, 2020	2020
254	Dr Sanjay Gour	STTP	Teachers training workshop	RTU, Kota and JECRC Jaipur	TEQIP-III	##### #####	2020
255	Dr. Vijeta Kumawat	STTP	Web Application Security Audit through ICT	NITTTR & JECRC	AICTE	7 jan2020-11 jan2020	2020
256	Manju Vyas	STTP	Student Evaluation	NITTTR & JECRC	AICTE	3 feb2020-7feb2020	2020
257	Amit Mithal	STTP	Python 3.4.3	Dr. K.N Modi University, Newai, Rajasthan	Spoken Tutorial Project, IIT Bombay	29 May - 2 June 2020	2020
258	Neha Solanki	STTP	Teachers training workshop	RTU, Kota and JECRC Jaipur	TEQIP-III	##### #####	2020

259	Sweetly Singhal	STTP	Robotics and Autonomous vehicle	JECRC Jaipur		13th December 2019	2019
260	Dr Nilam Choudhary	STTP	Teachers training workshop	RTU, Kota and JECRC Jaipur	TEQIP-III	##### #####	2020
261	Dr. Nilam Choudhary	STTP	Machine Learning using Python	Poornima University	AICTE	22-23 May 2020	2020
262	Dr Manmohan Singh	STTP	Emerging Trends in Mechanical Engineering	Dr K.N Modi University, Newai	Modi University	8-12 June	2020
263	Dr Rishi Pareek	STTP	LATEX	SVPKMIT, Dhule	IIT Mumbai	1-7 June	2020
264	Shweta Saxena	FDP (STC)	Student Evaluation (Module - III:IPD)	NITTTR Chandigarh		February 3-7	2020
265	Shweta Saxena	FDP (STC)	Machine Learning & Deep Learning	Forsk Technologies pvt. Ltd.		10-19 february	2020
266	Preeti Sharma	FDP (STC)	Student Evaluation (Module - III:IPD)	NITTTR Chandigarh	AICTE	February 3-7	2020
267	Kusum Yadav	FDP (STC)	Student Evaluation (Module - III:IPD)	JECRC(NIT TTR Chandigarh)	AICTE	February 3-7	2020
268	Shikha Shrivastava	FDP (STC)	Student Evaluation (Module - III:IPD)	JECRC(NIT TTR Chandigarh)	AICTE	February 3-7	2020
269	Deepika Bansal	FDP (STC)	Student Evaluation (Module - III:IPD)	NITTTR Chandigarh	AICTE	February 3-7	2020
270	Deepika Bansal	FDP (STC)	Machine Learning & Deep Learning	Forsk Technologies pvt. Ltd.		10-19 february	2020

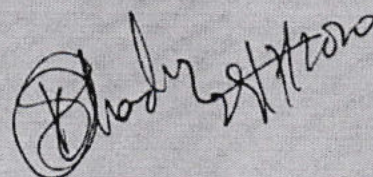
271	Dr. Omprakash Netala	STTP	One week STTP on Infrastructure Development : Possibilities and Challenges ahead.	New Horizon Institute of Technology & Management, Thane.	Self Sponsor	on 25-5-2020 to 29-5-2020	2020
272	Dr. Tripati Gupta	STTP	Optimization techniques and their applications to power system	SKIT, JAIPUR	AICTE	2nd to 7th March 2020	2020
273	Dr. Vishal Saxena	STTP	Optimization techniques and their applications to power system	SKIT, JAIPUR	AICTE	2nd to 7th March 2020	
274	Dr. Barkha Shrivastava	STC	"Current Trends in Graphene Synthesis and Applications"	Material Research Centre MNIT Jaipur	TEQUIP-III	Oct. 15-19, 2019	2019
275	Dr. Rekha Mithal	FDP (STC)	Student Evaluation	NITTTR Chandigarh		Feb. 3-7, 2020	2020
276	Dr. Seema Joshi	FDP (STC)	Student Evaluation	NITTTR Chandigarh		Feb. 3-7, 2020	2020
277	Prof. (Dr.) Vinay Kumar Chandra	Workshop	Universal Human Value in Technical Education	Online	AICTE	May, 3-7, 2020	2020

Point 60

Document Attached:

QIV

Session 2020-21 (RTU)



PRINCIPAL
Jawahar Engineering College &
Research Centre
Jodhpur-342022

VANDERBILT UNIVERSITY

COURSE
CERTIFICATE

06/30/2020

Dr. Vinita Mathur

has successfully completed

Introduction to Programming with MATLAB

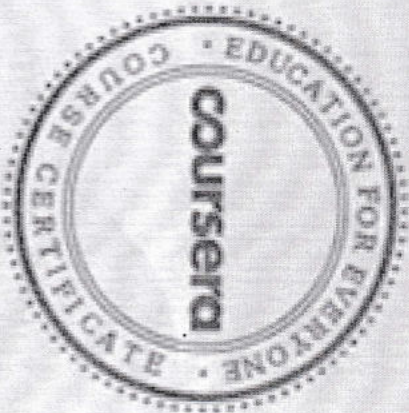
an online non-credit course authorized by Vanderbilt University and offered through
Coursera

Ar. Gaba

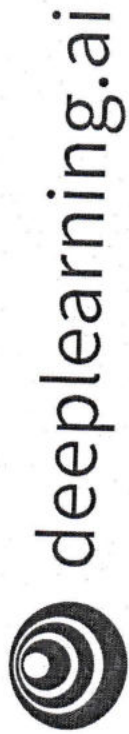
P. Michael H. Spentz

Miss LeAnn
Professor
Computer Engineering

Miss Tringora
Professor Emerita
Computer Science, Computer Engineering, Electrical Engineering, Neurosurgery, and Biology



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Coursera has confirmed the identity of this individual and
their participation in the course.



06/08/2020

Santosh Kumar Singh

has successfully completed

Neural Networks and Deep Learning

an online non-credit course authorized by deeplearning.ai and offered through
Coursera

A handwritten signature in black ink, appearing to read "Andrew Ng".

Adjunct Professor Andrew Ng
Computer Science

COURSE
CERTIFICATE



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Coursera has confirmed the identity of this individual and
their participation in the course.



YONSEI
UNIVERSITY

06/16/2020

Dr. Vinita Mathur

has successfully completed

Smart Device & Mobile Emerging Technologies

an online non-credit course authorized by Yonsei University and offered through
Coursera

A handwritten signature in black ink, appearing to read 'Jong-Moon Chung', written over a horizontal line.

Jong-Moon Chung
Professor, School of Electrical & Electronic Engineering
Director, Communications & Networking Laboratory

**COURSE
CERTIFICATE**



Verify at coursera.org/verify/KgTHjR8CM74G
Coursera has confirmed the identity of this individual and
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deeplearning.ai

06/06/2020

Santosh Kumar Singh

has successfully completed

Structuring Machine Learning Projects

an online non-credit course authorized by deeplearning.ai and offered through
Coursera

A handwritten signature in black ink, appearing to read "Andrew Ng".

Adjunct Professor Andrew Ng
Computer Science

COURSE
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their participation in the course.

UC San Diego

06/15/2020

Dr. Vinita Mathur

has successfully completed

Internet of Things: Multimedia Technologies

an online non-credit course authorized by University of California San Diego and offered through Coursera

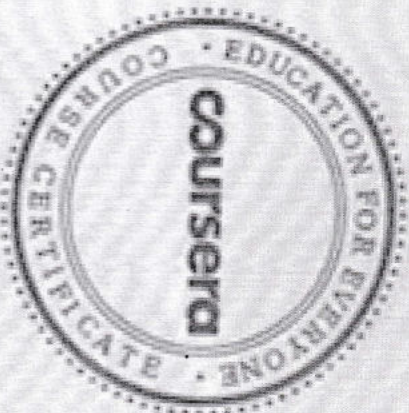


Han Cao
Qualcomm Institute



Ganu Choudhary
Qualcomm Institute of Calif

COURSE
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KVAIST

Dr. Vinita Mathur

Dr. Vinita Mathur

Electrical Engineering

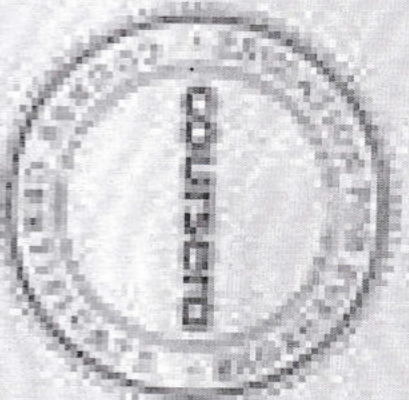
Electrical Engineering: An Introduction

An introductory text for students of Electrical Engineering in the first year of their undergraduate studies. The book covers the basic concepts of electrical engineering and provides a solid foundation for further study.

Va

Dr. Vinita Mathur
Electrical Engineering
Department of Electrical Engineering

**COURSE
CERTIFICATE**



This certificate is awarded to the student who has successfully completed the course and has achieved the required marks. The certificate is valid for the duration of the course.



YONSEI
UNIVERSITY

Department of

Dr. Vinita Mathur

has successfully completed

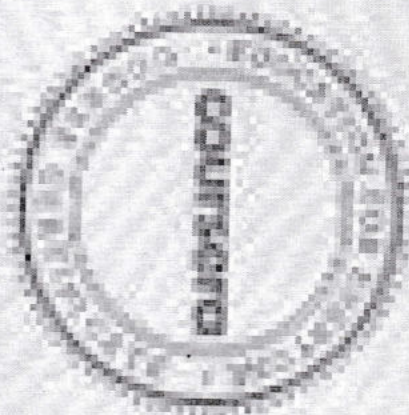
Workshop Communications for Everybody

for studies conducted between October and 15, 2004. Yonsei University and abroad through
Certificate

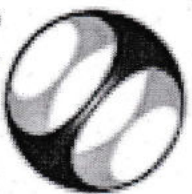
Received from Vinita Mathur, 2004-10-15

Department of Communications for Everybody, Yonsei University, Seoul, Korea
Date of Issue: 15 October 2004

COURSE
CERTIFICATE



This certificate is awarded to the student who has completed the course and has passed the final examination. It is valid for one year from the date of issue.



Certificate of Participation

This is to certify that **VINITA MATHUR** participated in the **LaTeX** training organized at **S. S. Jain Subodh Girls College** in **January 2020** semester, with course material provided by the **Spoken Tutorial Project, IIT Bombay**.

A comprehensive set of topics pertaining to **LaTeX** were covered in the training. This training is offered by the **Spoken Tutorial Project, IIT Bombay**, funded by the **National Mission on Education through ICT, MHRD, Govt. of India**.

May 25th - 29th 2020



Prof. Kannan M Moudgal
IIT Bombay



Association of Institutions Promoting Research
and Development in the Field of Engineering

Department of Computer Science and Engineering
in
Association with Computer Society of India

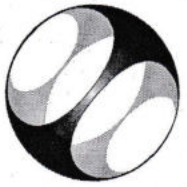
Certificate of Participation

This is to be certified that the Student Member has participated the Five Days Summer PDS on "Digital Image Processing with Research Methodology" organized by Karpagam College of Engineering, Coimbatore during 15.06.2020 to 19.06.2020.

S. Lakshmi
Coordinator

P. Praveen
Coordinator

P. Praveen
Principal



Certificate of Participation

This is to certify that **PARUL TYAGI** participated in the **LaTeX** training organized at **S. S. Jain Subodh Girls College** in **January 2020** semester, with course material provided by the Spoken Tutorial Project, IIT Bombay.

A comprehensive set of topics pertaining to **LaTeX** were covered in the training. This training is offered by the Spoken Tutorial Project, IIT Bombay, funded by the National Mission on Education through ICT, MHRD, Govt. of India.

May 25th - 29th 2020

Prof. Kannan M Moudgal
IIT Bombay



Department of Computer Science and Engineering
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Certificate of Participation

This is to be certified that Dr. Parul Tyagi has participated the Five Days Online FDP on "Digital Image Processing with Research Methodology" organized by Karpagam College of Engineering, Coimbatore during 15-06-2020 to 19-06-2020.

S. Ramkumar

Coordinator

B. S. Praveen

Convenor

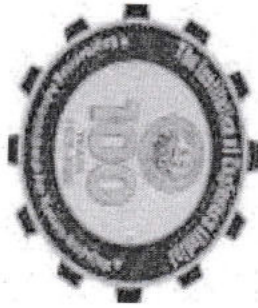
P. S. Prithvi

Principal

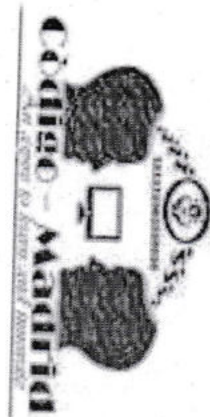


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STTP on
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CERTIFICATE OF PARTICIPATION



This is to certify that Mr./Ms. /Dr. **Dr. Parul Tyagi** has successfully completed online short term training program on "Digital Transformation" organized by Department of Computer Engineering, AISSMS College of Engineering, Pune-01 from 11th -13th June 2020.


Dr. S F Sayyad


D M Ujalambkar


V V Waykule


B A Patil


A A Gupta

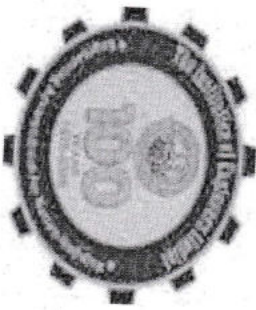

Dr. D P Gaikwad


Dr. D S Bormane

STTP Coordinators

HOD

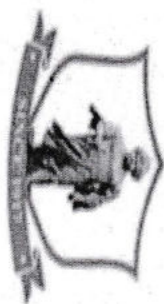
Principal



AISSMS

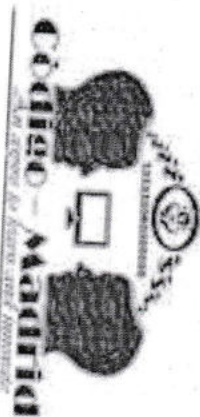
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श्रीतर्फ शिष्टाचार
Accredited by NAAC with "A+" Grade



STTP on

"DIGITAL TRANSFORMATION" CERTIFICATE OF PARTICIPATION



This is to certify that Mr./Ms. /Dr. **Dr. Parul Tyagi** has successfully completed online short term training program on **"Digital Transformation"** organized by Department of Computer Engineering, AISSMS College of Engineering, Pune-01 from 11th -13th June 2020.

Dr.S F Sayyad

D M Ujalambkar

V V Waykule
STTP Coordinators

B A Patil

A A Gupta

Dr.D P Gaikwad
HOD

Dr.D S Bormane
Principal

KAIST



05/20/2020

Dr. Neha Singh

has successfully completed

Electrodynamics: An Introduction

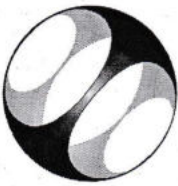
an online non-credit course authorized by Korea Advanced Institute of Science and Technology(KAIST) and offered through Coursera

Seungbum Hong,
Associate Professor
Materials Science and Engineering

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Certificate of Participation

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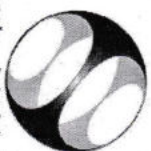
May 25th - 29th 2020

Prof. Kannan M Mondgalya
IIT Bombay



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Near Kanota, Agra Road, Jaipur - 303012 • Ph.: 9928755552, 53



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in association with Spoken Tutorial Project, IIT Bombay

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DEVESH GUPTA

For attending five days Online Faculty Development Program on "**LaTeX**"
Conducted from 19th May to 23rd May, 2020

P. Agarwal

Prof. Praveen Agarwal
Vice Principal (Anand-ICE)
FDP Co-ordinator

gsm

Prof. Vijay K. Sharma
Principal (Anand-ICE)

monika

Monika Mittal
Vice Chairperson (Anand-ICE)

Manoj Mittal

Manoj Mittal
Chairman (Anand-ICE)



Swami Keshvanand Institute of Technology,
Management & Gramothan, Jaipur



Certificate of Participation

WEBINAR SERIES ON

"BEYOND THE BOUNDARIES: REINVENTING HORIZONS"

(16th - 20th MAY, 2020)

This is to certify that

Devesh Gupta

has participated in the session
"Industry 4.0" on 17th May, 2020

Mr. Jaipal Meel
Director, SKIT

Prof. (Dr.) R. K. Pachar
Principal, SKIT



BHARAT

Institute of Engineering and Technology

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Approved by AICTE and Affiliated to JNTUH

DEPARTMENT OF SCIENCE AND HUMANITIES



CERTIFICATE OF PARTICIPATION

This is to certify that Dr Mahendra Pratap Singh

from

Jaipur Engineering college and Research Centre Jaipur

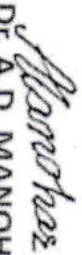
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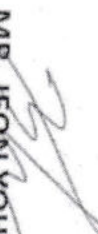
attended a One Week Faculty Development Program (FDP) on


“Advanced Materials Research” organized by BIET &

Indian Ceramic Society from 15th June - 19th June, 2020

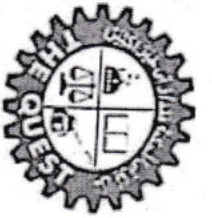

Dr. I. SOPHIAKRANI
Convenor
Associate Professor (S&H)


Dr. A.D. MANOHAR
Secretary
Indian Ceramic Society
Hyderabad


MR. JEON YOHAN
Deputy Director
CRESIHRD


Sri. C.H. VENGOPAL REDDY
Chairman
Bharat Institutions

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CERTIFICATE

This is to certify that Dr./Mr./Ms. VITETA KUMAMAT, Asst. Prof of JECRC Foundation, Sitapura, Jaipur, Rajasthan has participated /presented the paper entitled Digital Marketing Yesterday, Today and Tomorrow in the INTERNATIONAL CONFERENCE ON STRATEGIC INNOVATION AND EMERGING PERSPECTIVES FOR GLOBAL BUSINESS SCENARIO organized by the Department of Corporate Secretaryship, The Quaide Milleth College for Men, Chennai on 21st August 2019.


Dr. S. Sheik Kalil
Organising Secretary


Dr. M. Mohamed Sheriff
Convenor


Dr. A. Raaj
Director



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DEPARTMENT OF SCIENCE AND HUMANITIES



CERTIFICATE OF PARTICIPATION


This is to certify that Dr. Bhuvnesh Bhardwaj

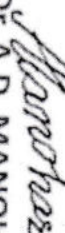
Jaipur engineering college and research centre


from


has

attended a One Week Faculty Development Program (FDP) on
"Advanced Materials Research" organized by BIET &
Indian Ceramic Society from 15th June - 19th June, 2020


DR. I. SOPHIARANI
Convener
Associate Professor (S&H)


DR. A.D. MANOHAR
Secretary
Indian Ceramic Society
Hyderabad


MR. JEON YOHAN
Deputy Director
CRESIHRD


Sri. C.H. VENUGOPAL REDDY
Chairman
Bharat Institutions

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ALL INDIA COUNCIL FOR TECHNICAL EDUCATION
NELSON MANDELA MARG, VASANT KUNJ, NEW DELHI

Certificate of Participation

This is to certify that Dr. Mahendra Pratap Singh from Jaipur Engineering College And Research Centre, Jaipur has participated and successfully completed the online workshop on Universal Human Values on the theme "Inculcating Universal Human Values in Technical Education" during 3-7 May, 2020 as organized by All India Council for Technical Education(AICTE).



Dr. Rajneesh Arora
Chairman
National Coordination Committee for Induction Program



Prof. Rajive Kumar
Member Secretary, AICTE

**One Day Workshop on
Assessments in Computer Science and Engineering
with focus on Examination Reforms Recommended by AICTE**

August 09, 2019

Jointly Organized by



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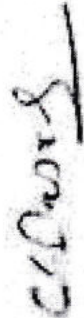
Department of Computer Engineering




POORNIMA
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Certificate

This is to certify that Dr. / Mr./Ms. DR. SANJAY GIAR
from Jaipur Engineering College & Research Center.....has participated
in the one day workshop on Assessments in Computer Science and Engineering with focus on Examination
Reforms Recommended by AICTE jointly organized by ACM India, Poornima College of Engineering ACM W Student
Chapter & Manipal University, Jaipur.


SH. Chandrashekhar Sahasrabudhe
COO
ACM India Council


Dr. Mahesh M. Bunde
Principal & Director
Poornima College of Engg. Jaipur

**One Day Workshop on
Assessments in Computer Science and Engineering
with focus on Examination Reforms Recommended by AICTE**

August 09, 2019

Jointly Organized by



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JAIPUR**


Department of Computer Engineering




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This is to certify that Dr. / Mr./Ms. **DR. SANJAY GIAR**
from **Jaipur Engineering College & Research Center**.....has participated
in the one day workshop on Assessments in Computer Science and Engineering with focus on Examination
Reforms Recommended by AICTE jointly organized by ACM India, Poornima College of Engineering ACM W Student
Chapter & Manipal University, Jaipur.


SH. Chandrashekhar Sahasrabudhe
COO
ACM India Council


Dr. Mahesh M. Bunde
Principal & Director
Poornima College of Engg. Jaipur

Date: 25th February, 2020

Ref. No.-FIP2-20-FEB-008



FORSK CODING SCHOOL

Certificate of Participation

This certificate is awarded to

Ms. Manju Vyas

On Successful Completion of Faculty Training Programme on

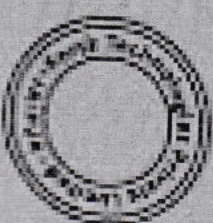
"Machine Learning & Deep Learning "

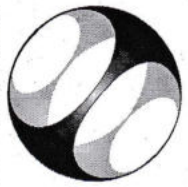
Conducted by Forsk Coding School, Held between

10th -19th February, 2020

Dr. Sylvester Fernandes

Director





Spoken Tutorial

Certificate of Participation

This is to certify that **SUNITI CHOUHAN** participated in the **R** training organized at **IMS NOIDA** in **January 2020** semester, with course material provided by the Spoken Tutorial Project, IIT Bombay.

A comprehensive set of topics pertaining to **R** were covered in the training. This training is offered by the Spoken Tutorial Project, IIT Bombay, funded by the National Mission on Education through ICT, MHRD, Govt. of India.

May 25th 2020

A handwritten signature in black ink, appearing to read 'Kannan Moudgal'.

Prof. Kannan M Moudgal
IIT Bombay



PRELIMS OF
**SMART INDIA
 HACKATHON '20**



Certificate

MENTOR

This Certificate is awarded to

Ms. B. Umamaheshwari

for exceptional contribution as Mentor in

“JECRC HACKATHON 4.0”

17th - 18th January, 2020

Sh. Arpit Agrawal

Sh. Arpit Agrawal
 Director

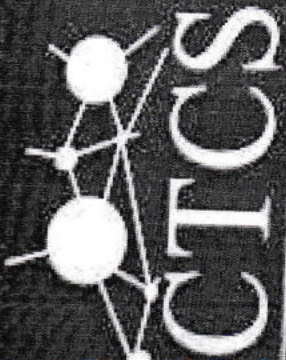
Dr. V.K. Chandna

Dr. V.K. Chandna
 Principal

Sh. Mukesh Agarwal

Sh. Mukesh Agarwal
 SPOC, SIH-2020





14 December, UDAIPUR-2019

Fourth International Conference on INFORMATION AND COMMUNICATION TECHNOLOGY FOR COMPETITIVE STRATEGIES (ICTCS-2019)

Certificate of Appreciation

Awarded to


Sanjay Gour


as


Session Chair

in Fourth International Conference on Information and Communication Technology for Competitive Strategies
(ICTCS 2019) held during December 13-14, 2019 at Bhupal Nobles' University, Udaipur, India.


Dr. Y K Bolia
Chairman
IE(I), ULC


Dr. Bharat Singh Deora
Chairman
CSI Udaipur Chapter


Dr. Amit Joshi
Conference Secretary
ICTCS, Udaipur


Dr. Mahipal Singh Deora
Organising Secretary
ICTCS, Udaipur



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Udaipur Local Chapter



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This is to certify that
Ms. B. Uma Maheswari
of JKCRC, Jaipur
participated in the
FICR International Conference on Rising Threats in Expert
Applications and Solutions
organized by the Department of CS & IT,
held at IIS (Institute of Information Systems), Jaipur
on 17-19 January 2020.
She presented a paper titled
"The Rising of Block Chain Technology and its Adoption in India"
at the Conference.

Prof. Vijay Singh Rathore
Convener

Dr. Manish Gupta
Organizer

Dr. Anshu Gupta
Organizer

A Data Mining Approach of Detection of Fake News on Social Media

B.Umamaheswari, Dr. Vijeta Kumawat
CSE Dept, JECRC

Abstract:

The advantage of easy accessibility, less expensive and faster reach to more people in less time has made the news on social media gaining popularity in recent years but at the same time it faced the problem on quality of news spread compared to other standard traditional media such as newspaper and TV channels. How the people are victimized by the fake news is the major concern. Also identifying such fake news has become almost a challenge. In this paper we will see how data mining is providing solution to identify fake news on social media.

Keywords— Fake news, Traditional media, social media , detection

INTRODUCTION

Social media originated in 1970 with the introduction of emails and slowly gained popularity when six degrees the first social media site was launched in 1997. The lack of interaction in traditional media also fuelled the growth of social networking sites. The social media is less expensive and it facilitates easy interaction with others. Literally speaking nowadays people are much more interested in accessing social media than traditional media. This created fake news to spread easily across the social networking sites: The main purpose of this paper is summarized as follows:

- There is no proper knowledge of fake news among online media users. Knowingly or unknowingly they are

spreading the fake news. At the same time they are the victims of the same. Educating the common people about the fake news is the primary task.

- There is no standard method for detecting fake news. Whatever prevailing is in development level only.

Before detecting the fake news we need to give proper definition of fake news and explain its characteristics. After that we can provide some approaches to detect them by considering some metrics. We can discuss related areas followed by issues in detection and how to solve those issues. Finally we will conclude the review.

FAKE NEWS DEFINITION AND FEATURES

Here defining the fake news is important in both traditional and social media. Fake news is the deception information under the semblance of genuine news. Even now there is no customary way to define the fake news. Everyone tried to define it in terms of legitimacy and purpose. Fake news always contains some counterfeit information about the original news. It may be related to some person, event, etc. Also the main intension is to damage someone identity. It is created to delude the reader.

The following ideas don't seem to be fake news as per our study:

- a) Sarcasm news with proper context that has no intent to mislead or deceive consumers and is unlikely to be mis-perceived as factual
- b) Rumors that didn't originate from news events
- c) Conspiracy theories that can be demonstrated as true or false
- d) Information that is created unintentionally and finally
- e) Hoaxes that are solely impelled by fun or to scam targeted individuals

FAKE NEWS ON TRADITIONAL MEDIA

Fake news is common even from traditional media itself. Traditional media normally target psychology of the people to spread the fake news. People who follow the particular news media for years strongly believe the news published is always the authentic news. Any negative comment against the media is normally neglected by them. They

normally support the media who go along with their ideology.

The next way to spread the fake news in traditional media is to influence the society we belong. People believe the news only in the way they wanted. Other way we can say if the news is benefit for them then they believe them. The theory behind fake news can be better understood considering the publisher and reader. The publisher has two motives one is to make profit and second giving unbiased news to maintain their reputation. Similarly the reader has two motives one is to receiving the true and unbiased news and second is to satisfy their social need

FAKE NEWS ON SOCIAL MEDIA

Fake news is even more common in social media because it is easy to create an account in social media. Also malevolent account can be created with fake identity. In that case user need not be real human being. They are normally social bot, cyborg and trolls. A social bot [2] refers to a social media account that is controlled by a computer algorithm to automatically produce content and interact with humans (or other bot users) on social media. Social bots [3] can turn into malevolent unit designed specifically with the purpose to do harm, such as manipulating and spreading fake news on social media.

Trolls, real person who aim to deliberately disrupt online communities [6] and incite clients into an emotional response, are also playing an important role in spreading fake

news on social media. Trolling behaviors are highly affected by people's mood and the context of online discussions, which enables the easy dissemination of fake news among otherwise "normal" online communities. The effect of angling is to trigger people's inner negative emotions, like anger and fear, resulting in doubt, distrust, and irrational behavior.

Finally, cyborg users can easily unfold fake news in a way that blends automated activities with human input. Usually cyborg [1] accounts are registered by human as a camouflage and 'set automated programs to perform activities in social media. The easy switch of functionalities between human and bot offers cyborg users distinctive opportunities to unfold fake news. In a nutshell, these highly active and partisan malicious accounts on social media become the powerful sources and proliferation of fake news

In Social media news will usually seen by intended users. Not all groups of people see the same news like traditional medium. People with same ideology can easily form groups and spread their opinion across. As a result, this creates segmented, homogeneous communities with a very limited information ecosystem. Research shows that such communities become the primary driver of information transmission that further strengthens division.

FAKE NEWS DETECTION USING DATA MINING

In traditional news medium fake news detection totally depend on the content of the news. While in social media in addition

to the news content milieu plays an important role in detecting fakenews. Milieu is nothing but social and physical environment in which people reside. There are two stages in detection. First extract the features [5] based on content of news and milieu. Second construct the model based on features extracted.

Features extraction

In the news content, features are nothing but meta information that are available in the news. First is the source who originated the news. Second catchy title given to those news. Then comes the essence of original content of the news. Finally other supporting media like images, audio and video clips. From these meta information feature representation can be constructed to retrieve fake news characteristics. Also fake news are always intentionally introduced mostly for exploit image of someone or for political gain. They are available as either hyperlinks, clickbaits or as cartoon. Linguistic features of language and visual media are given much more importance because they can capture fake news.

Linguistic features enable us to extract features in the form of characters, words, sentence etc. Visual features can be easily extracted from images and videos. Faking images were identified based on various user-level and tweet-level hand-crafted features using classification framework. In recent times, assorted illustration and statistical features are being extracted for news verification. In social context, features are user related and post related. In user based, features of individual users or group

of users are captured from their profiles and used for fake news detection. Individual features are important for user reliability and group features help to analyze how the members of group react to any particular news. In the post based emotional reaction of people towards any news are recorded for extracting features.

Model Construction

Based on the content of the news, the news content models are created based on the fact of the news. They are mainly for checking the truthfulness of news in the form of fact checking. The fact is checked either by some expert groups who can confirm whether the news is true or not. Also if news is supported or rejected by a large number of people then in that case their opinion is also considered for model construction [6]. After the news content the style or presentation of the news are given much more importance for model construction.

CONCLUSION

Nowadays social media has become the prime source regarding consumption of news compared to traditional news media. But it also faced the problem of spreading fake news. Such things affect not only individual member but social communities also. In this paper we are analyzing fake news characteristics and its problem. Also we reviewed how to detect them from data mining point of view.

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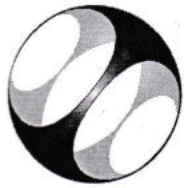
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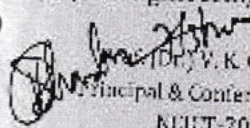
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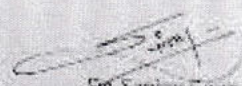
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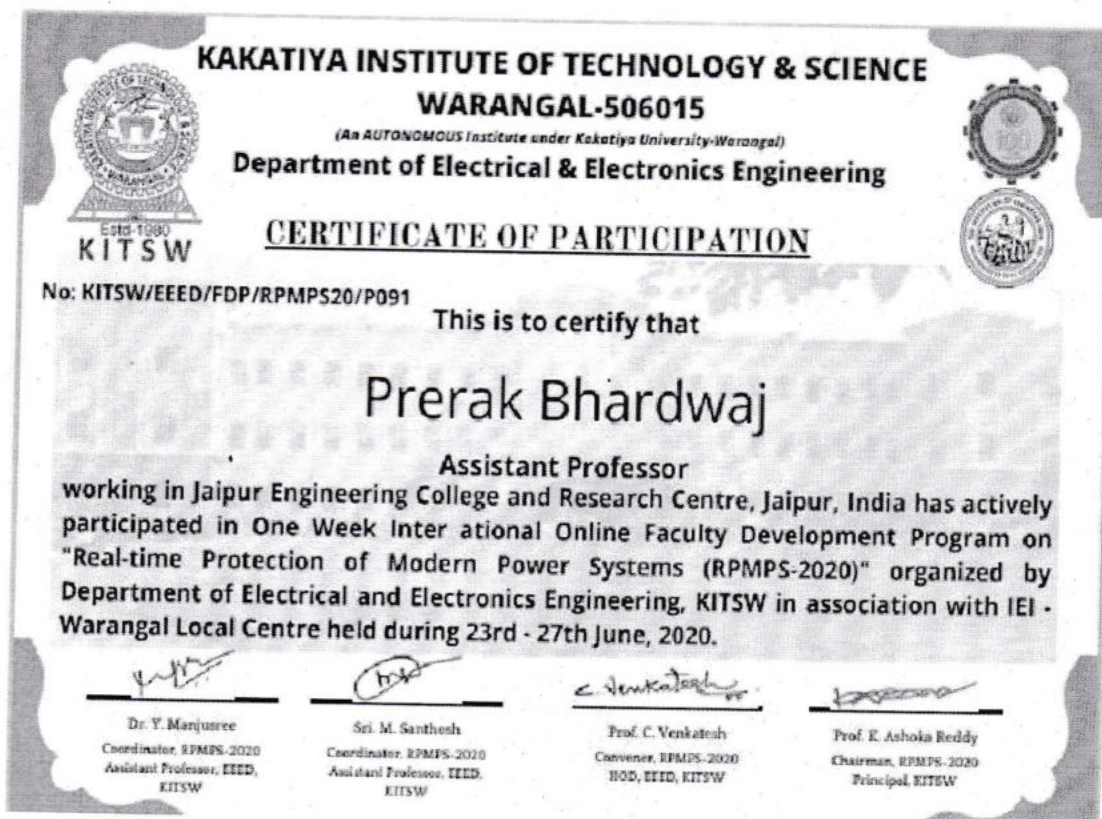


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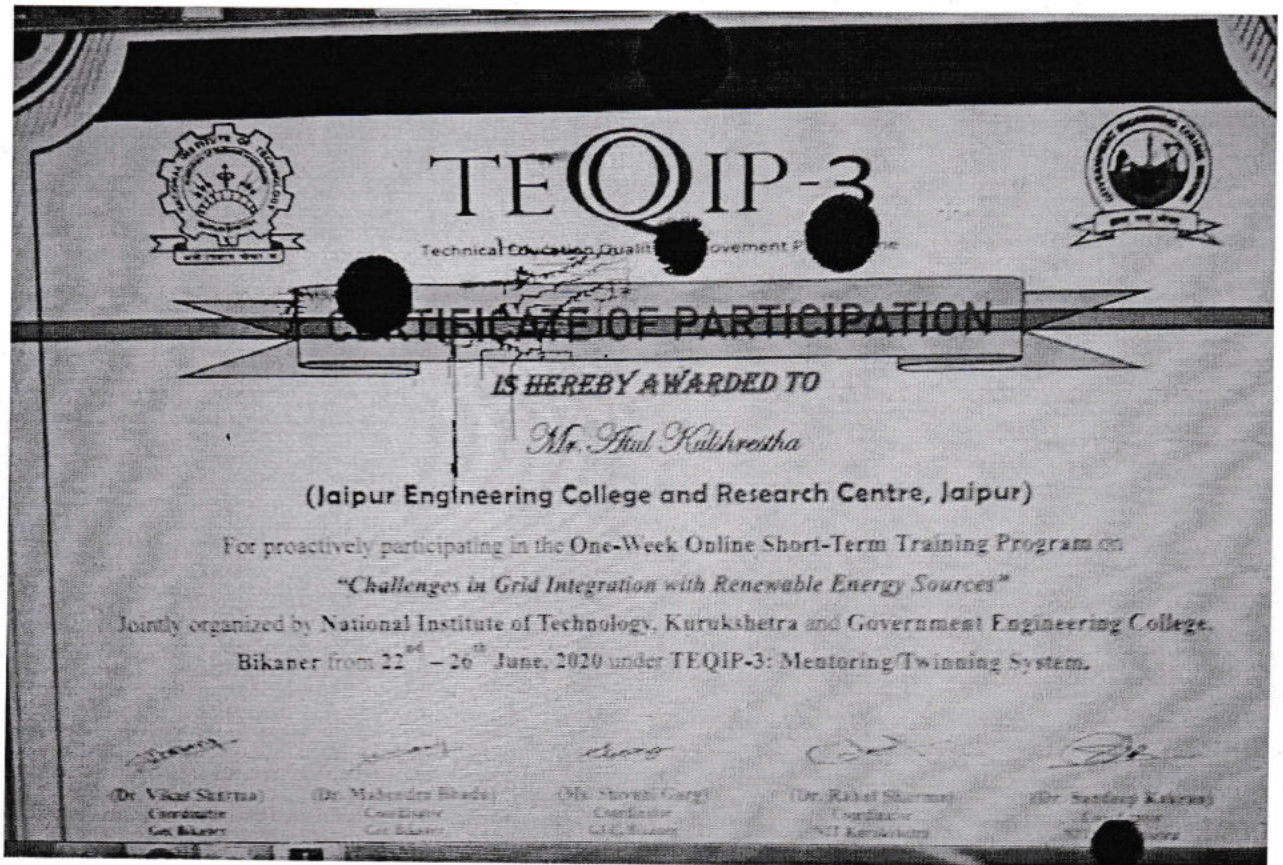


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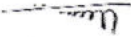

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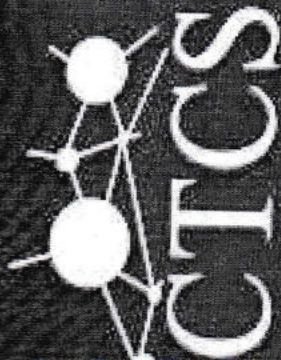
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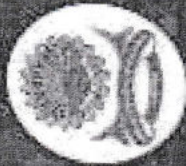

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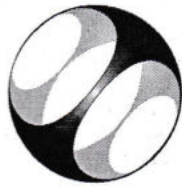
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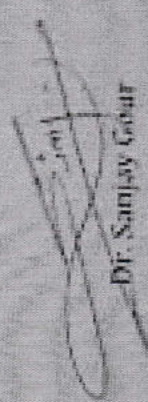
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30		Microstrip Hexagonal Fractal Antenna for Military Applications	Aug-19	Journal of RF-Engineering and Telecommunications	2191-6349	73/9-10		Scopus	N	N
31	S.S Manaktala	Design and Analyze the Effect of InGaN Nanomaterial in Light Emitting Diode towards Improving the Performance of Quantum Efficiency	Jul-19	IJRTE	2277-3878		VOL 8/ISSUE 2	SCOPUS	N	Y
32		Using InGaN/GaN multiple quantum well green light-emitting diodes as a promising replacement of conventional light sources'	Oct-19	IJEAT	2249-8958		VOL 9/ISSUE 1		N	Y
33	Dr. Neha Singh	Dual Ring resonator based 3-D photonic crystal for ADF using FDTD Least square technique	Jul-05	Wireless Personal Communications	0929-6212			SCI	N	N
34	Ashish Kumar	Development and Characterization of ZnO thin film for piezoelectric applications	Jan-20	Materials Today Proceeding	22147853			SCOPUS	N	Y
35	Dr. Omprakash Netula	"Exploration of Qualitative Characteristics of Ground Water at Chakrata Block in Dehradun. http://serisc.org/journals/index.php/IIAST/article	1 February 2020	International Journal of Advanced Science and Technology	2207-6260	29/03		SCO		

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36	Atul Kulshre stha	A Hybrid Fault Recognition Algorithm Using Stockwell Transform and Wigner Distribution Function for Power System Network with Solar Energy Penetration	July' 08, 2020	Energies	1996- 1073	Vol. 13, Iss. 14	SCI	Y	Y
37	Dr. Ruchi Mathur	Feket-Szeg o Inequalities for a new generalized class of Analytic functions	June, 2020	Internationa l Journal of Advanced Science and Technology	2207- 6360	Vol. 29, No.7s, (2020) , pp. 3820- 3826	Scop us	Y	Y
38	Dr Shiv Shankar Sharma	On fractional integral Involving Srivastava's Polynomial & I function	28/05/2020	Mathematics in Engineering Science and Aerospace (Q3 quartile)	2041- 3165	Vol.11 ,No2, pp.301 -308	Scop us	N	Y

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Feket-Szegö Inequalities for a new generalized class of Analytic functions

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Abstract

Here for a new unified class of analytic functions on the open unit disk $|z_1| < 1$ the authors introduce Feket-Szegö inequalities. The sharp upperbounds of $|a_3 - \eta a_2^2|$ for the function $h(z_1)$ defined in the open unit disk is also discussed in this article. Special cases and corollary are elaborated by using main result which shows that the concluded results are more accurate and computable from standard result.

Keywords: Analytic functions, Feket-Szegö Inequalities, Upperbounds, Unit disk, Univalent functions

1. INTRODUCTION

Let h is defined in the class A as -

$$h(z_1) = z_1 + \sum_{n=2}^{\infty} a_n z_1^n \quad (1.1)$$

it is analytic and univalent in $U = \{z_1 \in \mathbb{C} : |z_1| < 1\}$ and normalized by $h(0) = 0$ and $h'(0) = 1$. All functions in A which are univalent in U are contained in a generalized class S . (see [1 - 3]).

Definition 1.1 (see also [1,4]) Let $S^*(\psi)$ and $C(\psi)$ are the class of starlike functions and convex functions respectively, defined as-

$$S^*(\psi) = \text{Re} \left\{ \frac{z_1 h'(z_1)}{h(z_1)} \right\} \prec \psi(z_1), z_1 \in U \quad (1.2)$$

$$C(\psi) = \text{Re} \left\{ 1 + \frac{z_1 h''(z_1)}{h'(z_1)} \right\} \prec \psi(z_1), z_1 \in U \quad (1.3)$$

where \prec is the well known subordination between analytic functions. For detail one can see [2,3]

In this paper we will define a class $S^*C(\psi, \beta_1, \gamma_1)$ which is a generalization of the classes $S^*(\psi, \beta_1)$ and $C(\psi, \beta_1)$ introduced by Mustafa [3].

Definition 1.2 Let a univalent starlike function with respect to '1' denoted by

$\psi(z_1) = 1 + T_1 z_1 + T_2 z_1^2 + \dots$, where $T_1 > 0$. The function $h \in S^*C(\psi, \beta_1, \gamma_1)$ if

$$\left\{ \frac{z_1 h'(z_1) + \gamma_1 z_1^2 h''(z_1)}{\gamma_1 z_1 [h'(z_1) + \beta_1 z_1 h''(z_1)] + (1 - \gamma_1) [\beta_1 h'(z_1) + (1 - \beta_1) h(z_1)]} \right\} = \psi(z_1) \quad (\alpha_1, \beta_1 \in [0, 1), \gamma_1 \in [0, 1) \tag{1.4}$$

When

$$\psi(z_1) = \frac{(1 + Lz_1)}{(1 + Mz_1)}, \quad (-1 \leq M < L \leq 1),$$

Here in this article, we will attain the Fekete-Szegö inequality for $h(z_1)$ in the above discussed class $S^*C(\psi, \beta_1, \gamma_1)$

Lemma 1.1 [8]

If $p_1(z_1) = 1 + d_1 z_1 + d_2 z_1^2 + \dots$ and $\eta \in C$

$|d_2 - \eta d_1^2| \leq 2 \max\{1, |2\eta - 1|\}$ and for $p_1(z_1) = \frac{1+z_1}{1-z_1}$ and $p_1(z_1) = \frac{1+z_1^2}{1-z_1^2}$

Lemma 1.2 If $p_1(z_1) = 1 + d_1 z_1 + d_2 z_1^2 + \dots$ and $\xi \in R, \eta \in C$

$$|d_2 - \xi d_1^2| \leq \begin{cases} -4\xi + 2, & \xi \leq 0 \\ 2, & 0 \leq \xi \leq 1 \\ 4\xi - 2, & \xi \geq 1 \end{cases}$$

When $\xi < 0$ or $\xi > 1$, the equality holds iff $p_1(z_1)$ is $\frac{1+z_1}{1-z_1}$ or one of its revolutions. If $0 < \xi < 1$, then the equality holds iff $p_1(z_1)$ is $\frac{1+z_1^2}{1-z_1^2}$ or one of its revolutions. If $\xi = 0$, the equality holds iff

$$p_1(z_1) = \left(\frac{1}{2} + \frac{1}{2}\lambda\right) \frac{1+z_1}{1-z_1} + \left(\frac{1}{2} - \frac{1}{2}\lambda\right) \frac{1-z_1}{1+z_1} \quad (0 \leq \lambda \leq 1)$$

or one of its revolutions. If $\xi = 1$, the equality holds iff $p_1(z_1)$ is the reciprocal of one of its functions such that the equality holds in the case of $\xi = 0$. Also the above upper bound is sharp, and can be improved in the following manner when $0 < \xi < 1$

$$|d_2 - \xi d_1^2| + \xi |d_1|^2 \leq 2 \quad (0 < \xi \leq 1/2)$$

$$|d_2 - \xi d_1^2| + (1 - \xi) |d_1|^2 \leq 2 \quad (1/2 < \xi < 1)$$

2. MAIN RESULTS

Theorem 2.1 If $h(z_1) \in S^*C(\psi, s, t)$ and $\eta \in C$, then

$$|a_3 - \eta a_2^2| \leq \lambda \{T_1, T^*\}$$

where

$$\lambda = \frac{1}{2(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} \tag{2.1}$$

and

$$T^* = \left| T_2 + T_1^2 \frac{(1 + \beta_1 + \gamma_1 + \beta_1 \gamma_1)}{(1 - \beta_1 + \gamma_1 - \beta_1 \gamma_1)} + 2\eta T_1^2 \frac{(1 + \beta_1 + \gamma_1 + \beta_1 \gamma_1)}{(1 - \beta_1 + \gamma_1 - \beta_1 \gamma_1)} \right| \quad (2.2)$$

provided $1 - \beta_1 + \gamma_1 - \beta_1 \gamma_1 \neq 0$ and $1 - \beta_1 + 2\gamma_1 - \beta_1 \gamma_1 \neq 0$. This result is sharp.

Proof Let $h \in S^*C(\psi, \beta_1, \gamma_1)$ and by using the Schwarz function $w(z_1) \in A$ we get

$$\left\{ \frac{z_1 h'(z_1) + \gamma_1 z_1^2 h''(z_1)}{\gamma_1 z_1 [h'(z_1) + \beta_1 z_1 h''(z_1)] + (1 - \gamma_1) [\beta_1 h'(z_1) + (1 - \beta_1) h(z_1)]} \right\} = \psi(w(z_1)) \quad (z_1 \in U) \quad (2.3)$$

If $p_2(z_1)$ is obtained from lemma 1.1 with the same condition of having $p_1(0) = 1$, then

$$p_2(z_1) = \frac{1 + w(z_1)}{1 - w(z_1)} = 1 + d_1 z_1 + d_2 z_1^2 + \dots \quad (z_1 \in U) \quad (2.4)$$

by using (2.2) in the above equations we get

$$w(z_1) = \frac{d_1}{2} z_1 + \frac{1}{2} \left(d_2 - \frac{d_1^2}{2} \right) z_1^2 + \dots \quad (2.5)$$

also

$$p_1(z_1) = \left\{ \frac{z_1 h'(z_1) + \gamma_1 z_1^2 h''(z_1)}{\gamma_1 z_1 [h'(z_1) + \beta_1 z_1 h''(z_1)] + (1 - \gamma_1) [\beta_1 h'(z_1) + (1 - \beta_1) h(z_1)]} \right\} = 1 + b_1 z_1 + b_2 z_1^2 + \dots \quad (2.6)$$

$(z_1 \in U)$

which leads to

$$b_1 = (1 + \gamma_1 - \beta_1 - \beta_1 \gamma_1) a_2 \quad \text{and} \quad b_2 = (1 + \beta_1 + \gamma_1 + \beta_1 \gamma_1) (1 - \beta_1 + \gamma_1 - \beta_1 \gamma_1) a_2^2 + 2(1 + 2\gamma_1 - \beta_1 - \beta_1 \gamma_1) a_3 \quad (2.7)$$

by the definition of subordination and (2.4), we get:

$$p_1(z_1) = \psi(w(z_1)) = 1 + \frac{T_1 d_1}{2} + \left\{ \frac{1}{2} \left(d_2 - \frac{d_1^2}{2} \right) T_1 + \frac{1}{4} d_1^2 T_2 \right\} z_1^2 + \dots \quad (z_1 \in U) \quad (2.8)$$

Now from (2.6), (2.7) and (2.8), we have

$$(1 + \gamma_1 - \beta_1 - \beta_1 \gamma_1) a_2 = \frac{T_1 d_1}{2}$$

$$\frac{1}{2} \left(d_2 - \frac{d_1^2}{2} \right) T_1 + \frac{1}{4} d_1^2 T_2 = (1 + \gamma_1 + \beta_1 + \beta_1 \gamma_1) (1 - \beta_1 + \gamma_1 - \beta_1 \gamma_1) a_2^2 + 2(1 + 2\gamma_1 - \beta_1 - \beta_1 \gamma_1) a_3$$

Therefore we have

$$a_3 - \eta a_2^2 = \frac{T_1}{4(1 + 2\gamma_1 - \beta_1 - \beta_1 \gamma_1)} \{ d_2 - \xi d_1^2 \}, \quad (1 + 2\gamma_1 - \beta_1 - \beta_1 \gamma_1 \neq 0), (1 + \gamma_1 - \beta_1 - \beta_1 \gamma_1 \neq 0) \quad (2.9)$$

where

$$\xi = \frac{1}{2} \left\{ 1 - \frac{T_2}{T_1} - \left(\frac{1 + \gamma_1 + \beta_1 + \beta_1 \gamma_1}{1 - \beta_1 + \gamma_1 - \beta_1 \gamma_1} \right) T_1 + \left(\frac{1 + 2\gamma_1 - \beta_1 - \beta_1 \gamma_1}{(1 - \beta_1 + \gamma_1 - \beta_1 \gamma_1)^2} \right) 2\eta T_1 \right\}$$

$$(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1 \neq 0), (1 + \gamma_1 - \beta_1 - \beta_1\gamma_1 \neq 0)$$

the result is sharp for

$$\left\{ \frac{z_1 h'(z_1) + \gamma_1 z_1^2 h''(z_1)}{\gamma_1 z_1 [h'(z_1) + \beta_1 z_1 h''(z_1)] + (1 - \gamma_1) [\beta_1 h'(z_1) + (1 - \beta_1) h(z_1)]} \right\} = \psi(z_1) \quad (2.10)$$

and

$$\left\{ \frac{z_1 h'(z_1) + \gamma_1 z_1^2 h''(z_1)}{\gamma_1 z_1 [h'(z_1) + \beta_1 z_1 h''(z_1)] + (1 - \gamma_1) [\beta_1 h'(z_1) + (1 - \beta_1) h(z_1)]} \right\} = \psi(z_1^2) \quad (2.11)$$

Corollary 2.2 For $h(z_1) \in S^*C(\psi, \beta_1, \gamma_1)$, for real parameters η such that

$1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1 \neq 0, 1 + \gamma_1 - \beta_1 - \beta_1\gamma_1 \neq 0$, then

$$|a_3 - \eta a_2^2| \leq \begin{cases} T^* & \eta \leq \rho_1, \\ T_1 & \rho_1 \leq \eta \leq \rho_2, \\ -T^* & \eta \geq \rho_2, \end{cases}$$

where

$$\rho_1 = \frac{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)^2}{2T_1(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} \left[-1 + \frac{T_2}{T_1} + T_1 \left(\frac{1 + \beta_1 + \gamma_1 + \beta_1\gamma_1}{1 + \gamma_1 - \beta_1 - \beta_1\gamma_1} \right) \right]$$

$$\rho_2 = \frac{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)^2}{2T_1(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} \left[1 + \frac{T_2}{T_1} + T_1 \left(\frac{1 + \beta_1 + \gamma_1 + \beta_1\gamma_1}{1 + \gamma_1 - \beta_1 - \beta_1\gamma_1} \right) \right]$$

By taking η to be real number and by taking lemma 1.2 we will get the desired result.

Remark 1: $K_\psi^n (n = 2, 3, \dots)$ is defined to represent the sharpness of these bounds for real parameter η as follows:

$$\left\{ \frac{z_1 K_\psi^n(z_1) + \gamma_1 z_1^2 K_\psi^{n+1}(z_1)}{\gamma_1 z_1 [K_\psi^n(z_1) + \beta_1 z_1 K_\psi^{n+1}(z_1)] + (1 - \gamma_1) [\beta_1 K_\psi^n(z_1) + (1 - \beta_1) K_\psi^n(z_1)]} \right\} = \psi(z_1^{n-1})$$

$$K_\psi^n(0) = K_\psi^n - 1$$

and the functions F_λ and H_λ ($0 \leq \lambda \leq 1$) by

$$\left\{ \frac{z_1 F_\lambda'(z_1) + \gamma_1 z_1^2 F_\lambda''(z_1)}{\gamma_1 z_1 [F_\lambda'(z_1) + \beta_1 z_1 F_\lambda''(z_1)] + (1 - \gamma_1) [\beta_1 F_\lambda'(z_1) + (1 - \beta_1) F_\lambda(z_1)]} \right\} = \psi \left(\frac{z_1(z_1 + \lambda)}{1 + \lambda z_1} \right)$$

$$F_\lambda(0) = F_\lambda' - 1$$

$$\left\{ \frac{z_1 H_\lambda'(z) + \gamma_1 z_1^2 H_\lambda''(z)}{\gamma_1 z_1 [H_\lambda'(z) + \beta_1 z_1 H_\lambda''(z)] + (1 - \gamma_1) [\beta_1 H_\lambda'(z) + (1 - \beta_1) H_\lambda(z)]} \right\} = \psi \left(\frac{z_1(z_1 + \lambda)}{1 + \lambda z_1} \right)$$

$$H_\lambda(0) = H_\lambda' - 1$$

Obviously these functions $K_\psi^n, F_\lambda, H_\lambda \in S^*C(\psi, \beta_1, \gamma_1)$. If $\eta < \rho_1$ or $\eta > \rho_2$, then equality holds iff h is K_ψ^2 or one of its revolutions. When $\rho_1 < \eta < \rho_2$ then equality holds iff h is K_ψ^3

or one of its revolutions. If $\eta = \rho_1$ then equality holds iff h is F_λ or one of its revolutions. If $\eta = \rho_2$ then equality holds iff h is H_λ or one of its revolutions. If $\rho_1 \leq \eta \leq \rho_2$, Corollary 2.2 can be improved, taking in account Lemma 1.2.

Corollary 2.3 Let $h(z_1) \in S(\psi, s, t)$, for real parameters η such that

$1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1 \neq 0, 1 + \gamma_1 - \beta_1 - \beta_1\gamma_1 \neq 0$ and ρ_3 is given by

$$\rho_3 = \frac{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)^2}{T_1(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} \left[\frac{T_2}{T_1} + T_1 \frac{1 + \beta_1 + \gamma_1 + \beta_1\gamma_1}{1 + \gamma_1 - \beta_1 - \beta_1\gamma_1} \right]$$

If $\rho_1 < \eta \leq \rho_3$, then

$$|a_3 - \eta a_2^2| + \frac{1}{2(T_1^2)} \left[(T_1 - T_2) \frac{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)^2}{(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} T_1^2 \right. \\ \left. + T_1 \left(\frac{(1 + \beta_1 + \gamma_1 + \beta_1\gamma_1)(1 + \gamma_1 - \beta_1 - \beta_1\gamma_1)}{(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} \right) - 2\eta T_1^2 \right] \leq \frac{T_1}{2(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)}$$

If $\rho_3 < \eta \leq \rho_2$, then

$$|a_3 - \eta a_2^2| + \frac{1}{2T_1^2} \left[(T_1 + T_2) \frac{(1 + \gamma_1 - \beta_1 - \beta_1\gamma_1)^2}{1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1} \right. \\ \left. + T_1^2 \frac{(1 + \beta_1 + \gamma_1 + \beta_1\gamma_1)(1 + \gamma_1 - \beta_1 - \beta_1\gamma_1)}{(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} - 2\eta T_1^2 \right] \leq \frac{T_1}{2(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)}$$

where ρ_1 and ρ_2 are same as given in Corollary 2.2.

Example 2.4 Let $(-1 \leq M < L \leq 1)$. If $h(z) \in S^*C[L, M, \beta_1, \gamma_1]$, for real parameter η , then

$$|a_3 - \eta a_2^2| \leq \lambda \begin{cases} C^* & \eta \leq \rho_1, \\ L - M & \rho_1 \leq \eta \leq \rho_2, \\ -C^* & \eta \geq \rho_2, \end{cases}$$

where

$$\rho_1 = \frac{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)^2}{2(L - M)(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} \left[-1 + \frac{M(M - L)}{L - M} + (L - M) \left(\frac{1 + \beta_1 + \gamma_1 + \beta_1\gamma_1}{1 + \gamma_1 - \beta_1 - \beta_1\gamma_1} \right) \right]$$

$$\rho_2 = \frac{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)^2}{2(L - M)(1 + 2\gamma_1 - \beta_1 - \beta_1\gamma_1)} \left[-1 + \frac{M(M - L)}{L - M} + (L - M) \left(\frac{1 + \beta_1 + \gamma_1 + \beta_1\gamma_1}{1 + \gamma_1 - \beta_1 - \beta_1\gamma_1} \right) \right]$$

λ is defined in (2.1) and

$$C^* = \left| M(M - L) + (L - M)^2 \frac{(1 + \beta_1 + \gamma_1 + \beta_1\gamma_1)}{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)} - 2\eta(L - M)^2 \frac{(1 - \beta_1 + 2\gamma_1 - \beta_1\gamma_1)}{(1 - \beta_1 + \gamma_1 - \beta_1\gamma_1)} \right|$$

Remark 2: For $\beta_1 = 0$ in aforementioned Corollaries 2.2 and Example 2.4 we get the results by Shanmugham et al. [6].

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On fractional integral formulas involving Srivastava's polynomials and multivariable I-function

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Abstract. The main aim of our present work is to propose two fractional integral image formulas involving Srivastava's polynomials and the multivariable I-function. Due to the general nature of the functions involved herein, our results provide an extension of many known results and may be helpful in deriving new results.

1 Introduction

The branch of Mathematics in which we study differentiation and integration to an arbitrary order is popularly known as Fractional Calculus. It has been shown by many researchers that the arbitrary order derivative and integrals are very useful for explanation of the properties of various materials in mathematical modelling which are more adequate than integer order models. Arbitrary order derivatives gives an excellent descriptions of memory and hereditary properties of various process. The subject of fractional calculus has gained importance during the last three decades mainly due to its applications in various fields of science and engineering, such as fluid flow, archaeology, diffusion potential theory, electrical networks and probability, electrochemistry, scattering theory, transport theory, Statistics, Viscoelasticity. A systematic (and historical) account of investigations in the field of fractional calculus operators, image formulas and its applications carried out by various authors. A list of workers those have made significant contributions in the area includes Agarwal [1, 2, 3], Baleanu et al. [4, 5, 6], Bhargava et al. [7, 8, 9, 10], Bhattar et al. [11], Chaurasia [12], Choudhary [13], Gill [14], Goswami et al. [15], Kilbas [16], Love [17], Miller and Ross [18], Nisar et al. [19, 20], Purohit et al. [21], Rahman et al. [22], Saigo [23], Samko et al. [24], Saxena et al. [25, 26, 27, 28], Singh [29], Singh [30], Srivastava et al. [31], Srivastava and Agarwal [32] and Srivastava and Saxena [33]

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Keywords: Fractional integral operators, Srivastava's Polynomials, Multivariable I-function.



Fuzzy cognitive network-based maximum power point tracking using a self-tuned adaptive gain scheduled fuzzy proportional integral derivative controller and improved artificial neural network-based particle swarm optimization

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Abstract

The increased demand for electrical energy has driven the development of renewable energy sources. In particular, the conversion of solar energy into electrical energy using photovoltaic (PV) systems has become popular because of its simplicity and low cost. However, the nonlinear characteristics and power fluctuations due to changes in the temperature and irradiation hinder the maximum utilization of the power with a PV system. Thus, the maximum power point tracking (MPPT) control technique is used to extract the maximum available power from PV arrays. Due to insolation and variations in temperature in a PV system, the conventional MPPT techniques are readily trapped by local maxima to significantly reduce the conversion efficiency. In order to overcome this issue, we developed a novel perturb and observe algorithm based on an adaptive fuzzy PID controller with an improved artificial neural network-based particle swarm optimization method for tracking the maximum power point with high tracking speed as well as maintaining the system's stability. In addition, we used a fuzzy cognitive network to maintain the equilibrium state, which is essential for improving the conversion efficiency. Simulation results and performance evaluations using our proposed method demonstrated its suitability for applications in PV systems.

Keywords

Fuzzy cognitive network; Fuzzy PID controller; Improved neural network-based particle swarm optimization; Maximum power point tracking; Perturb and observe algorithm; Photovoltaic system

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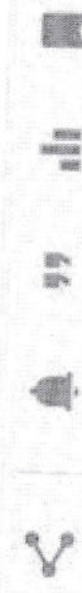
ak, Rukhsar Zafar, Vinay Kanungo and Sandeep Vyas

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Fuzzy Cognitive Network by Adaptive Fuzzy PID Controller and Hybrid Optimization Algorithm

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Abstract

Objectives: To improve the power produced by a photovoltaic system under varying climatic circumstances and thus improving the convergence speed. **Methods:** To improve power in this work a Fuzzy PID regulator is implemented which is tuned by hybrid Artificial Neural Network - Particle Swarm Optimization - Simulated Annealing (ANN-PSO-SA) and FCN (Fuzzy Cognitive Network) optimization algorithm. Additionally a DC/DC help converter is employed to regulate the yield intensity of the photovoltaic system. **Findings:** The proposed technique works on maximum power point and improves the performances of solar energy conversion capability and maintains system stability in case of quickly unstable atmospheric rules. To the best of knowledge no PID controller or regulator has implemented this hybrid optimization algorithm along with fuzzy concepts and works with differing climatic conditions. This method achieves the advantages of the fuzzy techniques along with optimization techniques. Along with achieving maximum power the proposed controller achieves constant voltage control. The DC-DC boost converter makes use of the output of PV panel and is responsible for regulating the output power. The FCN utilized is responsible for maintaining an equilibrium condition at varying climatic conditions. **Improvements:** The tuned controller is compared to the conventional MPPT algorithms with specification rise time, overshoot and delay time. This is demonstrated in the comparison results shown in the results section.

Keywords: DC/DC Help Converter, Fuzzy Cognitive Network (FCN), Maximum Power Point Tracking (MPPT) and Photovoltaic (PV) System

1. Introduction

With the continuous fall in the price of photovoltaic (PV) sector and the rising involvement on the ozone depleting substance emanations, solar energy is quickly becoming an important power source in the worldwide energy scenario¹. PV system is moderately simple to introduce, safe, nearly maintenance free and all the more importantly, condition cordial. Extensive PV control systems are being introduced worldwide because of their medium and long haul economic prospects². Also, it needs low preservation, no clamor and wears due to the lack of giving parts which makes solar power attractive³. Each kind of PV modules own specifies elements corresponds to the encompassing rules such as light, and temperature

and it make the tracking of most extreme power point (MPP) a complicated issue⁴. Most MPPT control algorithm is required to modify continuously the power interfaces to get the greatest power accessible from a PV exhibit at some random time under factor conditions (disconnection, shading, temperature and burden)⁵.

There is a one of a kind working on the cluster's capacity - voltage (P-V) curve called the MPP where generation of power is utmost⁶. A MPPT controller detects the current and voltage of the PV cluster; the power is measured and accordingly the obligation cycle of the converted is acclimated to match the MPP⁷. Numerous most extreme power points tracking (MPPT) control algorithms have been introduced already⁸. MPPT fuzzy logic controllers (FLC) are generally easy to model

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Novel Elliptical Ring Microstrip Patch
Antenna for Ultra-Wideband Application

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Anita Mathur & Deepak Bhatnagar



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Microstrip Hexagonal Fractal Antenna for Military Applications

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Abstract: Novel and miniaturized hexagonal Microstrip patch antenna design is presented in this paper. Patch is fractured using Sierpinski and Koch structures to make the antenna applicable for multiband applications. Additionally ground is defected to enhance the bandwidth and further size is reduced. Material FR-4 ($\epsilon_r = 4.4$) has been chosen to design proposed antenna and substrate thickness as 1.59 mm. Microstrip feed technique is used as it provides better results. Gain obtained in this case is 5.57 dB, 7.49 dB and 4.02 dB with bandwidth as 606.8 MHz, 507 MHz and 2 GHz at 8.3 GHz, 12.6 GHz and 17.6 GHz resonant frequencies. The antenna is better to other designs in terms of parameters like bandwidth, directivity, polarization, gain, return loss and dimension. The antenna provides application for military appliances. A good concord is obtained in Simulated and measured results.

Keywords: hexagonal patch, microstrip feed, fractal, Sierpinski, Koch, X-band, Ka band

1 Introduction

High performance, low cost, compact size, easy fabrication, wider bandwidth, low power consumption and multiband are the stringent requirement these days for communication industry. To reduce the size of antenna slots can be added [1], also by placing notches near shorting pin and feed [2] by making modifications in the overall electrical length of the antenna the area of the antenna can be scaled down [3]. Also antennas with slot are used to achieve multiband

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characteristics [4], whereas dual band application is obtained by enumerating meander-lines to a rectangular strip ring [5]. Fractal antenna has small side lobe arrays [6, 7]. Fractal geometry composed of numerous iterations of a simple initial shape, has a finite boundary with an infinite length. Researchers have explored many antennas of fractal nature like: Koch [8] and helix antenna. A new Minkowski fractal for wideband applications [9]. Combinations of Koch-like curve and Sierpinski Gasket multi-fractal to cut the size and enabling multiband width of a signal to be processed separately in order to get superior fidelity [10]. Although we have studied standard fractal shapes but because of better performance Koch and Sierpinski are taken in this work. In this paper a hexagonal patch is designed which operates in dual band to further increase its performance in terms of bandwidth, gain and reduce its size it is fractured. The modification in the ground is done to maximize the bandwidth. The antenna is applicable in X band (8–12 GHz) and Ku band (12–18 GHz) which is primarily used for military applications, radar, civil, weather news and maritime vessel traffic control.

2 Design analysis and discussion

The drawing of antenna taken with a thought of microstrip feed hexagon patch having patch length as 3 mm. This antenna is mounted on substrate material glass epoxy FR-4 ($\epsilon_r = 4.4$), having thickness $h = 1.59$ mm and value of loss tangent is taken as 0.025. The length L_{gnd} and width W_{gnd} of ground plane is $14 \text{ mm} \times 14 \text{ mm}$. This is decided by doing parametric analysis on the ground plane. The measurements of feed line (length wise feed (l) and widthwise feed (w)) are 4 mm and 1.6 mm, respectively. The considered feed line is made electrically broad that affects the overall realization of antenna. By Subsequent process of broad optimizations all design parameters are obtained. A hexagonal shape is considered because of the compressed structure having area coverage more than triangle or circle. All side lengths are identical on which fracturing is been done. Estimation of the side length of the hexagon patch a is done using the following equations [11]

Design and Analyze the Effect of InGaN Nano-Material in Light Emitting Diode towards Improving the Performance of Quantum Efficiency

Shyam Sunder Manaktala, K.M.Singh

Abstract- The efficiency of an InGaN light-emitting diode (LED) is critically dependent on internal electric field (IEF) exhibiting in its active region. In the present work we examined the properties of the NSSP light emitters. Also we developed a novel InGaN LED structure based on a Nano-structured semi-polar (NSSP) GaN template. This new structure can be fabricated on a mature c-plane substrate including low cost sapphire without any ex situ patterning. From this approach we got results in which we can see that with the help of RT PL, 30% enhancement in IQE will be observed in NSSP MQWs as compared to c-plane planar MQWs with the help of SEM and TEM imaging tools. We have successfully ramped up an MOCVD tool for the epitaxial growth of GaN LEDs for this study.

Index words-

I. INTRODUCTION

The advancement of the coming generation of high effectiveness light emitting diodes (LEDs) for solid state lighting takes a quantitative determination of intrinsic unit details to performance that is additional. A typical metric of optoelectronic gadgets is the output power of their emitted externally on the unit (P_{out}) measured in an integrating sphere. From there, 2 numbers determine the effectiveness of the LEDs: the wall plug efficiency (WPE) η_{wp} i.e., the ratio of electric input power to optical output power, and the outside quantum effectiveness (EQE) η_{EQE} , ratio between the figures of electrically injected carriers and externally observed photons. The WPE is connected to EQE by the voltage drop V in the unit as a result of the diode ahead voltage as well as series resistance, as $\eta_{wp} = P_{out}/VI$, wherever I may be the injected today's. In order to enhance it for a certain EQE, one involves structures with lower contact resistance as well as substantial conductivity substances and effective heat sink to keep high end below all operating conditions. η_{EQE} is readily evaluated by

$$\eta_{EQE} = P_{out}/(\omega)(I/q)$$

where ω is the photon energy and q is the electron charge. Though it just exposes the mix of non-easily separable element parameters, like carrier injection effectiveness η_{inj} , inner quantum effectiveness (IQE) η_{IQE} , along with gentle

extraction effectiveness (LEE) η_{extr} of the LED framework, ratio between the externally emitted photons as well as the internally produced photons in the established region.

II. INGAN/GAN ACTIVE REGION ON NSSP GAN NSSP InGaN/GaN MQWs

The attributes of InGaN MQWs developed on an NSSP GaN template had been examined in comparison with MQWs grown on a planar GaN template. For the planar MQWs, a two μ m-thick GaN epilayer was deposited on a c plane sapphire substrate. Subsequently, the substrate temperature was decreased to 780°C for the development of MQWs working with a nitrogen carrier gas at 400 Torr reactor pressure described in Table 1. For the NSSP MQWs, practically the identical development procedures had been carried out except the insertion of HTO as well as ISST for the development of NSSP GaN. The nominal thicknesses of InGaN quantum properly plus GaN barrier are three nm as well as ten nm, respectively, as established by transmission electron microscopy (TEM). Cross sectional TEM image showing NSSP MQWs, reveals the cross sectional TEM picture of the as grown NSSP InGaN MQWs. The 3 quantum wells had been distinctly witnessed and also marked by yellow arrows. From TEM, the crystal orientation of the NSSP MQWs was proven to include 2 distinct semi polar planes. Based on theoretical calculations, IEF in either of these semi polar planes is just approximately fifteen % of which in c plane MQW. Cross sectional TEM image showing NSSP MQWs, reveals the cross sectional TEM picture of the as grown NSSP InGaN MQWs. The 3 quantum wells had been distinctly witnessed and also marked by yellow arrows. From TEM, the crystal orientation of the NSSP MQWs was proven to include 2 distinct semi polar planes. Based on theoretical calculations, IEF in either of these 2 semi polar planes is just approximately fifteen % of which in c plane MQW.

Design and Analyze the Effect of InGaN Nano-Material in Light Emitting Diode towards Improving the Performance of Quantum Efficiency

Table 1: Summary of MQW growth condition

Layer	Growth Temp.	Reactor Pressure (Torr)	TMG Flow ($\mu\text{mol}/\text{min}$)	TMI Flow ($\mu\text{mol}/\text{min}$)	NH ₃ Flow (mmol/min)	V/III Ratio	Growth Rate (nm/Hr)	Thickness (nm)
UI D Ga N	1040	200	125	-	118	942	1270	1970
In Ga N	780	400	3.9	16.1	178	8901	60	3
Ga N Barrier	780	400	14.4	-	178	12427	60	10

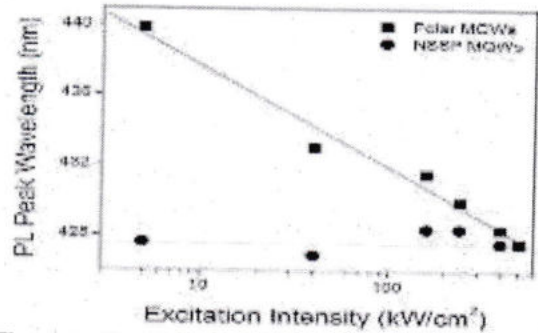


Figure 2: Photoluminescence peak wavelength as a function of excitation intensity. The two straight lines are for guides only

III. PHOTOLUMINESCENCE STUDY OF NSSP INGAN/GAN MQWS

The optical qualities of NSSP MQWs were indicated by excitation and temperature reliant photoluminescence (PL) measurements. By practicing these experiments, the IQE and IEF in an NSSP energetic area are experimentally examined. Most measurements had been carried out in comparison to some polar c plane MQW test. Figure 1 exhibits the comparison of PL intensity for equally samples at room temperature (RT; 300 K). It may be observed the PL intensity of the NSSP MQWs is 3.3 times stronger than that of the polar MQWs.

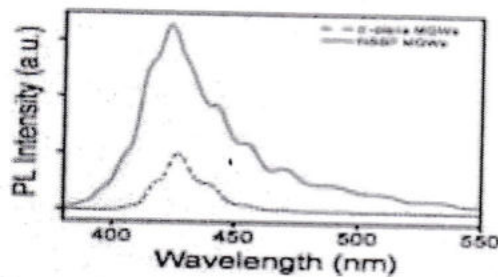


Figure 1: Photoluminescence intensity comparison of NSSP and polar MQWs at room temperature.

The PL peak wavelengths of equally samples had been assessed at different excitation intensities and shown in Figure 2. The peak wavelength of polar MQWs azure shifted when the excitation intensity increased, that had been due to the quantum confined Stark impact (QCSE) brought on by IEF. Stronger excitation raises the polarization charge screening in the quantum effectively and also lessens the IEF in polar MQWs. In comparison, the peak wavelength of NSSP stayed almost a continuous no matter improving excitation intensity, verifying the suppression of

Figure three shows the outcomes of temperature reliant PL measurements. By assuming the IQE is unity at heat that is lower (eleven K), the IQEs of polar MQWs and NSSP could be deduced being twenty four % along with eighteen %, respectively, at five kW/cm² excitation intensity; along with twenty % along with fifteen %, respectively, at 600 kW/cm² excitation intensity discussed in Table 2.

The suppression of the IEF in NSSP lively area advances the IQE by about thirty %. This particular value is anticipated to be further enhanced by thorough optimizations of the development problems.

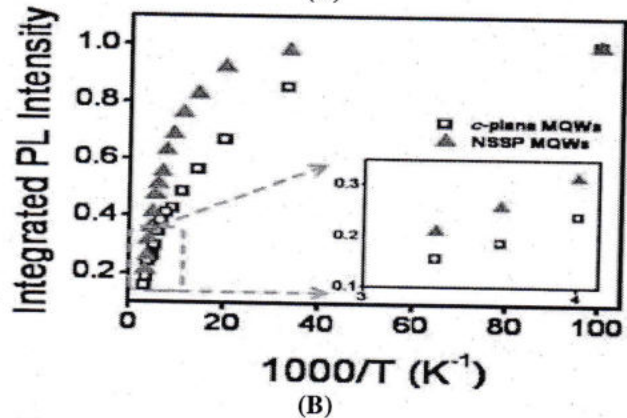
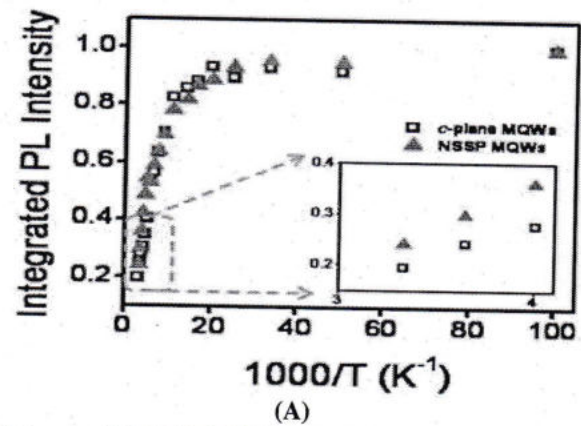


Figure 3: Arrhenius plots obtained from temperature dependent PL for NSSP and polar samples with excitation intensity of (a) 5 kW/cm² and (b) 500 kW/cm².

Table 2: IQE comparison of NSSP MQWs and polar MQWs

Excitation Intensity (kW/cm ²)	IQE of NSSP MQWs (%)	IQE of c-plane MQWs (%)	IQE Improvement of NSSP MQWs compared to c-plane MQWs (%)
5	25	19	31.6
500	21	16	31.3

Excitation Intensity (kW/cm ²)	IQE of NSSP MQWs (%)	IQE of c-plane MQWs (%)	IQE Improvement of NSSP MQWs compared to c-plane MQWs (%)
5	25	19	31.6
500	21	16	31.3

IV. TIME-RESOLVED PHOTOLUMINESCENCE STUDY OF NSSP INGAN/GAN MQWS

To additional characterize the optical qualities of an NSSP energetic region, the NSSP MQWs plus c plane polar MQWs have been examined by time resolved photoluminescence (TR PL) working with a triple frequency result associated with a mode locked titanium sapphire laser. The excitation wavelength was focused during 256 nm which has a 130 fs heartbeat wideness as well as a repetition rate of seventy five MHz. The typical laser intensity in the sample top was believed to remain one kW/cm². The mono chrometer grating was tuned towards the good emission wavelength of each test.

To extract non-radiative and radiative lifetimes, the following formulas were used:

$$\eta_{Int} = \frac{1}{1 + \tau_r / \tau_{nr}}$$

$$\frac{1}{\tau_{PL}} = \frac{1}{\tau_r} + \frac{1}{\tau_{nr}}$$

Where τ_{PL} , τ_r , and τ_{nr} are PL, radiative, along with non radiative lifetimes, respectively; η_{Int} is IQE, that had been from the heat reliant PL measurement together with the assumption that η_{Int} was hundred % at temperature that is lower (twelve K). The outcomes are summarized with Table three. It may be perceived that, though the radiative lifetime was diminished significantly in the NSSP test because of the lack of QCSE, the non radiative lifetime had also been decreased. This explains why just a thirty % improvement in IQE was noticed in the NSSP test while a consideration of three changes in IQE was formerly assessed in semi polar InGaN/GaN MQWs developed on a micro scale pyramidal GaN surface area using SAE. The bodily mechanism of the reduced non radiative lifetime remains under investigation. Nevertheless, it could be partially due to the model of gallium vacancies while in the ISST operation. As the gallium vacancies weren't in the InGaN energetic region, it's thought the non radiative recombination is further minimized by optimizing the HTO problems after the ISST progression and consequently annealing the defects.

Table 3: Summary of TR PL results

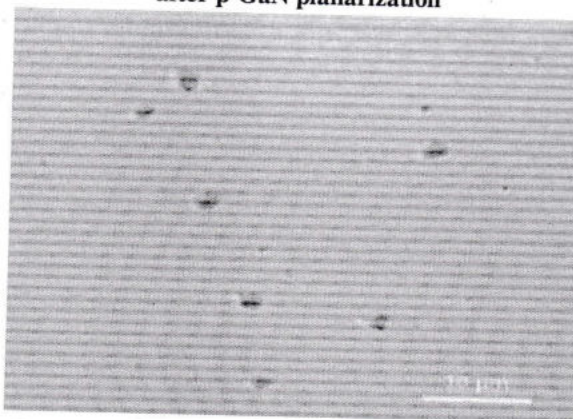
	NSSP MQWs	c-plane MQWs
η_{Int}	26 %	20 %
τ_{PL}	0.17 ns	2.95 ns
τ_r	0.74 ns	16.26 ns
τ_{nr}	0.31 ns	3.62 ns

V. NSSP INGAN/GAN LEDs

1. Planarization

An electrically injected InGaN LED structure based on NSSP GaN template will be examined. After the MQW growth, a 230 nm of Mg-doped p-type GaN epilayer was deposited at 1000°C. The p-type dopants were activated by a thermal activation process at 780 °C under N₂ ambient for 10 minutes. The measured doping concentrations of the n-GaN and the p-GaN layers were $4 \times 10^{18}/\text{cm}^3$ and $8.1 \times 10^{17}/\text{cm}^3$, respectively. The growth conditions used for all layers were very similar to those used in a planar LED except for the addition of ISST and HTO processes. The entire epitaxial sequence was performed in one shot starting from a two-inch c-plane sapphire substrate. No electron blocking layer was included to allow us to focus the studies on the optical and electrical properties of the nano-structured active region. As shown in Figure 4, the as-grown LED surface has been mostly planarized except for a low density of micro-scale pits ($3.3 \times 10^5 / \text{cm}^2$). These micro-scale pits are attributed to the threading dislocations reaching the surface although many of them disappeared during the p-GaN growth. Further optimizations of the p-GaN thickness and growth conditions are believed to be able to improve the surface morphology.

Figure 4: SEM image to show the surface morphology after p-GaN planarization



2. LED Fabrication

The mesa area was 350 μm by 350 μm and was identified by typical photolithography and also reactive ion etching (RIE; LAM 9400). A slim metallic film that comprise of five nm of Ni plus five nm of Au was deposited across the whole mesa like a transparent electrode. After the p ohmic contact development, the sample was annealed at 450 °C for ten minutes under N₂ environment through a fast thermal annealing (RTA);

Design and Analyze the Effect of InGaN Nano-Material in Light Emitting Diode towards Improving the Performance of Quantum Efficiency

JetFirst 150 RTP). 370 nm of Au and 380 nm of Ti/Au had been deposited by an e beam evaporator as p type and n type ohmic contacts, respectively. The specifics on the LED fabrication process are revealed in the Appendix A.

VI. ELECTRICAL AND OPTICAL MEASUREMENTS

The fabricated LEDs have been indicated by regular electroluminescence (EL) measurements at room temperature with no intentional cooling. The EL spectra under a variety of continuous wave (CW) current injection are shown in Figure 5. The inset shows the charge coupled device (CCD) picture of the unit under current injection. Uniform light emission across the mesa was observed. The peak emission wavelength was ~ 543 nm and didn't show some azure shift with escalating current. Rather, as shown in Figure 5, the peak wavelength showed minimal white shift (< two nm over the measurement range) possibly because of Joule heating. The full-width-half-maximum (FWHM) EL line width increased a little with escalating injection and also was much like that of semi polar green and yellow LEDs grown on semi polar bulk GaN substrates.

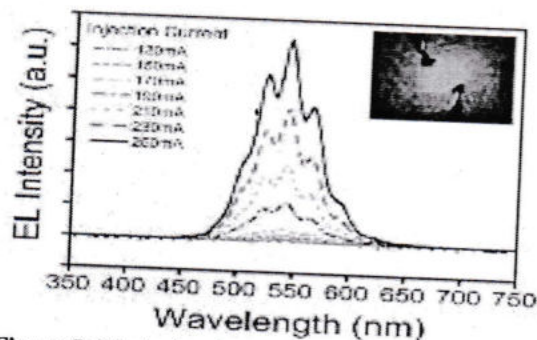


Figure 5: Electroluminescence spectra of NSSP LED for different injection currents

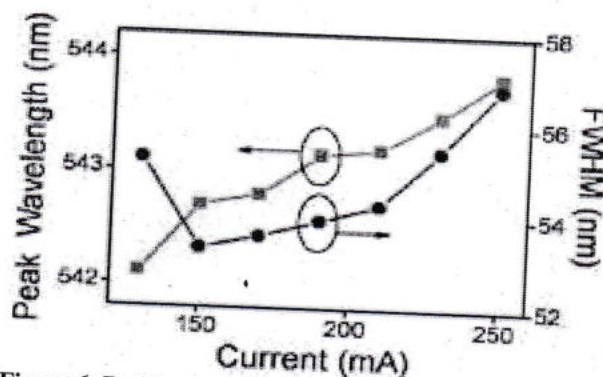


Figure 6: Peak wavelength and FWHM line width of EL spectra in NSSP LED

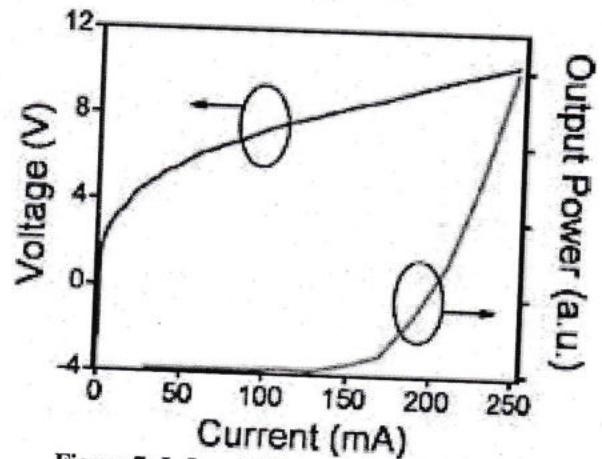


Figure 7: L-I and I-V curves of NSSP LED.

The L I as well as I V qualities of NSSP LEDs are shown in Figure 7. The turn on voltage was 4.2 V at twenty mA, which higher running voltage is due to the un optimized problems of the NSSP template and also the p GaN present spreading layer. These micro scale pits observed on the surface area of LED (Figure 7) may also degrade the electrical properties probably because of increased contact resistance. By optimizing the p GaN level thickness as well as planarization circumstances, the development of micro scale pit is minimized and consequently the power attributes of the LED are likely to be enhanced.

VII. CONCLUSION

In this particular research, the attributes of the NSSP mild emitters were examined. Established areas have been grown on NSSP GaN beginning from a c plane sapphire substrate. From RT PL, thirty one % enhancement in IQE was noticed in NSSP MQWs as compared to c plane planar MQWs. An additional enhancement of the IQE may be possible as indicated by TRPL dimensions. We feel an optimization of HTO and ISST conditions can substantially increase non-radiative lifetime. Nano-structured semi polar LEDs have been fabricated utilizing a standard top-light-emitting framework and measured by using typical characterizations, like EL, IV, and LI. To the greatest awareness of ours, that was the very first semi polar eco-friendly LEDs raised on affordable c plane sapphire substrates. The measured EL spectra showed negligible QCSE with a peak wavelength roughly 543 nm. The EL line width was much like which of semi polar LEDs fabricated on semi polar bulk GaN substrates.

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Using InGaN/GaN Multiple Quantum well Green light-Emitting Diodes as a Promising Replacement of Conventional light Sources

Shyam Sunder Manaktala, K.M.Singh

Abstract- In this particular paper we increase a graded indium composition p type InGaN (p InGaN) conduction level to supplant the p type AlGaIn electron blocking level & a p GaN level to update the mild yield intensity of a GaN based green light transmitting diode (LED). The indium structure of the p InGaN coating reduced from 10.4 % to zero % across the development heading. A tale configuration is proposed for n-electrode with openings to be connected in Thin-GaN light-transmitting diodes (LEDs). The impact of the n-electrode with gaps on the thermal and electrical qualities of a Thin-GaN LED chip is researched utilizing a three-dimensional numerical simulation The IQE of green LED is restricted by the deformities and the internal electric field in MQW. Thusly, we talk about the ongoing advancement in improving the IQE of green LED in detail. These techniques can be partitioned into two classes. A portion of these techniques were proposed to upgrade precious stone nature of InGaN/GaN MQW with high. In composition and low thickness of deformities by adjusting the development conditions. Different strategies concentrated on expanding electron-hole wave function cover by dispending with the polarization impact.

Index Terms: electron, layer, electrodes, hole, density temperature, etc.

I. INTRODUCTION

GaN-based light emitting diodes (LEDs) have yanked for substantial concern and also have been considered a promising replacement for traditional gentle options with probably the most current few years [1]. The effectiveness of pink LEDs is high, along with pink LEDs were commercially employed in several fields, for instance, burning, show, light correspondence, backdrop illumination [2-3], etc. Nevertheless, the inner quantum effectiveness (IQE) of GaN based eco-friendly LEDs remains less than that of pink LEDs, which is referred to as the "Green Gap" [4]. It hinders the greenish LED to be attached with Red-Green-Blue (RGB) burning, apparent light communication, along with full shading displays. A considerable polarization area and bad crystal quality [5] would be the concept explanations behind the lower IQE of natural LEDs with an impressive indium composition. Honestly, the very poor hole injection likewise assumes a crucial job in the

poor quantum effectiveness of GaN based LEDs. Numerous analysts have suggested methods that are several to manage this problem determined by band engineering on the electron obstructing level (EBL). Kim et al. used a functioning layer accommodating power grid coordinated InAlN EBL to enhance the quantum efficiency of natural LEDs [6]. A graded superlattice AlGaIn/GaN embeddings level was suggested by J. Kang et al. to increase the effectiveness of hole injection as well as execution of natural LEDs [7]. An InAlGaIn/GaN superlattice, an AlGaIn/InGaIn superlattice, along with a composition graded AlGaIn EBL had been the same used to lower the possible screen of holes without hurting the electron constraintment. An as of late proposed technique to enhance the attributes of p type GaN is polarization doping [8]. It uses the inner polarization of the buildings as well as material composition evaluating to encourage absolutely free electrons or maybe holes [9]. At any rate, the improvement temperature of AlGaIn is in each and every case very high in order to enhance the crystal quality. The higher indium foods InGaIn/GaN different quantum effectively (MQW) of natural LEDs will be damaged amid the high temperature procedure [10]. Right now there aren't a lot of accounts about the p type coating building meant to boost the gap injection of GaN primarily based LEDs.

II. MECHANISMS OF LOW IQE FOR A (GaN) BASED GREEN LED

The InGaIn wells' indium structure demands a top indium structure to complete a great deal of wavelength eco-friendly LED. The typically low quantum effectiveness of InGaIn/GaN eco-friendly MQW with the higher indium structure could be ascribed to a number of factors. In the very first place, it is difficult to develop excellent InGaIn/GaN MQWs with an impressive indium composition. The stress brought approximately by cross section crisscross among InGaIn wells as well as GaN barriers might increment together with the raise of indium structure in the QWs. Indium grouping incited by a rebel strain is observed when the well thickness is littler than the basic thickness [11]. Be that as it may, if the well is thicker than the basic thickness, the maverick strain may cause the rebel strain-induced deformities, for example, point surrenders [12], debasements [13], V-defects [14].

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Using InGaN/GaN Multiple Quantum well Green light-Emitting Diodes as a Promising Replacement of Conventional light Sources

These high-density strain-induced imperfections may go about as nonradiative recombination focuses within the InGaN/GaN MQWs and, so decline the IQE of environmentally friendly LED.

Furthermore, the development of indium composition also prompts the material inhomogeneity of the InGaN effectively layers due to the very poor miscibility among GaN as well as InN. Phase segregation causes challenges in accomplishing homogeneous InGaN amalgams, and even a debasement of the InGaN/GaN MQW dynamic locale [15]. Additionally, there's an internal electrical area of InGaN/GaN different quantum wells of LED created about the c-plane sapphire. The electrostatic area prompts the spatial separating of electron/hole wave works and consequently cuts down on the radiative recombination fees [16]. Since the piezoelectric polarization relies upon strain, the reduction in recombination rate is bigger for longer emission wavele gths' green LED.

III. APPROACHES TO ENHANCE THE EFFICIENCY OF GREEN LED

Numerous endeavors have been extended to defeat the difficulties referenced previously. As of late, a few approaches have been reported to adequately improve IQE of InGaN/GaN MQW green LED. These methodologies can be separated into two classifications. The main sort of strategies is centered around enhancement of radiative recombination by improving crystal quality of MQW. These strategies smothered the indium segregation and reduce the thickness of imperfection by streamlining the development state of MQW and utilizing some new structure. Another sort of methods in- wrinkled the recombination rate by raising the cover of wave function of holes and electrons, including polarization restraining and vitality band engineering plan.

IV. IMPROVEMENT OF CRYSTAL QUALITY

Ordinarily, the perfect advancement temperature of InGaN properly layers is substantially less than that of GaN barrier levels due to lower miscibility of InN found GaN [seventeen]. The traditional strategy is developing the entire MQW compelling district in a con' stant minimal temperature since it's difficult to modify the improvement temperature precisely and quickly. Thus, the crystal quality of GaN obstacles created at temperature that is low is very bad to have excellent optoelectronic qualities, and that is steadily significant in eco-friendly LED with good indium factor. S.J. Chan et al. enhanced the crystal quality as well as mild yield severeness of InGaN/GaN MQW greenish LED by raising a GaN barrier at temperature that is higher [18].

Amid the development of InGaN/GaN MQW, they initially inclined down the temperature and held up till it balanced out to grow an InGaN well layer. From that point onward, temperature was increase to a higher esteem and held up till it balanced out to grow a GaN barrier layer. The detail of the temperature sloping procedure is appeared in Fig. 1(a). Figure 1(b) demonstrates the light yield control as a function of injection current. The 20-mA yield intensity of nitride-based green LEDs with high temperature GaN barriers expanded by 65% compared to that of the conventional InGaN/GaN green LEDs.

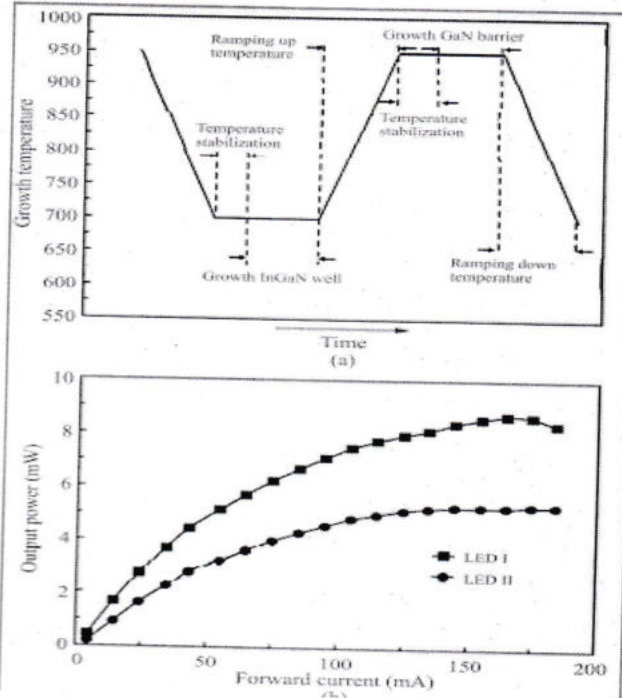


Figure 1: (a) Time sequence of the temperature ramping process during the growth of InGaN/GaN MQW active region. (b) Output power of LED I (with a temperature ramping MQW) and LED II (with a constant MQW).

Be that as it might, the high temperature advancement GaN barrier might possibly damage the InGaN effectively layer. Amid the temperature inclining as well as screen development process, the nicely experiences a greater temperature which prompts indium re-evaporation and segregation at the interface of QWs. This thermal debasement of MQW reduces the radiative recombination rate. Jin-Woo Ju et al. utilized a slight GaN, just as a protection layer to avoid thermal damage to the delicate well [19]. After the development of an InGaN well, a 1 nm-thick GaN well-protection-layer was along these lines covered at a similar temperature.

Michael Moseley's evaluation uncovered which indium area segregation was much more connected with the quantity of inside dium adsorbed on the counter, rather compared to improvement in the Inrich plan as a rule [20]. He proposed a method for managing indium area segregation by safeguarding Group III metal movements at a fixed harmony through metalmodulated epitaxy (MME). The rare turning off of the metallic emission cells requires into bank account complete utilization of overabundance metallic on the counter, retaining beads from continuing throughout the advancement.

HungCheng Lin et al. demonstrated the upsides of using indium therapy in the improvement of InGaN/GaN MQW [twenty one]. The indium therapy is usually to place in an extra progression where only NH₃ and TMIn got the opportunity to stream directly into the reactor at each

InGaNtoGaN interface amid the improvement of MQW. Subsequently, there's a sleek screen as well as minimal Vshape imperfection density in InGaN/GaN MQW, as appeared in Figure 2(a) as well as 2(b). Figure 2(c) shows the production energy of LED with as well as with no indium remedy. The light production energy of the TMIn addressed LED increments by forty three % in contrast to which of untreated LED.

Yufeng Li et al. discovered that the GaN epilayer created on the created sapphire substrate demonstrated a forty four % reduced threading dislocation density than which created on planar substrate [22]. A GaNbased earth-friendly LED created on s created cplane sapphire thus possessed a multiplying of the inner quantum efficiency.

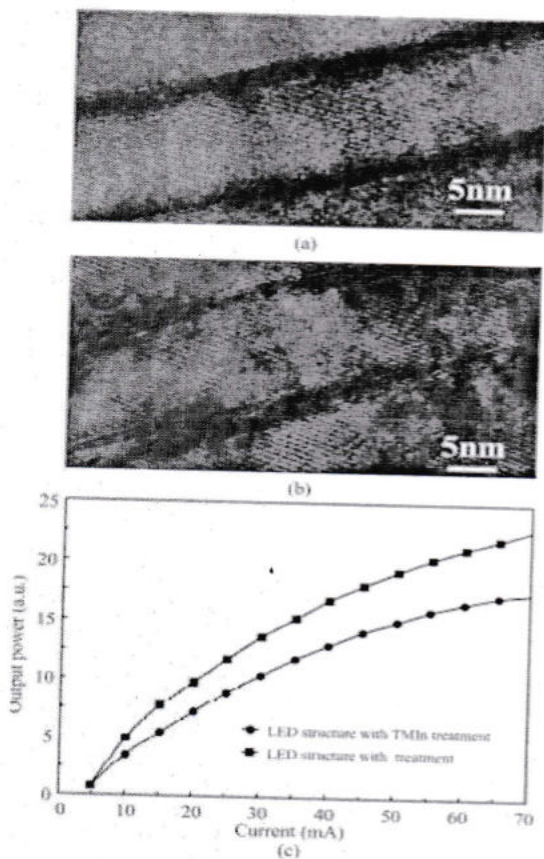


Figure 2: HRTEM images of the LEDs grown with (a) and without (b) indium treatment, and (c) light output-current characteristics.

Y. Yang et al. enhanced the crystallization quality as well as optoelectronic qualities of InGaN/GaN MQW of environmentally friendly LED by improving the components on freestanding GaN substrates [23]. The density of micro structural abandons within the LED on GaN was generously decreased. Appropriately, the IQE of environmentally friendly LED on GaN was seventy one % above relative LED created on sapphire. The improvement american states on the MQW presume serious task within the crystallization qualities as well as gentle qualities of eco-friendly LED. In the meantime, the high'temperature post'growth on the p'GaN gap transportation level can make winter harm the InGaN/GaN MQW as well as reduces the emission advantages on the InGaN/GaN MQWs LED. The ther' mal

harm on the InGaN/GaN MQW, that is as a result of higher advancement heat of p'GaN, is ascribed towards the indium dissemination into GaN screen levels coming from InGaN properly levels [24]. It is promising to bring down the improvement heat of a p'GaN level for more effective optical as well as fundamental qualities of InGaN/GaN MQW [25]. The caliber of InGaN/GaN MQW eco-friendly LED might similarly be enhanced by "active'region'friendly" p'InGaN levels created at heat that is lower .

V. WAVE FUNCTIONS OVERLAP IMPROVEMENT OF ELECTRONS AND HOLES

Polarization electric-powered field legitimately will cause the wave performs division of holes as well as electrons. The non polar as well as semi polar InGaN/GaN MQW might productively lessen the electrostatic area intensity as well as increment the quantum effectiveness of InGaN QW [26]. The rplane sapphire as well as aplane SiC have been used for the nonpolar aoriented nonpalor GaN advancement. Subsequently, aplane GaN platforms as well as mplane InGaN flicks on mplane 6HSiC had been accounted for [27]. Semipolar InGaN/GaN eco-friendly LEDs had been also constructed on the mplane sapphire. Taeil Jung et al. found a semipolar eco-friendly InGaN/GaN MQW developed on great ease cplane sapphire substrates and achieved thirty % increased inner quantum effectiveness when compared to a standard cplane MQW [28]. Additionally, bulkGaN substrates with very subjective introductions are attractive to develop a nonpolar as well as semipolar green LED, for instance, launch GaN semipolar GaN, and also aplane GaN [29]. In the study of TingWei Yeh et al, even GaN nanorod arrays have been created vertically by specific area advancement on cplane substrates. These nanorods exhibited 6 non polar 11? zero facets, that filled in as growth surfaces for semipoalr InGaN/GaN MQW [30], as came out in Figure 4(a) as well as 4(b). The nonappearance of polar airplane introduction prompts elimination or crucial decrease of polarization impacts.

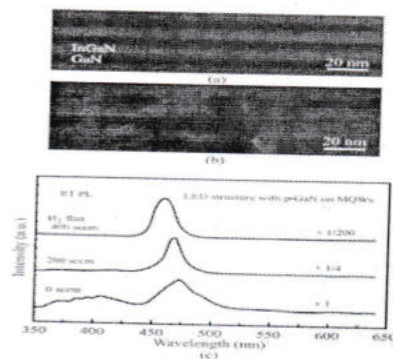


Figure 3. Cross sectional images of InGaN (6 nm)/GaN (8 nm) MQWs grown (a) with 400 sccm H2 and (b) without H2 during the interruption time of 0.5 min., (c) the effect of H2 introduction on the RT PL of a blue LED structure. The H2 was introduced during the interruption time of 0.5 min.

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Assuaged QCSE was consequently achieved with a longer coverage of electronhole trend operates for MQW. Thusly, the chance of dipole alter within the semipolar as well as nonpolar QWs was improved for more and more effective radiative recombination [31]. Stress is straight within control of piezoelectric polarization. Decrease of stress is able to eliminate the piezoelectric area as well as enhance the covering of electronhole trend feature. There are several novel strategies suggested as of late to ease upwards the stress

A particular method that is powerful to lessen stress is a straincompensated advancement process that intends to cultivate MQW and have a novel framework to ease upwards stress. D.M. Van Den Broeck et al. disclosed the advancement of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ "strainbalanced" many quantum wells (SBMQWs) produced on heavy $\text{In}_y\text{Ga}_y\text{N}$ platforms for $x > y$ [32]. The SBMQW is a cross part synchronised on the heavy $\text{In}_y\text{Ga}_y\text{N}$ structure. Within the SBMQWs, thicknesses & compositions are selected with the aim which the compressive worry within the wells is modified through the flexible stress within the obstacles.

R. Arvind Pawan et al. planned a novel highlow indium make up and then prestrained the InGaN/GaN MQW system of environmentally friendly LED [33]. With this MQW the original 4 QWs possess a reduced indium aspect contained $\text{In}_x\text{Ga}_{1-x}\text{N}$ to mini mize cross part stress and also achieve much better present density. Be that here as it might, the 5th level has a greater indium part to obtain emission within the eco-friendly location of the entire spectrum. Such a scheme using an amount contained indium make up within the QWs impressively cuts down on the stresses to come down with powerful outcomes and place within the enhancement of outstanding severeness as well as radiative recombination fee.

Hongping Zhao et al. found a straincompen sated InGaN/AlGaIn QW system making use of fragile tensile strained AlGaIn obstacles to cover the compressively emphasized InGaIn QWs.[34]. Additionally, Seoung Hwa n Park et al. detailed a straincompensated InGaIn/InGaIn QW which has a tensilestrained InGaIn screen [35].

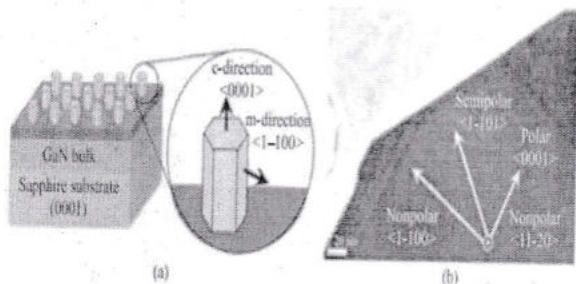


Figure 4: (a) Schematic diagram of a GaN nanorod array, (b) InGaIn/GaN MQWs are grown on three different planes as indicated in the arrows (reprinted from Ref. 36).

The radiative efficiency of a strain-compensated QW structure is appeared to be a lot bigger than that of a conventional QW structure. This is ascribed to the reduction of internal field in the strain-compensated QW structure

VI. CONCLUSION

Overall, we've examined the device restricted the inner quantum effectiveness of InGaIn/GaN MQW greenish LED and late techniques In order to improve the IQE. To accomplish greener emission, loaded with composition in InGaIn QW is needed. So, a sizable cross section jumble among InGaIn wells as well as GaIn barriers occurs as the In composition in wrinkles. This effect leads straininduced abandons and sound polarization field. The flaws go approximately as nonradiative recombinative concentrates & polarization isolates the electronhole trend feature. Subsequently, the radiative recombination effectiveness of InGaIn/GaN MQW eco-friendly LED is less than that of green LED that is categorized "green gap". This way, we've place accentuation on the continuing endeavors made to improve effectiveness of natural LED. A portion of these techniques were pro presented to build good quality InGaIn/GaN MQW with higher. In composition and decreased density of imperfections by altering the development conditions. Some other techniques concentrated on wiping away the polarization effect in MQW by nonpolar and semipolar LED or maybe novel MQW structures.

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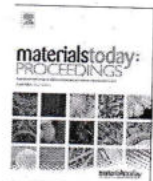
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Development and characterization of ZnO thin film for piezoelectric applications

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ABSTRACT

This paper reports a structural study of the ZnO thin film deposited on *p*-type silicon substrate using radio frequency (RF) sputtering technique. The structural study of the deposited ZnO thin film is done. The X-ray diffraction (XRD) spectra shows a strong peak of (0 0 2) orientation which ensures high quality of piezoelectric film. The roughness of the ZnO film is measured and found to be 1.85 nm which attributed to lower acoustic loss during wave propagation. These sputtering parameters can be used to deposit good quality ZnO thin film which can be utilized as piezoelectric layer in acoustic sensors, pressure sensors and many other optoelectronics devices.

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1. Introduction

Piezoelectric effect is defined as it is the ability of some materials to generate an electric charge when mechanical pressure is applied and vice versa. Piezoelectric sensors and actuators based on Micro Electro-Mechanical System (MEMS) have wide application areas such as pressure sensors [1], acoustic sensors [2,3], humidity and mass sensors [4], bio and gas sensing application [5] and so on. These piezoelectric devices have two main advantages. (i) it does not require any input power and (ii) it shows a wide dynamic range which is essential for high pressure level measurement in harsh environment. aluminium nitride (AlN), lead zirconate titanate (PZT), Zinc oxide (ZnO), organic polymer polyvinylidene fluoride or polyvinylidene difluoride (PVDF) and its co-polymer PVDF-TrFF exhibit piezoelectric nature. The organic polymer PVDF based devices renders excellent features like fast dynamic response, flexibility and workability but it has incompatibility with standard CMOS microfabrication process. PZT material has high piezoelectric coefficient d_{31} (27-274 pC/N) [6] which is higher as compared to ZnO and AlN but

PZT based devices show low sensing response due to its higher dielectric constant. Therefore, only AlN and ZnO are very attractive piezoelectric materials which show good compatibility with standard CMOS fabrication process.

In recent years, ZnO has tremendous demand due to its unique properties like high excitation binding energy, large bandgap which ensures its applicability in optoelectronics devices such as humidity and temperature sensors, solar cell, photodetector, etc. Its higher piezoelectric coefficients value fulfills the demand of piezoelectric based devices like pressure and acoustic sensors for pressure measurement in launching vehicles and aircraft. However, the deposition of desired *c*-axis oriented (0 0 2) thin film is a major challenge for researchers and industrialist. ZnO thin film can be grown using Radio frequency (RF) sputtering, sol-gel, chemical vapor deposition, pulsed laser deposition etc. Among these deposition techniques, RF sputtered thin film has high quality in-term of roughness, highly *c*-axis orientation and good adhesion. The quality of film depends upon sputtering parameters like RF power, deposition process pressure, flow rate, deposition temperature, distance between substrate

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Paper published in UGC listed journal/any journal having ISSN No.

S.no	Faculty Name	Paper Title	Date of Publication	Journal Name	ISSN/ ISBN	Volume /Issue	Open Access (Y/N)	Peer Reviewed (Y/N)
1	Dr M P Singh	Barriers analysis for sustainable manufacturing implementation in Indian manufacturing industries using interpretive structural modelling	May-June,2019	International Journal of Advanced Research in Engineering and Technology	0976-6480	Volume-10 /Issue-3		
2	Dr M P Singh	Case study on quality control tools for bearing industries	May,2019	International Journal of Scientific & Engineering Research	2229-5518	Volume-10 /Issue-5		
3	Dr Fauzia Siddiqui	Chargers(EVSE) and their stations with business model for India	May,2019	International Journal of Scientific & Engineering Research	2229-5518	Volume-10 /Issue-5		
4	Dr Fauzia Siddiqui	Identification of microvariables for supply management practices in context of flexible system in indian gas industry	May,2019	International Journal of Scientific & Engineering Research	2229-5518	Volume-10 /Issue-5		
5	Dr Fauzia Siddiqui	Industry 4.0in manufacturing sector:A review	May,2019	International Journal of Scientific & Engineering Research	2229-5518	Volume-10 /Issue-5		
6	Dr Fauzia Siddiqui	Optimal selection of parameters in CNC end milling of Al 7075 T6 alloy by TBLO	2019	International Journal of Engineering Sciences	0976-6693			
7	Dr Fauzia Siddiqui	Roadmap for future :Vision 2030 and its impact on Saudi	May,2019	International Journal of Scientific &	2229-5518	Volume-10 /Issue-5		

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24	Dr. S. K. Singh	Smart Helmet (IoT based)	May-19	IJSER	22295518	Vol. 10 / Issue 5	Y	Y
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27	Teekam Singh	ROAD ACCIDENT ANALYSIS IN RAJASTHAN	3 March 2020	IJCRT	23202882	8-3	Y	Y
28	Ashish Boraida	CASE STUDY ON CATCHMENT AREA OF CHINAV RIVER (KISHTWAR,J&K)	6 June 2020	IJCRT	23202882	8 / 6	y	Y
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30	Sumit Saini	CASE STUDY ON CATCHMENT AREA OF CHINAV RIVER	06-06-2020	IJCRT	23202882		Y	Y

		(KISHTWAR,J&K)						
31	yogesh kumar agarwal	previous concrete	06-06-2020	IJCRT	23202 882	8-3	Y	Y
32	Jitesh Kumar Jain	SOIL STABILISATION USING HUMAN HAIR FIBER	05 March 2020	IJCRT	23202 882	8-3	Y	Y
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35	Nida Khanam	1)Solar Tree: A Source of Energy 2) USE OF STEEL SLAG IN FLEXIBLE PAVEMENT	March 2020	IJCRT	23202 882	8-3	Y	Y
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41	Dr. Rekha Mithal	GCMS analysis and assessment of antimicrobial potential of Rhizospheric actinomycetes of AIA3 isolates, Indian J Traditional Knowledge	Jan-20	Indian J Traditional Knowledge	ISSN: 0975-1068	Vol. 19(1)	Y	Y
42	Ms. Rekha Vijay	Isolation and Structural Characterization of Alkali and Alkaline Earth Metal Salts with Synthetic Non Cyclic Ionophores	Jan-20	Journal of Sciences Islamic Republic of Iran	JSciences-20190 8-10073 88(R5)	Vol. 31	Y	Y
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45	Sonia khubchanda ni	Challenges of teaching and learning of english in 21 century	Dec6,2019	Journal of social sciences	2456-6756		Y	Y
46	Sonia khubchanda ni	A Review Based Study in english teaching learning at gradute level.	14-Jun-19	IJRAR	2348-1269	Volume 6 issue 2	Y	Y
47	Sonia khubchanda ni	Experiential validation of ELT in various countries	6,june 2019	IJELLH Sciences	2321-7065	Volume 7 issue 6	Y	Y
48	Saroj Parihar	Angst and Despair in the plays of Eugene O'Neill.	30 April, 2019	IJELLH	ISSN: 2582-3574	Vol. 7, Issue 4	Y	Y
49	Rashmi Kaushik	Errors and English Language Teaching	20-Jan	International Journal of Research Culture Society	2456-6683	VOL 4, ISSUE 1	Y	Y

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QIV

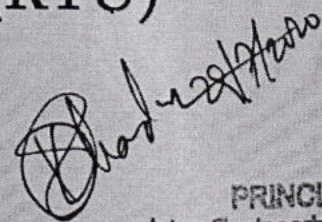
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Smart Helmet (IoT Based)

Ayushi Khandelwal, Himani Jain, Bhavya Jain, Arpit Khandelwal, Harsh Vijay, Akshay Kumar, Santosh Kumar Singh

Abstract— This paper gives description of a smart helmet which is based on IOT system to avoid accidents during vehicle riding results due to recklessness of riders towards helmet as it won't allow the vehicle to start until the riders wears the helmet. It consist of two modules one for the bike and other for the helmet. The bike module will act as a server and the helmet module will act as a client and the modules will act as an aggregated system when proper connectivity is established between the server and client module. As soon as the wi-fi connection is interrupted the bike will stop passing current to the ignition coil and hence stop it's functioning.

Index Terms— Smart helmet, IoT, server-client, Wi-fi, NodeMCU , Secure.

1 INTRODUCTION

IoT is a network of inter related devices sharing information and data, this ability to share information makes a device smart, thus smart device is nothing but a device working over IOT with other devices. Smart helmet works basically on the IOT platform with server-client connectivity[1]. The NodeMCU in the bike module will act as a server which will set-up the connectivity with the helmet module getting the power source from the ignition in the engine. NodeMCU is an open source IoT platform. It includes firmware and hardware part. firmware works on the ESP8266 Wi-Fi SoC from Espressif Systems and hardware works on ESP-12 module. Lua scripting language is use by this firmware. ESP8266 features are : It is open source , Interactive , Programmable , Low cost , simple ,smart , wi-fi enabled , USB-TTL included device. It works on XTOS operating system having memory 128kBytes and Storage 4M bytes. It is powered by USB. For coding, Arduino IDE used. It has 10 GPIO pins, some ground pins and two types of power voltage 3.3v, 5v (used with 3.3v Regulator which inbuilt on Board using Pin Vin). It also consist a relay which is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. The heart of a relay is an electromagnet (a coil of wire that becomes a temporary magnet when electricity flows through it). Relay is connected to the server and is used to control the motor vehicle functionality to turn on or off the bike as desired, relay is integrated with the ignition coil in the vehicle which supply high voltage current to spark plug and keep running the engine, with the help of relay NodeMCU (SERVER)controls the current supply to the ignition coil and directly control engine functioning . An Organic-LED is also present in bike module connected to bike display panel which will show the current status of the system. O-LED is a Light Emitting diode in which the electroluminescent layer is a film of organic compound (millions of small LED lights) that emits light in response to an electric current. The display connects to NodeMCU (Server) using only four wires - two for power (VCC and GND) and two for data (serial clock SCL and serial data SDA), making the wiring very simple. The data connection is I2C (I²C, IIC or Inter-Integrated Circuit) and this inter-

face is also called TWI (Two Wire Interface)[2]. OLED display is used to current state of the system, when the rider starts the motor vehicle and don't wear helmet OLED display warning "Please wear helmet " and when the rider wears the helmet it is display message " Helmet used".

The Helmet module consist of Node MCU use for handshaking with server (Bike Module) and a Capacitive touch sensor. Capacitive sensor (sometimes capacitance sensor) uses technology based on capacitive coupling, that can detect and measure anything that is conductive or has a dielectric different from air. This principle allows capacitive touch sensor to detect the presence of human head inside a helmet which sends signal over iot to allow displaying of corresponding message on OLED panel and allowing rider to start the bike for a ride.

2 PROBLEM FORMULATION

Every year around numerous people get badly injured or died due to their recklessness toward helmet and that's the reason Central Govt. along with the state legislatures is taking several steps for the compulsion of helmet during the ride. In India , per year around 39,975 deaths occur due to not wearing helmet and around 36,678 seriously injured. Keeping this initiative in mind this smart helmet is developed which won't allow the rider to access the bike until it wears the helmet [3].

3 PROPOSED SOLUTION AND ASSUMPTION

In this section we first discuss the background of IoT and then implementation of proposed solution model of Smart Helmet.

3.1 Background of IoT

IoT is a network of inter related devices sharing information and data , this ability to share information makes a device smart , thus smart device is nothing but a device working over IoT with other devices. The Internet of Things consists of any device operate through the Internet. This includes almost anything you can think of, ranging from cellphones to building maintenance to the jet engine of an airplane. Medical devices, such as a heart monitor implant or a biochip tran-

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Optoelectronic devices-application of Nanotechnology-a review

S. S. Manaktala, K. M. Singh

Abstract— This paper is a review of fundamental principle of optoelectronics and its applications , nanotechnology and its growth are highlighted. Various properties of Nanomaterial for development of optoelectronics have been studied. Nanomaterial fabrication techniques are studied also the effect of nanomaterial alloys on improvement of quantum efficiency is studied. Limitations of nanotechnology for optoelectronics devices as well future optoelectronic is also discussed in the paper.

Index Terms—Nanomaterial, Quantization, Semiconductor, Optoelectronics, Quantum Efficiency

1 INTRODUCTION

In recent year with the invent of molecular beam epitaxy, metal organic chemical vapor deposition and other experimental techniques, low dimensional structures having quantum confinement in one two and three dimensions have revealed new phenomenon in the nanoscience and technology. The classical laws of physics and chemistry do not readily apply at this very small scale for two reasons. Firstly, the electronic properties of very small particles can be very different from their larger cousins. Secondly, the ratio of surface area to volume becomes much higher, and since the surface atoms are generally most reactive, the properties of a material change in unexpected ways. For example, when silver is turned into very small particles, it takes on anti-microbial properties while gold particles become any color you choose. Photonic semiconductor devices like LED, Laser Diode, Photodiode, Solar Cell are used for various applications in electronics and communication industry. Nanostructure science and technology is a wide area of research which involves various disciplines of science and technology. It has greatly contributed to the worldwide growth over the years.

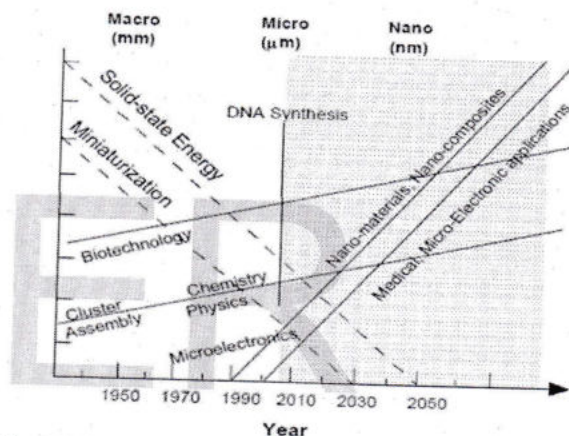


Fig 1:Evolution of science and techology and future[1]

Nano scale materials are those objects where the dimensions if measured then at least one dimension is less than nearly 100 nanometers. A nanometer is measured as one millionth of a millimeter -Which is almost 100,000 times thicker than the diameter of a human hair. Nanomaterial generate huge interest for researchers as at Nano size of substances distinguished optical, magnetic, electrical, and other properties are surfaced. These newly highlighted properties have the ability for great impacts in electrical, electronics, medicine, and other fields.



Fig 2:Nanomaterial for Example (Carbonnanotube) [1]

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Novel Vedic Multiplication Technique and its Implementation – A Fast and Simple Method of Convolution

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Urdhva Triyakbhyam a new method of convolution based on Vedic Mathematics has been explained for digital signal processing. It has been shown that the convolution of large sequence can be found out in comparatively short time, by this method. We have demonstrated the capability of the method on eight samples. We had used Tanner tool for simulation and 16nm CMOS technology. A delay 53.21ns and power dissipation is 14.91uW has been found.

1. Introduction: With the latest advancement of VLSI technology the demand for portable and embedded digital signal processing (DSP) systems has increased considerably. Using programmable devices for DSP applications could narrow the gap between the flexibility of general purpose processor (GPP), programmable DSP (PDSP). FPGAs are being increasingly used for variety of computationally intensive applications. In digital signal processing convolution is a fundamental computation that is ubiquitous in many application areas [1].

Convolution is the most important and fundamental concept in signal processing and analysis. Many researchers have been trying to improve performance parameters of convolution system []. One of the factors in performance evaluation of any system is speed. The core computing process in convolution is always a multiplication routine. Faster addition and multiplication are of extreme importance in DSP. Therefore, engineers are constantly looking for boosting performance parameters of it using new algorithms and hardware. After comparative study of different multipliers, Urdhva Tiryagbhyam sutra based on ancient Indian wisdom book – the Vedas, is shown to be an efficient multiplication algorithm [2][3].

2. Background: In Ref.[1],convolution is carried out by serial processing. They used only one 4×4 bit Vedic multiplier based on Urdhva Tiryagbhyam sutra. Though hardware is less, delay is more as sixteen multiplications are carried out one by one using only single multiplier. Direct method for calculating the linear convolution sum of two finite length sequences is easy to learn and perform. The approach is easy to learn because of the similarities to computing the multiplication of two numbers by a pencil and paper calculation. FPGA implementation is future work [2]. In parallel FIR filter algorithm, the preprocessing, post-processing and sub-filter matrices can be calculated easily with Matlab. Then, Matlab can be used to automatically generate Verilog code for the hardware implementation of this algorithm [5]. But in automatically generated code there is no control on architecture level. ROM look up tables can be used to implement the computational modules. Multipliers can be realized using memory based approach. Multiplication of two n bit input variables can be performed by ROM table of size 2 with power 2n entries [7]. But this approach is not efficient in

area point of view.CRT algorithm minimizes multiplication operation at cost of increase in addition operations [8]. Parallel implementation improves speed [9]. The sutras in Vedic mathematics are easy to understand, easy to apply and easy to remember. Vedic maths is helpful to software developers as it is more scientific than the normal system of mathematics [10].

3. Convolution: Discrete time convolution can be defined as

$$y[n] = \sum_{k=-\infty}^{\infty} x[k]h[n - k]$$

Where x[n] is the input and h[n] is the impulse response. Thus the output of the LTI system is given by a weighted sum of time shifted impulse responses. It is known as convolution sum and represented as *.

$$x[n] * h[n] = \sum_{k=-\infty}^{\infty} x[k]h[n - k]$$

For example if

then convolution sum will be calculated as

$$\text{For } x[n] = \{10, 20, 30, 40\} \text{ \& } h[n] = \{2, 3, 5, 6\}$$

Then

Similarly in the case of binary

In above method of linear convolution, it is simply a multiplication process with addition with no carry being propagated. This method utilizes large area of the chip. Also this method is bit slow & slower if we take large no of samples for convolution.

4. Proposed method of convolution:

Vedic mathematics is part of four Vedas (books of wisdom). It is part of Sthapatya-Veda (book on civil engineering and architecture), which is an upa-veda (supplement) of Atharva Veda. It gives explanation of several mathematical terms including arithmetic, geometry (plane, co-ordinate), trigonometry, quadratic equations, factorization and even calculus.

His Holiness Jagadguru Shankaracharya Bharati Krishna Teerthaji Maharaja (1884-1960) comprised all this work together and gave its mathematical explanation while discussing it for various applications.

The work presented here, makes use of Vedic Mathematics. "Urdhva Tiryagbhyam Sutra" or "Vertically and Crosswise

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Paper published in Conference/Proceeding

S. no	Faculty Name	Paper Title	Date of Publication	Conference /Proceeding Name	International /National	ISSN/ ISBN	Open Access (Y/N)	Peer Reviewed (Y/N)
1	Dr M P Singh	Descriptive Analysis through Survey for Sustainable Manufacturing	Oct,2019	International Conference On Advancements in Computing & management, Elseveir	International	Elseveir SSRN		
2	Dr M P Singh	Development of mathematical model and process optimization of deep groove ball bearing	Oct,2019	International Conference On Advancements in Computing & management, Elseveir	International	Elseveir SSRN		
3	Dr M P Singh	Design and simulation of piezoelectric biomorph cantilever beam	Oct,2019	International Conference On Advancements in Computing & management, Elseveir	International			
4	Dr M P Singh	Enhancing the performance of burner – a review	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National	ISBN-978-81-940543-1-3		
5	Dr M P Singh	A comparative study of landmine detection techniques	March, 2020	National Conference on Futuristic Trends In Mechanical Engineering	National	ISBN-978-81-940543-1-3		
6	Dr Fauzia Siddiqui	Enhancement of sliding wear resistance of SiC filled carbon fiber reinforced polymer composites	Sep,2019	CORCON	International			

7	Dr Fauzia Siddiqui	Six sigma implementation in a sand casting industry: a case study	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National	ISBN-978-81-940543-1-3		
8	Dr Fauzia Siddiqui	A review on electric paper shredder machine	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National	ISBN-978-81-940543-1-3		
9	Dr Bhuvnesh Bhardwaj	Enhancement of sliding wear resistance of SiC filled carbon fiber reinforced polymer composites	Sep,2019	CORCON	International			
10	Dr Bhuvnesh Bhardwaj	Process parameter optimization for minimum polymerization shrinkage of resin based material	03 Sep,2019	AIP Conference Proceedings	International			
11	Dr Bhuvnesh Bhardwaj	Effect of reinforcement (B4C & Al2O3) and rotational speed on tribological properties of aluminium alloy 7075 hybrid composites through friction stir processing	03 Sep,2019	AIP Conference Proceedings	International			
12	Dr Bhuvnesh Bhardwaj	Smart wheelchair using android smart phones for physically disabled people	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National	ISBN-978-81-940543-1-3		
13	Dr Bhuvnesh Bhardwaj	Advance composite materials	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National	ISBN-978-81-940543-1-3		
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17	Mr Rajendra kumar gupta	A review paper on 3d-printing aspects and various processes of 3d-printing	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National 1	ISBN-978-81-940543-1-3		
18	Mr Kuldeep sharma	Solar cooling technologies : a review	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National 1	ISBN-978-81-940543-1-3		
19	Mr Kuldeep sharma	Kinematics and compliance of sports utility vehicle	March, 2019	National Conference on Futuristic Trends In Mechanical Engineering	National 1	ISBN-978-81-940543-1-3		
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59	Dr. Vijeta Kumawat	Internet of Things (IoT) Based Smart Environment Integrating Various Business Applications and Recent Research Directions	05-01-2019	IJTSRD-2019	International	2456-6470	y	y
60	B.Umamaheswari	Digital Marketing Yesterday, Today and Tomorrow	21/8/2019	SIEPGBS-2019	International		y	y
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95	Sanjay Gour	A Comparative Study between AWS and Google Anthos	1st may 2020	Contemporary Issues in Computer Technology, NCICT-2020	National	ISBN: 978-81-940543-2-0	y	y
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103	Dr. Sandeep Vyas	Review: Nonlinear Effects in Photonic Crystal Fiber for Bio-Sensing	Feb./2020	4th International Conference on Innovative Advancement in	International		Y	Y

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104	Dr. Sandeep Vyas	Exploration of Agriculture Automation Employing IoT Gateway and Wireless Network	Feb./2020	4th International Conference on Innovative Advancement in Engineering & Technology (IAET-2020)	International		Y	Y
105	Girraj Sharma	Cooperative Spectrum Sensing Over Weibull and Hoyt Fading Channels using Centralized and Distributed Schemes	Feb-20	ICETCE	International		N	Y
106	Dr. Neha Singh	Simulation of five channel demultiplexer using double ring resonator photonic crystal based ADF	Dec-19	ICDSA 2019	International		N	N
107	Jaiverdhan	IOT BASED SMART SECURITY AND HOME AUTOMATION SYSTEM	Mar-20	RACON 2020	National			
108	Rakesh Kadam	SMART SHOES	Mar-20	RACON 2020	National			
109	Yazusha Sharma	A LIBRARY WHERE YOU WILL FIND DOCTORS AND LISTING OF HOSPITALS	Mar-20	RACON 2020	National			
110	Manish Yadav	ENTERPRISE RESOURCE PLANNING	Mar-20	RACON 2020	National			
111	Anil Jain	AUTOMOBILE TRACING AND ACCIDENT DETECTION SYSTEM	Mar-20	RACON 2020	National			
112	Naresh Kumar	A STUDY OF SECURITY MODES AND THREATS IN BLUETOOTH DEVICES	Mar-20	RACON 2020	National			
113	Nishi Atrey	HOSTEL-COMPLAINT-MANAGEMENT-SYSTEM	Mar-20	RACON 2020	National			
114	Dr. Vinita Mathur	IoT BASED SMART PARKING SYSTEM	Mar-20	RACON 2020	National			
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117	Ashish Sharma	BREAST CANCER CLASSIFICATION: A COMPARATIVE STUDY	Mar-20	RACON 2020	National			
118	Deepmala Kulshrestha	SMART HELMET FOR BIKE RIDER SAFETY	Mar-20	RACON 2020	National			
119	Dr. Rajesh Bathija	RFID BASED SMART CART	Mar-20	RACON 2020	National			
120	Dr. Parul Tyagi	ACCIDENT DETECTION AND NAVIGATION USING GPS and GSM	Mar-20	RACON 2020	National			
121	S. S. Manaktala	SELF DRIVING CAR	Mar-20	RACON 2020	National			
122	Teekam Singh	Laboratory Investigation of natural Fiber in Concrete	9 Nov.2019	Recent Advancements in Computational Mathematics and Engineering science	National Conference			
123	Teekam Singh	Study on Smart city pedestrain friendly pathway	17 Feb 2020	Recent Trends in Civil Engineering	National Conference			
124	Teekam Singh		17 Feb 2020	Recent Trends in Civil Engineering	National Conference			
125	Jitesh Kumar Jain	SOIL STABILISATION USING HUMAN HAIR FIBER	05 March 2020	National Conference on "Emerging trends in Civil Engineering for Sustainable Development" Organised By Department of civilengineering JECRC	National Conference			
126	Jitesh Kumar Jain	A REVIEW: USE OF PLASTIC WASTE IN ROADCONSTRUCTION	05 March 2020	National Conference on "Emerging trends in Civil Engineering for Sustainable Development" Organised By Department of	National Conference			

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127	Nida Khanam	1)Solar Tree: A Source of Energy 2) USE OF STEEL SLAG IN FLEXIBLE PAVEMENT	05 March 2020	National Conference on "Emerging trends in Civil Engineering for Sustainable Development" Organised By Department of civilengineering JECRC	National Conference			
128	Shivangni Khandelwal	use of plastic waste in construction of bituminous road	05 March 2020	National Conference on "Emerging trends in Civil Engineering for Sustainable Development" Organised By Department of civilengineering JECRC	National Conference			
129	yogesh kumar agarwal	previous concrete	05 March 2020	National Conference on "Emerging trends in Civil Engineering for Sustainable Development" Organised By Department of civilengineering JECRC	National Conference			
130	Akhil Maheshwari	A STUDY ON PROPERTIES OF CONCRETE MADE USING SILICA FUMES	05 March 2020	National Conference on "Emerging trends in Civil Engineering for Sustainable Development" Organised By Department of civilengineering JECRC	National Conference	23202882	Y	Y
131	Akhil Maheshwari	SOIL STABILISATION USING HUMAN HAIR FIBER	05 March 2020	National Conference on "Emerging trends in Civil Engineering for Sustainable Development" Organised By Department of civilengineering JECRC	National Conference	23202882	Y	Y
132	Dr. Barkha Shrivastava	Host-Guest Chemistry: A Strategy of Sustainability	Sept. 23, 2019	The 14 th India-Japan International Conference BICON-2019	International	ISBN-97893-83462-95-7	N	Y

133	Ms. Rekha Vijay	Host-Guest Chemistry: A Strategy of Sustainability	Sept. 23, 2019	The 14 th India-Japan International Conference BICON-2019	International	ISBN-97893-83462-95-7	N	Y
134	Sonia Khubchandani	Prospects and limitations of approaches in ELT	24-25 jan 2020	Hermeneutics Today:Negotiating Traditional Approaches across Cultures,	International	NA	NA	NA
135	Mr. Naveen Kumar Kedia	2nd International Conference on Communication & Computational Technologies -ICCCT 2019"	30-31 August	2nd International Conference on Communication & Computational Technologies - ICCCT 2019"	International	RIET ,Jaipur ,Rajasthan ,India	Y	
136	Ms. Shikha Shrivastava	33rd National Convention of Computer Engineers and National Conference	15-16 February	33rd National Convention of Computer Engineers and National Conference	National	The Institution of Engineers(India)	Y	

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QIV

Session 2020-21 (RTU)

A STUDY ON ARDUINO BASED SOLAR TRACKING SYSTEM FOR ENERGY IMPROVEMENT OF PV SOLAR PANEL

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Abstract

Solar energy is a clean, easily accessible and abundantly available alternative energy source in nature. Getting solar energy from nature is very beneficial for power generation. Using a fixed Photovoltaic panels extract maximum energy only during 12 noon to 2 PM which results in less energy efficiency. Therefore, the need to improve the energy efficiency of PV solar panel through building a solar tracking system cannot be over-emphasized. Photovoltaic panels must be perpendicular with the sun in order to get maximum energy. The methodology employed in this work includes the implementation of an Arduino based solar tracking system. Light Dependent Resistors (LDRs) are used to sense the intensity of sunlight and hence the PV solar panel is adjusted accordingly to track maximum energy. The mechanism uses servo motor to control the movement of the solar panel. The microcontroller is used to control the servo motor based on signals received from the LDRs. The result of this work has clearly shown that the tracking solar panel produces more energy compared to a fixed panel.

Keywords: - Solar Energy, Arduino, Tracking, Microcontroller

Introduction

Presently, public electricity covers only 40% of homes and this is not still on a consistent basis. Due to lack of constant power supply in Nigeria, people have started embracing the culture of generating their own power supply. The use of fossil fuels as a means of generating electricity has become expensive making cost of living very high, especially in the rural part of the country. Also the use of fossil fuel has brought about pollution to the environment which in turn is not safe for our health. It releases carbon dioxide which causes the greenhouse effect. This brings about the deforestation of land and also the pollution of air and water. Solar energy is gotten solely from the sun and as a result does not emit carbon dioxide which prevents the green-house effect. The development of solar energy has the potential to create jobs. Employment in renewable energy industry would reduce occupational hazards especially when compared to coal mining and the extraction of oil. Nowadays solar energy is becoming one of the most reliable source of energy as a result of its surplus and environmental friendly. According to reference [2] a system that tracks the sun will be able to know the position of the sun in a manner that is not linear. The operation of this system should be controlled independently. Maximum energy is produced by a solar

IoT BASED SMART PARKING SYSTEM

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Abstract

As of late the idea of keen urban areas have picked up grind notoriety. On account of the development of Internet of things brilliant city presently is by all accounts attainable. Steady endeavors are being made in the field of IoT so as to expand the efficiency and unwavering quality of urban foundation. Issues, for example, traffic blockage, restricted vehicle leaving offices and street wellbeing are being tended to by IoT. Right now, present an IoT based cloud coordinated keen stopping framework. The proposed Smart Parking framework comprises of an on location sending of an IoT module that is utilized to screen and signalize the condition of accessibility of each single parking spot. A versatile application is likewise given that permits an end client to check the accessibility of parking spot and book a stopping opening as needs be. The paper likewise depicts an elevated level perspective on the framework design. Towards the end, the paper talks about the working of the framework in type of an utilization case that demonstrates the rightness of the proposed model.

Keywords:- Internet of Things; Cloud Computing; Smart Parking; Smart City; Cloud of Things

INTRODUCTION

The idea of Internet of Things (IoT) began with things with personality specialized gadgets. The gadgets could be followed, controlled or observed utilizing remote PCs associated through Internet. IoT expands the utilization of Internet giving the correspondence, and therefore between system of the gadgets and physical items, or 'Things'. The two conspicuous words in IoT are "web" and "things". Web implies an immense worldwide system of associated servers, PCs, tablets and mobiles utilizing the globally utilized conventions and interfacing frameworks. Web empowers sending, getting, or conveying of data. Thing in English has number of employments and implications. Lexicon significance of 'Thing' is a term used to reference to a physical article, an activity or thought, circumstance or movement, in the event that when we don't wish to be exact. IoT, when all is said in done comprises of between system of the gadgets and physical articles, number of items can assemble the information at remote areas and convey to units overseeing, getting, sorting out and breaking down the information in the procedures and administrations. It gives a dream where things (wearable, watch, morning timer, home gadgets, encompassing articles with) become brilliant and carry on alive through detecting, registering and imparting by inserted little gadgets which cooperate with remote items or people through network. The adaptable and strong nature of Cloud processing is permitting engineers to make and host their applications on it. Cloud goes about as an ideal accomplice for IoT as it goes about as a stage where all the sensor information can be put away and got to from remote locations[11]. These variables offered ascend to the amalgamation of the two innovations in this way prompting the development of another innovation called Cloud of Things(CoT). In CoT the things(nodes) could be gotten to, checked and controlled from any remote area through the cloud. Because of high adaptability in cloud any number of hub could be included or expelled from the IoT framework consistently. In basic terms IoT can be clarified in type of a condition

SELF DRIVING CAR

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Abstract

Autonomous driving has always been a big challenge among companies because of the involvement of the issue which has unlimited applications. Some big giant companies like Google, Tesla and Uber are working towards automated driving cars. They have applied some algorithms and had some success in it as well. But those vehicles are applicable only in well developed areas. In this paper we have proposed a driverless car that will navigate automatically by following traffic rules and avoiding accidents. In this Technique the car automatically detects the traffic light color and makes decisions accordingly. Various sensors are involved to detect the distance of obstacles from the car as well as to predict the color of traffic light. Such cars are useful in traffic control management and providing road safety. The application of Obstacle Avoiding robots is not limited and it is used in most of the military organizations now which helps carry out many risky jobs that cannot be done by any soldiers.

Keywords: *Driverless car, Traffic Light.*

Introduction

Automation is the need of the hour. With the advancement in technologies day by day people are finding ways to utilize these technologies in the automobiles as well. They already build automated vehicles like cars have certain restrictions. They are specifically applicable only to those areas which have well built roads as well as traffic signs. This will eventually lead to a huge development cost. This robotized vehicle is executed utilizing stereoscopic vision. This model can be utilized as a kind of perspective to overcome the issues of existing frameworks, by improving the precision and proficiency of independent vehicles for better wellbeing. The smart autonomous/the automobile vehicle is one step towards savvy city and is suitable for all the handicap individuals particularly blind individuals and is appropriate for the entire everyday vehicle exercises. The thought process behind the entire idea of the driverless vehicle was to stay away from mishaps that happen nowadays in huge numbers. As indicated by the measurements of 2014, the demise pace of individuals because of mishaps in the US was around 32,000 every year. In India itself, the tally was around 13,976. Utilization of these Smart Automobiles on the streets could decrease at any rate half of these mishaps, it could set aside to 16,000 lives every year. Automobiles on the streets could decrease at any rate half of these mishaps, it could set aside to 16,000 lives every year. Likewise, the handicap and old age people can travel a long distance without depending on a third party or a person say a driver. This project additionally has a plan to control the speed of any vehicles naturally in urban communities and furthermore in confined regions such schools, parks, emergency clinics and in speed constrained territories and so forth. These days in an exceedingly quick paced world all the people groups don't appear to have self-control. Such individual square measure driving vehicles at an exceedingly fast speed so the police don't appear to have the option to screen every one of

SMART SHOES

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Abstract

There are approximately 39 million people in the world are blind in 2018 according to World Health Organization. Majority of them are using a conventional white cane to aid in navigation. The limitation in white cane is that the information's are gained by touching the objects by the tip of the cane. The traditional length of a white cane depends on the height of user and it extends from the floor to the person's sternum. So we'll design ultrasound sensor to detect all kinds of barriers whatever its shape or height and warn him with vibration. Blind people also face great problems in moving from place to another in the town and the only way for them is Guide dogs which can cost about \$20, 000 and they can be useful for about 5 – 6 years. So we'll design GPS for blind people which help him in moving from place to another in the town with voice orders for directions and he will identify the place he want to go with voice only and not need to type anything. But we want also to help him in moving indoor or in closed places he goes daily from place to another we will design an indoor navigation system depend on working off line to help him to move from location to another in specific places home, malls, libraries etc. also by voice orders . The person may face a great problem in control his electric devices we will design for him a total wireless control system to easily control all his electric devices by voice connected to a security system to warn him if he indoors or out if anything wrong happen and help him to solve this problem.

Keywords: -GPS, WHO

INTRODUCTION

Problem Definition

There is approximately 39 million people in the world are blind in 2018 according to World Health Organization. Majority of them are using a conventional white cane to aid in navigation. The limitation in white cane is that the information's are gained by touching the objects by the tip of the cane. The traditional length of a white cane depends on the height of user and it extends from the floor to the person's sternum.

Blind people'also face great problems in moving from place to another in the town and the only way for them is Guide dogs which can cost about \$20, 000 and they can be useful for about 5 – 6 years. They also have a great problem to identify the objects he frequently used in his house as kitchen tools and clothes. And also he may face a great problem in control his electric devices or have a security problem and he can't face it.

Problem Solution

All previous problems we're trying to solve them. To help the user moving easily indoor and outdoor we'll use ultrasound sensor to detect the barriers on his way and alert him by 2 ways

A STUDY OF SECURITY MODES AND THREATS IN BLUETOOTH DEVICES

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Abstract

Bluetooth is an open standard for shortrange radio frequency (RF) communication. Bluetooth technology, which is used primarily to establish wireless personal area networks (WPANs), has been integrated into many types of business and consumer devices; examples include cell phones, laptops, automobiles, medical devices, printers, keyboards, computer mouse devices, and headsets. Bluetooth technology enables users to establish ad hoc networks supporting voice and data communications between a wide variety of devices that can be conveniently interconnected without the need for cables or wired connections. Bluetooth technology becomes widespread; vulnerabilities in its security protocols are increasing which can be potentially dangerous to the privacy of a user's personal information. The security issues of Bluetooth have been an active area of research for the last few years. This paper presents the security threats and countermeasures with their solutions of this technology. It also presents some tips that end-users can implement immediately to become more cautious about their private information. The paper also concludes with some recommendations for future security enhancements that can be implemented in the Bluetooth standard.

Keywords- Bluetooth architecture, security services, security threats, Security Modes, Bluetooth encryption.

INTRODUCTION

Bluetooth is a technology for short range wireless data and real time two-way audio/video transfer providing data rates up to 24 Mbps. It operates at 2.4 GHz frequency in the free Industrial, Scientific, and Medical (ISM) band. Bluetooth devices that communicate with each other form a Pico net. The device that initiates a connection is the piconet master and all other devices within that piconet are slaves. The radio frequency (RF) waves can penetrate obstacles, because of this reason the use of wireless communication systems have grown rapidly in recent years.

The wireless devices can communicate with no direct line-of sight between them. This makes RF communication easier to use than wired or infrared communication, but it also makes it easier to drop. Moreover, it is easier to disrupt and jam wireless RF communication than wired communication. Because wireless RF communication can suffer from these threats, additional countermeasures are needed to protect against them. The basic Bluetooth security configuration is done by the user who decides how a Bluetooth device will implement its connect ability and discoverability options. The different combinations of connect ability and discoverability capabilities can be divided into three categories, or security levels: Silent, Private and In Bluetooth a trusted relationship between two devices called 'pairing' are formed by exchanging

BREAST CANCER CLASSIFICATION: A COMPARATIVE STUDY

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Abstract

The most frequently occurring cancer among Indian women is breast cancer. There is a chance of fifty percent for fatality in a case as one of two women diagnosed with breast cancer die in the cases of Indian women. This paper aims to present comparison of the largely popular machine learning algorithms and techniques commonly used for breast cancer prediction, namely Support Vector Machine (SVM) and kNN (k-Nearest-Neighbor). The Wisconsin Diagnosis Breast Cancer data set was used as a training set to compare the performance of the various machine learning techniques in terms of key parameters such as accuracy, and precision. The results obtained are very competitive and can be used for detection and treatment.

Keyword: - Breast Cancer, Support vector machine, k-Nearest- Neighbor.

INTRODUCTION

The most commonly occurring type of cancer in women is breast cancer. It is known to affect over two million women annually. For women diagnosed during 2010-14, five-year survival for breast cancer shows very heavy variation with changes in location. It is generally known to be above fifty 50% in most places. There are no prevention techniques for breast cancer but early detection and diagnosis is critical in determining the chances of survival.

During the early stages of the disease, the symptoms are not presented well and hence diagnosis is delayed. It is recommended by the NBCF (National Breast Cancer Foundation) that women over the age of forty years of age should get a mammogram once a year. A mammogram is an X-ray of the breast. It is a medical technique used for the detection of breast cancer in women without any side effects deeming the procedure as safe. Women who get regular mammograms have a higher survival rate as compared to women who do not.

According to [2] in 2018, over six hundred thousand fatalities were caused by breast cancer. The number is approximately fifteen percent of the total deaths resulting from all types of cancer among women. The chances of contracting this particular type of cancer are usually higher in urban regions; however, the rate of ontraction seems to be on an upward rising trend globally.

The only current method of improving the results of breast cancer cases is early diagnosis and screening.

AUTOMOBILE TRACING AND ACCIDENT DETECTION SYSTEM

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Abstract

The GPS continuously takes input data from the satellite and stores the latitude and longitude values in the AT89s51 microcontroller's buffer. When the vehicle needs to be tracked, a message is sent to the GSM device and it gets activated. It also gets activated by detecting an accident on the accelerometer sensor connected to the vehicle. Simultaneously it deactivates GPS with the help of relay. When the GSM gets activated the last received latitude and longitude positions are taken from the buffer and a message is sent to the predefined number in the program. Once the message has been sent to the device the GSM gets deactivated and GPS is activated back.

Keywords: - GSM, GPS, Microcontroller's

INTRODUCTION

The purpose of our project is to give security to all automobiles and rescuing people in accidents. In future days, the rate of accidents can be increased rapidly because of the increase in the number of vehicles. Because of the increase in employment, the number of vehicles like cars, bikes can be increased and because of this more accidents are likely to happen. People are going under risk because of rash driving and other factors that include the unavailability of advanced techniques. The paper provides an appropriate solution to reduce the accident rate. An automatic alert system for vehicle accidents is introduced; the main objective is to control the accidents by sending a message to the registered mobile using wireless communications techniques. Whenever an accident occurs, the GSM module sends the message to the predefined mobile number within seconds. Arduino is the major part of the system which sends a message to different modules in the system. Accelerometer sensor will be activated when the accident occurs and the information is transferred to the registered number through the GSM module. GPS will help in finding the location of the accident spot. GPS is highly useful, this system enables the owner to observe and track his automobile and find out the automobile movement and its past activities of the automobile. This hardware is fitted on to the automobile in such a manner that it is not visible -to anyone who is inside or outside of the automobile. When the automobile is stolen, the location data from the tracing system can be used to find the location and can be informed to the police for further action. Some Automobile Tracing System can even detect unauthorized movements of the automobile and then alert the owner.



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A LIBRARY WHERE YOU WILL FIND DOCTORS AND LISTING OF HOSPITALS

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Abstract

The purpose of the project entitled as "DOCLARY- A library where you find doctors" is to computerize the management of Hospital to develop software which is user friendly simple, fast, and cost effective. It deals with the collection of patient's information, diagnosis details, etc. Traditionally, it was done manually. The main function of the system is register and store users details, doctor details and hospital information and retrieve these details as and when required, according to the need of users. Input contains patient details, diagnosis details etc. while system output is to get these details on to the screen accordingly. Disease can be cured by proper treatment. But from where to get it, as there are plenty of hospitals and clinics in India about which we have no idea. In fact we don't have reviews on each doctors and hospital. Looking at the building of hospitals we just assume it's cost and judge its effectiveness and select accordingly. Also in a new city it is really hard to find what one want. We even need to call different people, relatives, friends or family to get reviews of particular hospital. So to overcome these flaws, here we are to propose a website which not only helps you to find good hospitals regarding your disease, rate doctors, provide you approximate bill, available beds but also helps every patient to manage their medical reports. A responsive website with many benefits for patients, doctors and hospitals. The Hospital Management System can be entered using a username and password. It is accessible by any person who makes their account either by doctor or hospital or general public domain. Only they can add data into the database. The data can be retrieved easily. The data are well protected for personal use and makes the data processing very fast. A detailed network diagram has been drawn to describe every step clearly. Full effort has been given to complete each and every pros and cons, so that they are taken into account.

Keywords: - Hospital Management, Library

Introduction

Health is the first and foremost priority for any person. Anyone whether rich or poor wants to be wealthy in terms of his/her health. It is very important to keep a check on your health regularly and for that we need proper treatment and in depth knowledge about the disease. Disease can be cured by proper treatment. But from where to get it, as there are numerous hospitals and clinics claiming to be no. 1 in India about which we have no idea. In fact we don't have reviews on each doctors and hospital. Looking at the building of hospitals we just assume it's cost and judge it's effectiveness and select accordingly. Also in a new city it is really hard to find what one want. We even need to call different people, relatives, friends or family to get reviews of particular hospital. So to overcome these flaws, here we are to propose a website which not only helps you to find good hospitals regarding your disease, rate doctors, provide you approximate bill, available beds but also helps every patient to manage their medical reports. A responsive website with many benefits for patients, doctors and hospitals.

The idea here is to make an online platform which can enable people to search for hospitals/doctors according to their requirements. User can seek information regarding hospitals and doctors and get there reviews before visiting them. All basic information including location, timings, contacts, availability, facilities, doctor's specializations, cost etc. will be available for every user 24x7 in a proper updated format, which will help user to have a better choice of treatment. This will help user in saving time and money in search for better treatment.

HOSTEL-COMPLAINT-MANAGEMENT-SYSTEM

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Abstract

"ONLINE HOSTEL MANAGEMENT SYSTEM" is software package developed for managing numerous activities within the hostel. For the past few years the amount of instructional establishments is increasing apace. Thereby the amount of hostels is additionally increasing for the accommodation of the scholars learning during this establishment. And thus there's a great deal of strain on the one who square measure running the hostel and software's don't seem to be sometimes utilized in this context. This specific project deals with the issues on managing a hostel and avoids the issues that occur once carried manually. Identification of the drawbacks of the present system results in the planning of computerized system which will be compatible to the present system with the system that is a lot of user friendly and a lot of graphical user interface homeward-bound. We are able to improve the potency of the system, therefore overcome the drawbacks of the present system.

Keywords: - Software Package, Homeward-Bound

INTRODUCTION

In our current era of machine-controlled systems with it being either package or hardware, it's not sensible to be victimization manual system. Hostels while not a management system square measure sometimes done manually. Registration forms verification to alternative information saving processes square measure done manually and most sometimes, they're written on paper. so plenty of repetitions are the drawbacks of the prevailing manual system. This system is meant in favor of the hostel management that helps them to save lots of the records of the scholars regarding their rooms and alternative things. It helps them from the manual work from that it's terribly troublesome to seek out the record of the scholars and also the mess bills of the scholars, and also the info of regarding the ones who had left the hostel years before. This system provides a thought regarding however a student and fee details, area allocation, mess expenditure square measure maintained in a very higher method. The hostel management system will contain special options like what number students square measure in a very area, student's id and free rooms or area available. The administration features a distinctive identity for every member also as students' details.

LITERATURE REVIEW

The existing system is manual primarily based and want ton of efforts and consume enough time. within the existing system are able to apply for the hostels on-line however the allotment processes are done manually. it's going to result in corruptions within the allocation method moreover as hostel fee calculation. The prevailing system doesn't deals with mess calculation and grievance registration. Thus there square measure plenty of repetitions which might be simply avoided. And thus there's plenty of strain on the one that is running the hostel and software's aren't sometimes employed in this context. This specific project deals with the issues on managing a hostel and avoids the issues that occur once carried manually. Identification of the drawbacks of the present system results in the planning of computerized system which will be compatible to the present system with the system that is additional user friendly and additional interface familiarized. we will improve the potency of the system, so overcome the drawbacks of

RFID BASED SMART CART

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Assistant Professor ECE Deptt., JECRC Foundation, Jaipur⁴

Abstract

In metro cities we can see you a huge rush at shopping malls on holidays and weekends. This becomes even more when there are huge offers and discounts. Now a days, people purchase a variety of items and put them into the cart. After total purchasing one is supposed to approach the counter for billing purpose. By using barcode reader, the cashier prepares the bill which is quite a time consuming process. This results in long queues at the billing counters. This project presents an idea to develop a system in shopping malls to overcome the above problem. To achieve this all products in the mall would be equipped with RFID stickers and all carts should be equipped with an RFID reader and an LCD screen. When one puts any product in the cart its code will be detected automatically, the item name and cost will be displayed on the LCD, thereby after that, the cost gets added to the total bill. If it is wished to remove the product from the cart, simply take away the product and the amount of that specific product gets deducted from the total amount and the same information passes to the central billing unit via wireless module. Hence the billing can be done in the cart itself thereby, saving a lot of time to the customers.

KEYWORDS: RFID Tags, RFID Reader, LCD, Cart.

INTRODUCTION

The main objective involved in this plan is to implement a smart shopping cart with the help of RFID technology for improvising purchasing. The plan is to employ the RFID related surveillance implementation practice in the purchasing cart. In this plan RFID card is utilised as protection entry for acquiring of commodities in the Shopping malls. If the commodity has been placed in the shopping cart the price of the product appears and accordingly the total amount will be shown and if we wish to remove the product from the trolley, you can take away the product and the amount of that specific product gets deducted from total amount. In this, the technology used is for obtaining the products thereby which boosts security performance and speed while purchasing in shopping complexes.

The technological objective for our presented problem in shopping complexes is the practice of RFID technology for the instinctive recognition of commodity in the interior of the purchasing cart thereby annihilating shopper intervening in the task of commodity purchase and for payment. The principle point of proposed framework is to give an innovation which is minimal effort oriented, effectively adaptable, and efficiently feasible for helping shopping in individual. With the help of this a lot of time will be saved at the billing counters.

LITERATURE REVIEW

[1]Amine Karmouche (2013, IEEE) in Aisle-level Scanning for Pervasive RFID- based Shopping Applications, proposed to develop a system that is able to scan dynamic and static products in the shopping space using RFID Reader antennas. [2]Mr. P. Chandrasekar (2014,

ENTERPRISE RESOURCE PLANNING

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Abstract

Enterprise Resource Planning system, popularly known as ERP system, the descendant of MRPII offers the answer to the economic and productivity troubles of manufacturing and service enterprises. Thus, the ERP system has become very popular as an enterprise management software tool. It was the larger companies that have opted to use the ERP systems initially. However, the use of ERP has changed and today the term can refer to any type of company, no matter what industry it falls in. In fact, ERP systems are used in almost any type of organization - large or small. The latest ERP tools available in the market today can cover a wide range of functions and integrate them into one unified database. This made ERP to land up into higher educational institutes. In today's competitive business world usage of ERP system is becoming a must for any educational organization to meet the challenges faced in their business process and to have a cutting edge. Studies also reveal that organizations that don't have an ERP implemented are facing numerous problems in their internal processing like attendance management, payroll management, quick decision making, etc. So, in order to be different and ready for action the institutes need a central resource planning that can manage the entire information and operations of the institutions. This paper deals with the implementation of E-college ERP, the technology used and why every higher educational institute should opt for an ERP. Higher education environments are extremely dynamic, where the education system has been fundamentally changed.

Higher education institutions and the state should leave behind the question of Information support for business processes and should focus on informatics as one of the key factors of quality assurance in higher education. ERP provides a unified enterprise view of the business that encompasses all functions and departments as well as an enterprise database where all business transactions are processed, monitored, and reported. But implementing an ERP system requires careful exercise in strategic thinking, precision planning, and negotiations with all stakeholders.

Keywords: - ERP, MRPII

REVIEW OF LITERATURE

ERP stands for Enterprise Resource Planning. Enterprise resource planning (ERP) is business management software or a system which is typically used to manage core departmental data of respective business. ERP provides an integrated view of business processes, often in real-time, using common databases maintained by database management systems. ERP system track business resources— raw materials, cash, production capacity and the status of business commitments like: payroll, purchase orders, and orders. The application that make up the system share data across the various departments (purchasing, accounting, sales, manufacturing etc.) That provides the core data. ERP facilitates information flow between business function, and manages connections to outside stakeholders.

Every college has to maintain a management system for various sections which may include performance analysis, attendance system, test wise result, student information, fee structure, academic information, transport facility, staff information and many more. Managing all these sections manually on paper becomes very time consuming and complex tasks. In such system there is high possibility of misplacement of collected data and data redundancy in the form of paper records in order to overcome these drawbacks there is a need to design and implement College ERP system where a college staff can track a student profile in all aspects of academic course.

College ERP system is an online web-based system which implements a user friendly and attractive interface for college. The aim for deployment and implementation of

ENTERPRISE RESOURCE PLANNING

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College ERP system is an online web-based system which implements a user friendly and attractive interface for college. The aim for deployment and implementation of

Review: Nonlinear Effects in Photonic Crystal Fiber for Bio-Sensing

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ABSTRACT

This article reviews the nonlinear effects in optical sensors utilizing photonic crystal fiber (PCF) sensors, which is recently embraced the most significant sensing applications with their predictable parameters and characteristics. Various PCF sensors are available in various applications and configurations are working on photonic crystal fiber with more than 15-20 applications regions. In this article, various applications have been reviewed with their various types. This article has been discussed about the various forms of knowledge, gas, pH, liquid temperature, curvature, rotation, pressure, refractive index, optical sensing standards deployed in this article with nonlinear effects namely surface-enhanced Raman scattering and four-wave mixing.

Keywords: Photonic Crystal Fiber, Nonlinear effects, Biosensor, Four-Wave Mixing

1. INTRODUCTION

Photonic Crystal Fiber (PCF) is the variant of conventional optical fiber which utilizes photonic crystals to make the covering every which way of the core in the fiber. The photonic crystal is an inhomogeneous dielectric medium of low loss, which is doped with excellent management of particles scale at holes covering the whole length of the fiber. In the PCF, photonic crystals are built with photonic bandgap (PBG) to avoid the spread of light in certain ways with a specific wavelength range. In contrast to ordinary optical fiber, PCF utilizes total internal reflection instead of refraction of light in hollow-core methods to propagate light. The light travel in PCF is the much superior than the standard optical fiber, which mainly utilizes less refractive index cladding. In PCF, there are various controlling physical parameters such as hole size, hole spacing, hole diameter, hole shape, hole number, number of holes, dielectric material, which can be utilized to make a fiber working as single mode or multimode, as a highly birefringent fiber, large mode area fiber [1], etc. Consequently, PCFs can be designed as per the application requirements and its area of application includes spectroscopy, tomography, nonlinear optics, quantum optics, optical communication, industrial machining, broadband communications and military innovation. PCF is additionally utilized in an instrumented optical fiber (IOF) or safety fiber [1-3].

The advancement of the optical fiber in 1966 changed fields, for example, media communications and detectors, which provided the foundation of entirely sensitive and enhanced systems dependent on the properties of light. This prominent trend of optical fiber, such as its geometric adaptability, its inherent sensitivity to existing techniques and its inherent modulation with their optical communication technology, distinguishes them from existing optical fibers. The advancement of PCF in conventional optical fiber depend on its modeling, band coding and various parametric properties. For example, a transparent waveguide parametric properties because of its size and geometry. The optical fiber does not require any geometric phenomenon and therefore it is based on normal operation [4, 5].

According to the core construction, the PCFs are of two types, one type is the Solid Core PCF and the second type is the Hollow Core PCF. PCFs are fundamentally divided into two categories: single-core PCF and multi-core PCF. The multi-core PCF has various (MC) features. The area of application of solid-core PCF are high power management, long-period gratings, multiple laser waveguides generation, optical add-drops, multiplexing and demultiplexing [6-8]. In this article, the theoretical analysis is described according to nonlinear effects in photonic crystal fiber.

2. Biosensors

In any sense, the biosensor is employed to identify the target molecules. The 'biosensor' can be used to describe any kind of sensor that is related to biology. Even though this is not incorrect, the word has a specific meaning. According to biosensor theory, two

Cooperative Spectrum Sensing Over Weibull and Hoyt Fading Channels using Centralized and Distributed Schemes

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Abstract—Multipath fading, hidden terminal and shadowing are problems faced by users in non-cooperative type spectrum sensing techniques. A solution to this problem is Cooperative Spectrum Sensing (CSS) technique. CSS allows users to collaborate to perform spectrum sensing which may be managed by a common receiver. Further, it has two categories Distributed CSS (DCSS) and Centralized CSS (CCSS). In this paper these two schemes are compared with each other and different fusion rules are applied over them. Mathematical formulas for detection probability (P_d) of two fading channels namely Weibull and Hoyt are shown and further different fusion rules are applied on cluster-based CSS to explore the performance of centralized and distributed CSS. This concept has been earlier used for the conventional fading channels i.e. Rayleigh, Rician, Nakagami-m. In this paper results for cluster-based CSS are examined for comparatively lesser studied Weibull and Hoyt fading channels. It is noticed for different fusion rules, Weibull fading channel generates better performance as compared to Hoyt fading channel. This paper focuses on the implementation of four different fusion rules such as AND-AND, AND-OR, OR-AND along with centralized AND for these two fading channels. Results have shown that at SNR<5dB Weibull fading channel attains a higher probability of detection (P_d) than the Hoyt fading channel for all four fusion rules. It is noticed that the slope of the curve for Hoyt fading channel is steep as compared to Weibull fading channel and reaches to 0.9 P_d at SNR>5dB for OR-AND and AND-OR rule, while with these fusion rules, Weibull fading channel attains 0.9 P_d at SNR less than 0dB. OR-AND fusion rule gives the best result amongst all 4 fusion rules for both the channels.

Index Terms—Cognitive Radio, Cooperative Spectrum Sensing (CSS), Fusion rules, Weibull and Hoyt fading channels, Detection probability P_d .

I. INTRODUCTION

To overcome the shortage of spectrum resources due to inefficient spectrum usage, Cognitive Radio plays a vital role. The crusted policies in which the government has allocated prized spectrum to Primary Users (PU) leads to wastage of spectrum as most of it at different times and locations are idle. Spectrum sensing allows Secondary Users (SU) to sense such White spaces (space where PU is absent) and utilize them [1]. PUs are also called as licensed users and they have a higher priority on the usage of the allocated spectrum, while SUs, also called as unlicensed users, have reduced preference over PUs. SUs access spectrum in a way that it does not cause interference to PUs. The energy-detection method is the simplest and less complex and is preferred over other sensing techniques for spectrum sensing [2]. In the non-cooperative spectrum sensing technique, individual SUs sense the presence of a vacant spectrum. While in CSS, SUs work as a team and collaborate to perform spectrum sensing. In CSS, PU energy is evaluated by each secondary user with the help of the energy-detection technique and the sensing result is sent to a common Fusion Centre (FC). On the basis of different fusion rules, FC determines the presence of PU. A lot of studies have been done and literature is available for Cooperative Spectrum Sensing [3] [4]. Much of study has been done on Centralized CSS [5] [6]. In [5], to determine unoccupied OFDMA (Orthogonal Frequency Division Multiple Access) subchannels, a scheme is designed which performs spectrum sensing using Centralized decision Fusion. Again in [5], reporting channels are represented by shadowed and fading model and it informs that spectrum sensing performance is corrupted by shadowed correlation. Instead of Omni-directional antennas, directional




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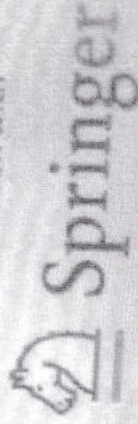
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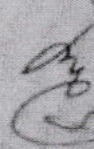
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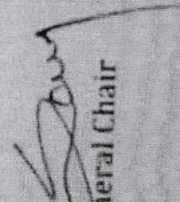
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Home / Journals / Journal of Advances in Management Research / Performance obstacles in sustainable manufacturing - model building and validation

Performance obstacles in sustainable manufacturing - model building and validation

Priyanka Pathak, M.P. Singh, Gaurav Kumar Badhotiya

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Identification of Drivers and Barriers of Sustainable Manufacturing

Authors Authors and affiliations

Priyanka Pathak , M. P. Singh, Gaurav Kumar Badhotiya, Avnish Singh Chauhan

Conference paper

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Abstract

Sustainable manufacturing is playing an important role in the growth of manufacturing organizations by providing social, financial, and environmental benefits. Drivers and barriers are the core essentials of any system. Their need to pursue a system in any manner always exists. For this pursuance, the very basis is their proper identification, so that they can be used for implementation in any system. In this study, drivers and barriers of sustainable

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An ISM Approach to Performance Indicators of Sustainable Manufacturing Through MICMAC Analysis in Indian Manufacturing Industry

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Abstract

This paper emphasizes analysis of various performance indicators for successful implementation of sustainable manufacturing in Indian industries. This research carries identification of performance variables through survey and brain storming, interpretive

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Ranking of Drivers of Sustainable Manufacturing

Priyanka Pathak, M. P. Singh

Abstract: Sustainable manufacturing is important criterion nowadays in developing nations like India. Its implementation is made almost compulsory for all types of industries for the sake of the environment. It could be better implemented if its supporting factors are used at priority instead of wasting time with other less important factors that are not worthy in the process of implementation. So, here in this paper already identified drivers of sustainable manufacturing through a vast literature review of past articles are ranked to give them priority numbers, so that these could be used at first in comparison to the lower ones in the hierarchy table for implementation of sustainable manufacturing. As the ranking of factors is a decision-making process, here we used one of the Multi-Criteria Decision Model Techniques, named as a fuzzy linguistic approach of decision making for ranking or prioritization of factor, for ranking of drivers of sustainable manufacturing. Total 13 identified drivers have first categorized in four different criteria with four different decision variables using 5 point linguistic ratings and then has been ranked, from one to thirteen as one is for most supportive driver and thirteenth as least supportive driver of sustainable manufacturing. These are suggested to various industries for implementing sustainable manufacturing as easier task for them. It might be very helpful for them.

Keywords: Sustainable Manufacturing, Fuzzy TOPSIS, Fuzzy Linguistics, Drivers.

I. INTRODUCTION

The primary aim of Sustainable Manufacturing (SM) is to weaken down the harmful impacts of manufacturing over environment. But side by side concerns on finances and people has also been a big factor. Figure 1 shows the relation for this:

1. Social or people issues are related to culture of society, poverty, lifestyle, peace, health, happiness, harmony, and education.
2. While the financial issues are employment, standards of living, productivity outcomes, Wealth, Competition and technology.
3. and the environmental issues are harmful emissions, ozone layer depletion, increasing temperature, and lack of natural resources.

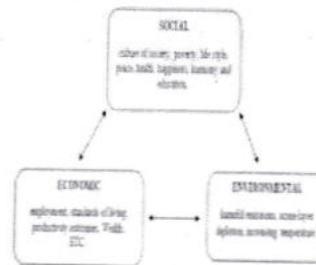


Fig 1: Relationship diagram for three aspects and their interconnections. [1]

II. IDENTIFICATION OF DRIVERS OF SM

Various drivers of sustainable manufacturing have been identified through a vast literature review of previous year papers, and total 13 drivers had identified, which are as follows:

1. Financial/Other Promotional Offers and Supporting Aspects
2. Surrounding Agencies Pressure
3. Other Agencies Pressure
4. Expected Future Law and Rulings
5. At Present Law and Rulings
6. Industrial Resources
7. Technological Resources
8. Perception of Public
9. Dedication and Synergy among Manufacturers
10. Effects from Supply Chain
11. Monetary Benefits
12. Competition and Benchmarking
13. Expected Demand from Market [2].

III. RANKING PROCEDURE

The term ranking is all about **decision making** when working on a level of importance of factors. When it comes to the performance variables or drivers and performance obstacles or barriers of SM, it means the chapter is dealing with finding the most important to the least important drivers.

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Noise Reduction of Deep Groove Ball Bearing (6205) by Process Optimization - An Experimental Approach

Manish Bhargava, Shraddha Arya, M.P. Singh

Abstract: This paper presents a comprehensive study of the noise effect on deep groove ball bearing. Life of any rotary components and machinery are depends on Ball Bearing so the bearing (DGBB) is crucial part of any rotary machinery and its failure causes disastrous failure of machinery. Noise level is the most important quality criteria of a ball bearing; it mainly depends on the following factors like Precision of the geometric forms (Track Profile, Curvature, and Talyrod etc.), Surface finish of the raceway and the balls, Cleanliness of the bearing, Type of lubricants etc. This paper mainly defines the experiment done on 18 random bearings, effect of different parameters of bearing to maintain a noise level by using DMAIC technology, and pareto chart after identification, reduction of noise has been done, which improves quality of bearing, cost effective & directly improves the quality of machine.

Index Terms: Curvature, Deep Groove Ball Bearing, DMAIC, Track Profile, Talyrod, Pareto Chart.

I. INTRODUCTION

Deep groove ball bearings are particularly versatile. They are suitable for high and very high speeds, accommodate radial and axial loads in both directions and require little maintenance. Deep groove ball bearings are the most widely used bearing type, they are available in many designs, variants and sizes; improvement in quality of DGBB increases rapidly, by optimizing the different cutting parameter, it improves the surface finish of deep groove ball bearing. The focused problem in this study is noise, and to eliminate this problem improvement in the surface texture of inner and outer track of the bearing is essential. Poor surface texture has become a big issue, especially for the automobile industry. DOE tool and DMAIC methodology is being used to define the method and technologies to identify the optimum parameter and its significant effects on ball bearing & on its component, after getting hypothetical result by using regression analysis the equation has been formed to identify the major optimum solution and reduce the level of noise [3].

II. METHODOLOGY

Noise level is the most important quality criteria of a ball

Bearing. It mainly depends on the following factors:

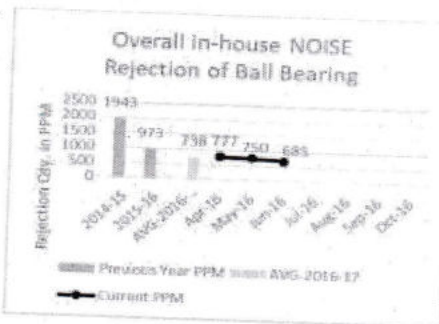
- Precision of the geometric forms (Track Profile, Curvature, Talyrod etc.).
- Surface finish of the raceway and the balls.
- Cleanliness of the bearing.
- Type of lubricant.

DMAIC methodology is a very common and successful 6-sigma technology to define the method and process to reduce the noise reduction in deep groove ball bearing. This section discuss reduction of noise rate in deep ball bearing by comparing Inner Race and Outer race of balls with different parameters (Ra, Rmax, Pt, Talyrod) at National Engineering Industry (NEI), Jaipur (India) using DMAIC cycle.

A. DEFINE PHASE

The main aim of this phase is to clearly solve the commercial problems; achieve goals, potential resources, venture possibility and high-level project timeline. As per venture contract, the core objective of this study is to reduce noise rate in ball bearing by improving quality and eliminating defects from 8373 PPM against target of 7716 PPM.

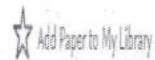
Graph 4.2, shows Overall, in-house NOISE rejection of Assembled Ball Bearing in 2017-18, showing the reduction rate from July, 2015 to January, 2017 in parts per minute (PPM).



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Manish Bhargava Associate Professor, NIT, AGARTALA,
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Barriers Analysis for Sustainable Manufacturing Implementation in Indian Manufacturing Industries Using Interpretive Structural Modelling

International Journal of Advanced Research in Engineering and Technology, 10(3), 2019, pp 27-35.

9 Pages • Posted: 28 Feb 2020

Priyanka Pathak

Jagannath University, Jaipur, Students

M. P. Singh

Jaipur Engineering College & Research Centre

Date Written: 2019

Abstract

The paper analyses SM barriers in Indian manufacturing industries. The analysis process begins with review of articles for identifying core barriers and developing a structural model using ISM. The purpose of using ISM is to find dependent and driving factors out of those barriers so that industries can get benefited by working in full capacity for removing the most hurlers and keeping in mind the less ones and society can get benefited through proper implementation of SM in those industries.

Keywords: SM, ISM, Descriptive Analysis, Questionnaire Preparation

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Abstract

In the present research, Taguchi methodology with grey relational analysis has been employed to optimize EDM parameters for multiple responses, i.e. metal removal rate and surface roughness during the EDM machining of Hastelec C-200 alloy. The experiments have been

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Host-Guest Chemistry: A Strategy of Sustainability

Rekha Vijay¹, Barkha Srivastava¹ & Poonam Haryani^{2*}

¹Department of Chemistry, Japur Engineering College & Research Centre, Japur

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ABSTRACT: Host-guest chemistry deals with development with biology and physics. It provides the framework for the design of molecules with attractive properties. The engineering and molecular approach can be used to incorporate the extensive properties using nanotechnology viz. conductivity, magnetism, potentiality, molecular recognition, catalytic activity etc.

KEYWORDS: extensive, nanotechnology, catalytic

INTRODUCTION: The key feature of supramolecular chemistry is its ability to reorganize and exchange molecules in the correct combination of building blocks is selected from a collection of different molecular components for the development of thermodynamically and kinetically favored supramolecular entity. Within the general class of supramolecular ligands and host compounds, the alignment of donor atoms in an open-chain framework is the structural feature of a polyand.



The first step in molecule making designing is a clear definition and careful consideration of the target viz. electronic and size complementarity, hydrophobic and steric contributions, cooperativity and chelate effect, hydrophobic effects etc. Due to these cooperative interactions (non-covalent) or cooperatively, the free energy change (ΔG) is either decreased or increased.

CONCLUSION: The fabrication of supramolecular materials has the applications in nanomedicine, sensors, green chemistry etc. Molecular modeling is done by computational approach of atomic, molecular and supramolecular behavior to generate the information about any number of properties. Newton-Raphson method, Ab initio method, semiempirical method are based on minimum energy, density functionals and neglect of diatomic differential overlap (NDDO) approximation respectively. Molecular machines are capable of showing controlled repetitive motion and function at the nanoscale. Thus, such materials have great potential in the field of nanotechnology.

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GCMS analysis of compounds extracted from actinomycetes AIA6 isolates and study of its antimicrobial efficacy

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In this study the compounds have been analyzed by GCMS technique and checked for their antimicrobial potency on Muller Hinton agar media plates. Solvents for component extraction used were benzene, pet ether, ethyl acetate, chloroform and extraction is carried out by layer separation method. From Actinomycetes AIA6 isolate compounds are extracted and tested for antimicrobial activity against indicator pathogens. Cultures used are *Staphylococcus aureus* (MTCC-3160), *Pseudomonas aeruginosa* (MTCC 1688), *Klebsiella pneumonia* (MTCC-432), *Proteus vulgaris* (MTCC-7306), *Bacillus subtilis* (MTCC-441), *Aspergillus flavus* (MTCC-2206), *Aspergillus terreus* (MTCC-6324), *Aspergillus niger* (MTCC-961), *Saccharomyces cerevisiae* (MTCC-170), *Candida albicans* (MTCC-183). From four Solvents pet ether, benzene, chloroform and ethyl acetate major bioactive compounds, hexadecane, 2,6-di-Tert butyl phenol, 1-pentadecene, 1-hexadecene, heptadecane, 1-nonadecene, anthracene, heneicosane, pyrrolo[1,2-a] pyrazine-1,4-dione, hexahydro-3-(2-methylpro), 5,10-dioxy-2,3,7,8-tetrahydro-1h,6h-dipyrrolo[1,2-a:1,2-d]pyrazine, n-hexadecanoic acid, hexadecanoic acid-butyl ester, n-acetyltriptamine, n-tetracosanol-1, hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester, octacosanol, eicosanoic acid 2,3 bis (acetyloxy) propyl ester, octadecanoic acid, 2,3 dihydroxy propyl ester, geranyl linalool are present with antimicrobial activity. Compound identification was done with the help of NIST 14 library. Inhibition zones (IZ=mm) of activity test were observed against *Staphylococcus aureus* (IZ=Ben-11mm, E.A-11mm) *Pseudomonas aeruginosa* (IZ=Ben-18mm, E.A-21mm) *Bacillus subtilis* (IZ=Ben-19mm), *Klebsiella pneumonia* (IZ=E.A-12mm) *Proteus vulgaris* (IZ=P.E-21mm, E.A-15mm), *Aspergillus flavus* (IZ=Chl.-11mm), *Aspergillus niger* (IZ=Chl.-11mm), *Saccharomyces cerevisiae* (IZ=E.A-9mm). No antifungal activity was recorded against starins *Aspergillus terreus* and *Candida albicans*.

Keywords: Antimicrobial activity, Component extraction, Actinomycetes, Indicator pathogens

Antibacterial or anti-infection agents, compose a greater group of compounds. Earlier antibiotics used to imply as normally happening compounds that can be produced by a variety of microorganisms. Regardless, the term has not constrained but rather it is presently advanced to man-made engineered mixes as well. Antibiotics act diversely and can differentiate into four different classes in view of their mechanism of activity. Those four classes are (1) restraint of bacterial cell wall biosynthesis, (2) hindrance of protein biosynthesis, (3) restraint of deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) and (4) hindrance of folate synthesis^{1,2}. Anti-microbial resistance has transformed into a universal well-being need worldwide and it's spreading at more rapid rate contrasted with the improvement of new compounds. A multidrug resistance expands patient treatment dis-satisfaction and mortality, and medical services expenditure. Utilization at extreme level and

misleading of anti-infection agents exert the precise burden supporting the development, duplication and rapid spread of resistant strains. Moreover, the transmission of resistant organisms between individuals in relation to health security facilities and in community and among animal and their surrounding condition has lead to the spread of the anti-infection resistance³. The beta-lactam antibiotics, like penicillins, cepheims, carbapenems, and monobactams were successful against gram positive organisms, prior after disclosure of penicillins. Cepheims were made during the 1960s, and are categorized into ages on the basis of their antimicrobial potential. Cepheims like cefazolin are powerful against gram-positive organisms and *E.coli*. Second-age cepheims like cefotiam enclose a great action against both gram-positive and gram negative microorganisms. In addition third-age cepheims are also very effective particularly for gram negative microbes and these cepheims includes ceftazidime, cefotaxime.

Moreover carbapenem is another class of anti-microbial that incorporates panipenem, imipenem, and meropenem, which are dominant against gram-positive and also gram negative organisms⁴. Actinomycetes are unique group of aerobic, branched, unicellular and gram positive microscopic organisms found openly or saprophytically in various habitats, for example, soil, warm water, and marine deposit with high level of GC (70%) in their hereditary material. They incorporate essential genera, for example, micromonospora, nocardia and streptomyces whose extensive genomes allow them to deliver some different kinds of secondary metabolites, anti-microbial, industrially useful enzymes, antitumor materials, beneficial metabolites and pesticides. Actinomycetes especially streptomyces are well recognized source of secondary metabolites especially antibiotics. Commercially crucial molecules are significantly delivered by streptomyces, micromonospora, saccharopolyspora, amycolatopsis and actinoplanes. Almost, 80% of anti-infection agents have been delivered from streptomyces. Consequently the incredible significance was given to variety Streptomyces as they are unique, has high metabolic generation rate and they have capability in recycling organic matter and to degrade chitin, lignocelluloses etc^{5,6}. Actinomycetes exist as cohorts together with different microorganisms in diverse habitat. This association could initiate silent pathways that may result in the combination of novel secondary metabolites and eventually lead to chemical defense of the delivering microorganism⁷. Microbial diseases are expanding step by step and they are turning into a major danger to human health. There number of diseases is of 200 that are transmitted by microscopic organisms, parasites, infections, prions, rickettsia and different microorganisms to humans. Viruses or prions, among the distinctive microbial pathogens causes 37-44% of diseases, percentage of bacteria or rickettsia is 10-30%, for protozoa 10.7% diseases, fungi cause 6.3% of sicknesses and helminths cause 3.3% of diseases, prompting a huge number of death consistently⁸. The need for new antibiotics expanding every day because of the rise in drug resistant pathogens. Regardless of enormous potential sources of antimicrobial agents including therapeutic plants, soil is still the most essential store for novel antibiotics along with pharmaceutical and biological action⁹. The seriousness of the problem and its worldwide spread has encouraged the World Health Organization (WHO) and the European Union (EU) to

initiate a few reconnaissance frameworks⁴. In 2015, a programme has been initiated, The National Action Plan for Combating Anti-infection Resistant Bacteria, which lay out to relieve anti-microbial resistance, jointly with requisition and improvement of ASPs¹⁰. Present study includes analysis of compounds from GCMS technique and their antimicrobial efficacy against some indicator pathogens causing various infectious diseases extracted from actinomycetes.

Experimental Section

Location of sample collection and isolation of Actinomycetes

Samples were collected from rhizospheric soil of different plants from different regions of Rajasthan. Samples were named as JPSN-I, UDSN-II, KOSN-III, ALSN-IV as per their locations like Jaipur, Udaipur, Kota and Alwar. To protect from other sources of contamination, soil was collected with hand gloves in clean, dry, sterile air tight bags from mentioned four locations and brought to laboratory for further processing of samples. Isolation of the actinomycetes was done by serial dilution¹¹, crowded plate technique and sprinkle method on actinomycetes isolation agar media (AIA). The plates were incubated inverted at 37°C for 7 days¹². After incubation, individual colonies were maintained on actinomycetes isolation agar (AIA) media.

Media optimization, mass production and metabolite production

Actinomycetes were grown on actinomycetes isolation agar media (AIA) for the metabolite extraction. For extraction of compounds pure cultures were suspended in flasks filled with luria broth and kept at shaker incubator at 150 rpm at 30°C. Shaker incubation period was given for two weeks at same temperature and conditions given above. After two weeks cultures were centrifuged for separation of mycelium at 5000 rpm for 15-20 min. Filtration was done for extracts and kept safe at 4°C for further analysis of samples. Pet ether, benzene, ethyl acetate and chloroform solvents were used for compounds extraction from AIA6 culture broth. Solvent and broth of culture was blended in 1:1 (v/v) proportion and shaken well and kept undisturbed for 30 min till two isolate layers got completely separated from each other. Solvent beaker containing metabolites was kept at 60°C on water bath for complete dryness so that only compounds were left behind in the container^{11,13-15}. Mixture of compounds was shifted to ependroff tube for Gas Chromatography Mass Spectrometry (GCMS) study. Compounds were studied from GCMS (Table 1-3) results.

Table 1 — Compounds present in ethyl acetate extract sample of AIA6 isolate: Name, Retention time (RT) and Area % showing in GCMS analysis

S.No.	Compound	Retention. time (RT)	Sum of Area %
1	Benzenesulfonic Acid, 4-Hydroxy-	6.88	0.38
2	3-Octanol	11.206	0.34
3	Acetamide, N-(Aminoiminomethyl)-	13.395	6.09
4	Benzamide	13.82	0.52
5	Decanoic Acid	14.336	0.31
6	3-Hexadecene, (Z)-	14.82	1.01
7	Tetradecane	14.955	0.96
8	Phenol, 2,6-Dimethoxy-	15.387	0.6
9	Benzamide, 4-Methyl-	15.775	0.12
10	Hexadecane, 1-Chloro-	16.152	0.24
11	Hexadecane	16.38	2.68
12	10-Methyl-Octadec-1-Ene	16.445	0.18
13	Acetamide, N-(2-Phenylethyl)-	16.691	0.51
14	Dibenzofuran	16.986	0.33
15	N,N-Bis(2-Hydroxyethyl)Dodecanamide	17.485	0.41
16	Pentadecane, 3-Methyl-	17.644	0.26
17	1,2-Benzenedicarboxylic Acid, Diethyl Ester	17.903	0.13
18	1-Pentadecene	17.974	4.09
19	1,2-Epoxyundecane	18.4	0.19
20	Pyridine, 4,4'-(1,2-Ethenediyl)Bis-	18.764	0.31
21	8-Pentadecanone	19.109	0.15
22	Eicosane	19.518	0.38
23	3-Methyl-1,4-Diazabicyclo[4.3.0]Nonan-2,5-Dione, N-Acetyl-	19.711	2.07
24	3-Undecanone	19.983	0.1
25	Tetradecane, 5-Methyl-	20.212	0.23
26	Pyrrolo[1,2-A]Pyrazine-1,4-Dione, Hexahydro-	20.338	1.54
27	Heptadecane, 3-Methyl-	20.49	0.34
28	4-Pentenoic Acid, 2-Methyl-, Tetradecyl Ester	20.606	0.14
29	Formic Acid, Heptyl Ester	20.692	0.14
30	9-Eicosene, (E)-	20.789	2.57
31	Benzene, 1,1'-(1,2-Ethynediyl)Bis-	20.866	3.69
32	Pyrrolo[1,2-A]Pyrazine-1,4-Dione, Hexahydro-3-(2-Methylpropyl)-	21.126	4.17
33	Pentadecanoic Acid	21.184	0.62
34	Pyridine, 3-Ethyl-2,6-Dimethyl-	21.351	0.56
35	5h-Indeno[1,2-B]Pyridine	21.589	0.11
36	Diisobutyl Benzene-1,2-Dicarboxylate	21.663	0.24
37	9-Octadecanone	21.832	0.2
38	1-Hexadecanol	21.93	0.62
39	7,9-Di-Tert-Butyl-1-Oxaspiro(4,5)Deca-6,9-Diene-2,8-Dione	22.277	0.88
40	Palmitic Acid	22.478	0.67
41	2,5-Piperazinedione, 3,6-Bis(2-Methylpropyl)-	22.71	5.32
42	Dibutyl Phthalate	22.871	1.15
43	N-Hexadecanoic Acid	22.988	7.4
44	Eicosane, 2-Methyl-	23.07	0.21
45	9,10-Anthracenedione	23.271	0.41
46	1-Heneicosanol	23.34	1.5
47	Heptadecane	23.416	0.86
48	1-Hexanol, 2-Ethyl-	23.617	0.09
49	Eicosanoic Acid	23.727	2.76
50	9-Octadecenoic Acid (Z)-	23.814	0.37
51	Palmitic Acid, Tms Derivative	23.922	0.51

(Contd.)

Table 1 — Compounds present in ethyl acetate extract sample of AIA6 isolate: Name, Retention time (RT) and Area % showing in GCMS analysis (Contd.)

S.No.	Compound	Retention time (RT)	Sum of Area %
52	3-Propionyloxytridecane	24.137	0.24
53	Carbonic Acid, Monoamide, N-Decyl-, 2-Ethylhexyl Ester	24.416	0.52
54	Octadecane	24.59	0.44
55	Heptadecyl Acetate	24.666	0.16
56	Dibenzothiophene 5,5-Dioxide	24.948	0.16
57	1-Docosanol	25.029	1.22
58	Octadecanoic Acid	25.328	2.24
59	Acetamide, N-[2-(1h-Indol-3-Yl)Ethyl]-	25.649	6.14
60	1-Decene, 3,3,4-Trimethyl-	25.719	1.09
61	1-Octanol, 2-Butyl-	25.814	0.28
62	Dodecane, 4-Cyclohexyl-	25.985	0.15
63	Octadecanoic Acid, Trimethylsilyl Ester	26.156	0.24
64	2,5-Piperazinedione, 3-Benzyl-6-Isopropyl-	26.468	0.16
65	Oxiraneoctanoic Acid, 3-Octyl-, Methyl Ester, Trans-	26.737	0.56
66	Oxalic Acid, 3,5-Difluorophenyl Tetradecyl Ester	27.199	0.23
67	Ergotaman-3',6',18-Trione, 9,10-Dihydro-12'-Hydroxy-2'-Methyl-5'-(Phenylmethyl)-, 76	27.297	0.86
68	Docosane	27.648	0.39
69	Pyrrolo[1,2-A]Pyrazine-1,4-Dione, Hexahydro-3-(Phenylmethyl)-	27.817	0.51
70	1-Nonadecene	27.921	0.68
71	Quinoline, 2-Propyl-	28.146	0.23
72	1,3,5-Trisilacyclohexane	28.967	0.25
73	D-Ribose, 2-Deoxy-Bis(Thioheptyl)-	29.232	0.28
74	Hexadecanoic Acid, 2-Hydroxy-1-(Hydroxymethyl)Ethyl Ester	29.559	2.8
75	1,2-Benzenedicarboxylic Acid	29.882	0.34
76	L-Prolinamide, 5-Oxo-L-Prolyl-L-Phenylalanyl-4-Hydroxy-	30.727	2.92
77	Hexadecanoic Acid, 2-(Acetyloxy)-1-[(Acetyloxy)Methyl]Ethyl Ester	32.401	0.22
78	Octadecanoic Acid, 2,3-Dihydroxypropyl Ester	33.155	1.6
79	2,2,20,20-Tetramethyl-3,7,11,15,19-Pentaoxa-2,20-Disilahenicosane	33.657	0.14
80	9-Octadecenamide	33.884	2.24
81	N-Tetracosanol-1	34.122	0.17
82	Squalene	34.323	0.18
83	Z-2-Acetoxy-12-Tetradecenitrile	34.6	0.18
84	9-Octadecenoic Acid (Z)-, 2,3-Bis(Acetyloxy)Propyl Ester	34.692	0.24
85	Eicosanoic Acid, 2,3-Bis(Acetyloxy)Propyl Ester	35.019	0.26
86	(3e,6e,10e)-3,7,11,15-Tetramethyl-1,3,6,10,14-Hexadecapentaene 99	45.06	0.31
87	1,6,10,14-Hexadecatetraen-3-ol, 3,7,11,15-Tetramethyl-, (E,E)-	45.866	1.87
88	5,11,17,23-Tetratert-Butylpentacyclo[19.3.1.1~3,7-.1~9,13-.1~164166052	54.058	9.83

Microbial cultures and antimicrobial activity of ethyl acetate extract

For the antimicrobial activity test some microbial cultures were used For analysis of antimicrobial efficacy test. These were brought from IMTECH Chandigarh. Cultures were *Staphylococcus aureus* (MTCC-3160), *Pseudomonas aeruginosa* (MTCC 1688), *Klebsiella pneumonia* (MTCC-432), *Proteus vulgaris* (MTCC-7306), *Bacillus subtilis* (MTCC-441), *Aspergillus flavus* (MTCC-2206), *Aspergillus Terreus* (MTCC-6324), *Aspergillus Niger* (MTCC-961), *Saccharomyces cerevisiae* (MTCC-170), and *Candida albicans* (MTCC-183). The antibacterial, antifungal activity was measured utilizing the

standard Kirby-Bauer disc diffusion strategy¹³. Petri plates were set up with 20 mL of sterilized Muller Hinton Agar (MHA) media and permitted to dry for 10 min. The crude extract were set on the surface of the medium and left for 20-30 min at room temperature for compound dispersion and then kept inverted for incubation at 37°C for 24-48 h¹¹.

GCMS analysis

Compound extracts of Actinomycetes AIA6 isolate were analyzed by GC-MS method. GC-MS analysis was executed using GC Shimadzu QP2010 ultra system and gas chromatograph interfaced to a Mass Spectrometer (GC-MS) and was operational with

Table 2 — Compounds present in chloroform extract sample of AIA6 isolate: Name, Retention time (RT) and Area % showing in GCMS analysis

S.No.	Compound	Retention time (RT)	Sum of Area %
1	2-Pyrrolidinone	8.771	0.12
2	Cyclohexane, Eicosyl-	11.236	0.36
3	Acetamide, N-(Aminoiminomethyl)-	13.657	6.81
4	Ethyl Cyclopropanecarboxylate	14.027	1.88
5	Methacrylic Acid, Tms Derivative	14.711	0.19
6	3-Hexadecene, (Z)-	14.833	0.88
7	Tetradecane	14.963	0.08
8	Phenol, 2,4-Bis(1,1-Dimethylethyl)-	16.754	8.36
9	4-Undecene, 3-Methyl-, (Z)-	17.911	0.09
10	1-Hexadecene	18.022	8.94
11	Hexadecane	18.099	0.21
12	Tridecane, 3-Methylene-	18.164	0.23
13	3-Methyl-1,4-Diazabicyclo[4.3.0]Nonan-2,5-Dione, N-Acetyl-	19.834	2.6
14	Pyrrolo[1,2-A]Pyrazine-1,4-Dione, Hexahydro-	20.56	1.8
15	1-Nonadecene	20.846	19.03
16	Octadecane	20.902	0.15
17	Pyrrolo[1,2-A]Pyrazine-1,4-Dione, Hexahydro-3-(2-Methylpropyl)-	21.214	1.88
18	2-Piperidinone, 1-(3,4,5,6-Tetrahydro-2-Pyridinyl)-	21.988	0.09
19	7,9-Di-Tert-Butyl-1-Oxaspiro(4,5)Deca-6,9-Diene-2,8-Dione	22.295	0.15
20	3-Isobutylhexahydropyrrolo[1,2-A]Pyrazine-1,4-Dione #	22.509	0.09
21	5,10-Diethoxy-2,3,7,8-Tetrahydro-1h,6h-Dipyrrolo[1,2-A:1,2-30	22.805	3.39
22	N-Hexadecanoic Acid	22.976	0.54
23	3,5-Di-Tert-Butyl-4-Hydroxyphenylpropionic Acid	23.269	0.35
24	Hexadecanoic Acid, Trimethylsilyl Ester	23.918	0.09
25	Tricyclo[20.8.0.0e7,16]Triacontan, 1(22),7(16)-Diepoxy-	25.043	0.05
26	1-Decanethiol	25.091	0.07
27	Octadecanoic Acid	25.322	0.32
28	2,5-Piperazinedione, 3,6-Bis(2-Methylpropyl)-	25.621	0.37
29	N-Tetracosanol-1	25.714	11.64
30	2-Ethylhexyl Acrylate	25.834	1.11
31	Tetradecanoic Acid, 2-Hydroxy-1-(Hydroxymethyl)Ethyl Ester	26.868	0.06
32	Ergotaman-3',6',18-Trione, 9,10-Dihydro-12'-Hydroxy-2'-Methyl-5'-(Phenylmethyl)-, 42	27.358	0.33
33	Octadecanoic Acid, 3-Oxo-, Ethyl Ester	28.985	0.74
34	1h-Indene, 1-Hexadecyl-2,3-Dihydro-	29.288	0.18
35	Hexadecanoic Acid, 2-Hydroxy-1-(Hydroxymethyl)Ethyl Ester	29.7	8.68
36	1,2-Benzenedicarboxylic Acid, Dioctyl Ester	29.923	0.06
37	3-Hydroxypropyl Palmitate, Tms Derivative	30.367	0.28
38	1-Methyl-2,3-Cis-Dimethylaziridine	30.957	0.03
39	Octacosanol	31.09	7.23
40	3-Benzyl-6-Isobutyl-2,5-Dioxo-Piperazine	31.805	0.53
41	Octadecanoic Acid, 2,3-Dihydroxypropyl Ester	33.273	7.85
42	6-Ethyl-3-Decanol, Tms Derivative	33.571	0.07
43	2-Hydroxyethyl Palmitate, Tms Derivative	33.696	0.53
44	9-Octadecenamide	33.911	0.14
45	Squalene	34.343	0.09
46	Hexacosyl Heptafluorobutyrate	46.932	0.41
47	5,11,17,23-Tetratert-Butylpentacyclo[19.3.1.1~3,7~.1~9,13~.1~	54.136	0.93

Elite-1 fused silica capillary column. Helium gas (99.99%) was the carrier gas with a constant flow rate of 1.21 mL/min and with split ratio: 10. Temperature of Injector was 260°C; Ion-source temperature 200°C.

The oven temperature was intended from 60°C (constant for 3 min.) with an increment as of 280°C for 22 min. Mass spectra were taken at 70 eV with a scan interval of 0.5 sec¹³.

Table 3 — Compounds present in benzene extract sample of AIA6 isolate: Name, Retention time (RT) and Area % showing in GCMS analysis

S.No.	Compound	Retention. time (RT)	Sum of Area %
1	Tridecane		
2	Pentadecane	13.249	0.21
3	5-Decyne-4,7-Diol, 2,4,7,9-Tetramethyl-	14.981	3.03
4	2,6,10-Trimethyltridecane	15.115	0.61
5	Octadecanoic Acid	15.943	0.29
6	3-Octadecene, (E)-	17.541	0.75
7	Heptadecane	17.985	0.23
8	Pentadecane, 2,6,10-Trimethyl-	18.129	5.01
9	Nonadecane	18.773	0.71
10	1,1'-Biphenyl, 2,2',5,5'-Tetramethyl-	19.538	1.88
11	10-Methoxy-Nb-.Alpha.-Methylcorynantheol	19.694	0.33
12	2-Bromotetradecane	19.835	0.19
13	Tetradecane, 5-Methyl-	20.12	0.33
14	Undecanoic Acid, 10-Bromo-	20.225	0.27
15	1-Docosene	20.353	0.4
16	Heneicosane	20.805	0.36
17	Pentadecanoic Acid	20.931	13.41
18	1,2-Benzenedicarboxylic Acid, Bis(2-Methylpropyl) Ester	21.283	1.75
19	Hexadecanoic Acid	21.688	0.68
20	Piperazine, 2,5-Dimethyl-3-(2-Methylpropyl)-	22.523	0.38
21	N-Hexadecanoic Acid	22.76	1.14
22	1-Hexadecanol	23.033	1.93
23	Heptadecanoic Acid	23.356	0.33
24	Eicosane, 2,4-Dimethyl-	23.759	0.48
25	Hexadecanoic Acid, Butyl Ester	25.177	0.85
26	Decane, 4-Cyclohexyl-	25.607	5.23
27	Pyrrro[1,2-A]Pyrazine-1,4-Dione, Hexahydro-3-(Phenylmethyl)-	25.999	0.23
28	4-Cyclohexylnonadecane	27.836	0.22
29	Hexadecanoic Acid, 2-Hydroxy-1-(Hydroxymethyl)Ethyl Ester	28.358	0.19
30	Di-N-Octyl Phthalate	29.615	1.48
31	Eicosanoic Acid, 2-(Acetyloxy)-1-[(Acetyloxy)Methyl]Ethyl Ester	29.909	0.25
32	Eicosanoic Acid, 2,3-Bis(Acetyloxy)Propyl Ester	32.349	2.12
33	Octadecanoic Acid, 2,3-Dihydroxypropyl Ester	32.499	8.87
34	2-Methylhexacosane	33.204	1.08
35	2,3,4-Trifluorobenzoic Acid, Undec-10-Enyl Ester	34.196	0.93
36	Tetratetracontane	34.981	41.55
37	5,11,17,23-Tetratert-Butylpentacyclo[19.3.1.1~3,7~.1~9,13~.1	37.043	0.45
		54.203	1.88

Compounds identification

Identification of active components interpretation of GC-MS samples were finished using the database of Willey library and National Institute of Standards and Technology (NIST), which is having over 62,000 patterns for assessment of diverse compounds. The results recorded were compared with the library of the known components stored in the NIST 14.lib and Wiley 8.lib. Compounds with the name, mass, molecular formula, molecular weight etc. of the components were compared from above mentioned library.

Results and Discussion

Natural products have been considered the largely significant source of potential drugs since ancient era. On the other hand, due to the emergence of different human diseases with the changing environment, continuous screening along with validation of secondary metabolites in the form of effective drug needs to be updated¹⁶. This work is directed to the extraction of bioactive components from the soil actinomycetes isolated on actinomycetes isolation agar (AIA) media from Rajasthan and was tested for antimicrobial activity against selected pathogens

brought from IMTECH Chandigarh. Pet ether, benzene, ethyl acetate and chloroform solvent were used for the extraction of compounds present in AIA6 isolate. Extraction process was held by layer separation technique and compounds were applied on prepared Muller Hinton Agar (MHA) media that occupied with pathogens growth. The isolate was characterized by means of GCMS. A relative concentration of compounds was shown by chromatogram of GCMS. Height of every peak is proportional to its present concentration of compounds. Mass spectrometer identifies the structure and nature of the compound structure, molecular weight, molecular formula, retention time and area percentage of components was identified from NIST 14.lib and Wiley 8.lib. Fatty acids (saturated, unsaturated), phenols, terpenes, alcohols etc. were present in good to moderate amount. Actinomycete produces different compounds showing a good range activity against variety of test pathogen. Actinomycetes have capability to deliver excellent range of antimicrobial compounds¹⁷. Bioactive compounds found (Table 4) in GCMS results have been reported with antimicrobial

activities (antimicrobial²⁰, antibacterial¹⁹, antifungal¹⁸, antioxidant²⁰, anti-inflammatory²⁵, hypocholesterolemic²⁸, antieczemic properties³³, antihistaminic³³). Compounds were hexadecane with RT 16.380, 2,6-di-tert butyl phenol with RT 16.754, 1-pentadecene with RT 17.974, 1-hexadecene with RT 18.022, heptadecane with RT 18.129, 1-nonadecene with RT 20.846, anthracene with RT 20.866, heneicosane with RT 20.931, pyrrolo[1,2-a] pyrazine-1,4-dione, hexahydro-3-(2-methylpro) with RT 21.126, 5,10-diethoxy-2,3,7,8-tetrahydro-1h, 6h-dipyrrolo[1,2-a:1,2-d] pyrazine with RT 22.805, n-hexadecanoic acid with RT 22.988, hexadecanoic acid-butyl ester with RT 25.607, N-acetyltriptamine with RT 25.649, n-tetracosanol-1 with RT 25.714, hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester with RT 29.700, octacosanol with RT 31.090, eicosinoic acid, 2,3 bis (acetyloxy) propyl ester with RT 32.499, octadecanoic acid, 2,3 dihydroxy propyl ester with RT 33.273, geranyl linalool with RT 45.866. Inhibition zones (IZ) of antibacterial and antifungal activity was observed.

Antibacterial activity was observed against *Pseudomonas aeruginosa*, *Staphylococcus aureus*,

Table 4 — Major Compounds present in all three samples of AIA6 isolate: Name, Retention time (RT), Molecular formula, Molecular weight, Activity present in samples of GCMS analysis

Retention time (RT)	Compound	Molecular formula	Molecular weight	Activity
16.380	Hexadecane	C ₁₆ H ₃₄	226	Antibacterial, Antifungal, Antioxidant ¹⁸
16.754	2,6-Di-Tert butyl phenol	C ₁₄ H ₂₂ O	206	Antibacterial, Anti-inflammatory ¹⁹
17.974	1-Pentadecene	C ₁₅ H ₃₀	210	Antimicrobial, Antioxidant ²⁰
18.022	1-Hexadecene	C ₁₆ H ₃₂	224	Antimicrobial ²¹
18.129	Heptadecane	C ₁₇ H ₃₆	240	Antifungal ²²
20.846	1-Nonadecene	C ₁₉ H ₃₈	266	Antifungal ²³
20.866	Anthracene	C ₁₄ H ₁₀	178	Antimicrobial ²⁴
20.931	Heneicosane	C ₂₁ H ₄₄	296	Antibacterial, Anti-inflammatory, Anti-larvalsettle ²⁵
21.126	Pyrrolo[1,2-a] pyrazine-1,4-dione, hexahydro-3-(2-methylpro) 5,10-diethoxy-2,3,7,8-tetrahydro-1h,6h-dipyrrolo[1,2-a:1,2-d]pyrazine	C ₁₁ H ₁₈ N ₂ O ₂	210	Antifungal ²⁶
22.805	5,10-diethoxy-2,3,7,8-tetrahydro-1h,6h-dipyrrolo[1,2-a:1,2-d]pyrazine	C ₁₄ H ₂₂ N ₂ O ₂	250	Antimicrobial ²⁷
22.988	n-Hexadecanoic acid	C ₁₆ H ₃₂ O ₂	256	Antioxidant, Pesticide, Hypocholesterolemic, Nematicide, Lubricant, Antiandrogenic, Hemolytic 5 alpha reductase inhibitor, Antipsychotic ²⁸
25.607	Hexadecanoic acid- butyl ester	C ₂₀ H ₄₀ O ₂	312	Antimicrobial, Antioxidant ²⁹
25.649	N-acetyltriptamine	C ₁₂ H ₁₄ N ₂ O	202	Antibacterial ³⁰
25.714	n- Tetracosanol-1	C ₂₄ H ₅₀ O	354	Antibacterial ²³
29.700	Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl)ethyl ester	C ₁₉ H ₃₈ O ₄	330	Antimicrobial ²⁸
31.090	Octacosanol	C ₂₈ H ₅₈ O	410	Anti-inflammatory, Antinociceptive ³¹
32.499	Eicosinoic acid 2,3 bis(acetyloxy) propyl ester	C ₂₇ H ₅₀ O ₆	470	Antifungal ³²
33.273	Octadecanoic acid, 2,3 dihydroxy propyl ester	C ₂₁ H ₄₂ O ₄	358	Antioxidant, Hepatoprotective, Antihistaminic, Hypocholesterolemic and Antieczemic activities ³³
45.866	Geranyl linalool	C ₂₀ H ₃₄ O	290	Antimicrobial ³⁴

Table 5 — Inhibition zones (IZ=mm) of antibacterial activity of AIA6 Isolate against different test pathogens

Solvents	Test pathogens				
	<i>Staphylococcus aureus</i> (MTCC-3160)	<i>Pseudomonas aeruginosa</i> (MTCC 1688)	<i>Bacillus subtilis</i> (MTCC 441)	<i>Klebsiella pneumonia</i> (MTCC 432)	<i>Proteus vulgaris</i> (MTCC 7306)
Benzene	11mm	18mm	19mm	-	-
Pet ether	-	-	-	-	21mm
Chloroform	-	-	-	-	-
Ethyl acetate	11mm	21mm	-	12mm	15mm

Table 6 — Inhibition zones (IZ=mm) of antifungal activity of AIA6 Isolate against different test pathogens

Solvents	Test pathogens				
	<i>Aspergillus flavus</i> (MTCC-2206)	<i>Aspergillus terreus</i> (MTCC-6324)	<i>Aspergillus niger</i> (MTCC-961)	<i>Saccharomyces cerevisiae</i> (MTCC-170)	<i>Candida albicans</i> (MTCC-183)
Benzene	-	-	-	-	-
Pet ether	-	-	-	-	-
Chloroform	11mm	-	11mm	-	-
Ethyl acetate	-	-	-	9mm	-

Bacillus subtilis, *Klebsiella pneumonia* and *Proteus vulgaris* indicator pathogens. Although antibacterial activity was observed against all test pathogens but the isolate was found to be more sensitive against two gram negative test pathogens- *Pseudomonas aeruginosa* and *Proteus vulgaris*. A good range activity was observed against two test pathogens such as *Pseudomonas aeruginosa* (IZ=Ben-18mm, E.A-21mm) and *Proteus vulgaris* (IZ=P.E-21mm, E.A-15mm). Further results showed antibacterial activity against gram positive bacteria *Staphylococcus aureus* (IZ=Ben-11mm, E.A-11mm) and *Bacillus subtilis* (IZ=Ben-19mm). The Isolate showed moderate activity against gram negative strain *Klebsiella pneumonia* (IZ=E.A-12mm) (Table-5). Antifungal activity was checked against five fungal strains such as *Aspergillus flavus*, *Aspergillus niger*, *Saccharomyces cerevisiae*, *Aspergillus terreus* and *Candida albicans*. Results showed that the isolate was having moderate antifungal activity against three fungal strains, *Aspergillus flavus* (IZ=Chl.-11mm), *Aspergillus niger* (IZ=Chl.-11mm) and *Saccharomyces cerevisiae* (IZ=E.A-9mm). No antifungal activity was recorded against strains *Aspergillus terreus* and *Candida albicans* (Table-6).

Conclusion

On the whole, examination of actinomycetes acquired from rhizospheric soil demonstrates their antibacterial, antifungal, antioxidant and antitoxins etc activity in analysis of GCMS. Under a scope of various development conditions, actinomycetes delivers such compounds which is beneficial against

multidrug resistance pathogens (MDR). In this manner numerous screening events center around discovering novel antimicrobial components that focus on these pathogens. Various untapped rhizospheric regions need to be targeted continuously in search of novel antimicrobial agents which are very significant to the clinic and pharmaceutical industries. So this research is continued in such area to get higher quality effective antimicrobial compounds.

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Bioactive Compounds characterization and Antibacterial Potentials of Actinomycetes isolated from Rhizospheric soil

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Due to acquired resistance produced by micro-organism against all frequently used antimicrobial agents, there is a great need of newer antibiotics to fight against different microbes. To explore the unknown diversity of microorganisms, soil screening for antimicrobial agents are performed for the detection of newer antibiotics from Actinomycetes. Studies were carried out with isolation of total 65 actinomycetes from rhizospheric soil of plants. Isolation and characterization of antimicrobial agents producing actinomycetes was performed and after screening some of isolates were having antimicrobial activity. Among them isolate AIA29 from rhizospheric soil was further studied for their potential. In the present study soil samples have been collected from different regions of Rajasthan. Isolation of actinomycetes was done on Actinomycetes Isolation Agar (AIA) media. Gram staining, characterization of colony and extraction of bioactive compounds was done by solvent extraction method. Antibacterial screening of crude extract was also performed against selected organisms like *Staphylococcus aureus* (MTCC-3160), *Pseudomonas aeruginosa* (MTCC-1688), *Klebsiella pneumoniae* (MTCC-432), *Proteus vulgaris* (MTCC-7306), *Bacillus subtilis* (MTCC-441) procured from IMTECH Chandigarh. The extract showed inhibition zones (IZ) against *Staphylococcus aureus* (IZ= 33mm), *Proteus vulgaris* (IZ= 23mm) and *Bacillus subtilis* (IZ= 28mm). In GCMS analysis various compounds have been identified and compounds like Skatole, 3-methylpentane, Cyclohexane, Hexadecane, linoleic acid, Heptadecane, Nonadecane, Cyclotetradecane, Triacontane, Vinylbital, Ethosuximide and Stearyl alcohol, Dioctylphthalate was identified as having various activity.

Keywords: Secondary metabolites, Rhizosphere, Actinomycetes, Antimicrobial Activity, Antibiotics

Introduction

Microbial diseases are expanding step by step and they are turning into a major risk to human wellbeing. There are in excess of 200 recognized diseases transmitted by microscopic organisms, parasites, infections, prions, rickettsia and different microorganisms to humans¹. Methicillin resistant *Staphylococcus aureus* (MRSA) is one of the superbugs which are accountable of causing hazardous nosocomial infections. The advancement of new antimicrobial agents, ideally naturally happening ones with novel activity, is an utmost medicinal requirement². Today, the creating of viable antimicrobial agents is the actual challenge to the health care industry, particularly immune-compromised patients and Multidrug resistance (MDR) pathogens. Among the every known actinomycete particularly Streptomyces, Nocardiosis species³, Micromonospora, Saccharopolyspora, Amycolatopsis

and Actinoplanes produces commercially important molecules. Approximately, 80% of total antimicrobials have been delivered from streptomycetes. Various important anti-toxins and metabolites have been gotten from terrestrial microorganisms⁴. From the genera Streptomyces and Micromonospora, Numerous nutrients, anti-microbials, proteins and siderophores gotten by Actinomycetes have pharmaceutical, veterinary, rural and clinical significance. Actinomycetes are outstanding for their capacity to create an abundance of regular items with basic unpredictability and with various organic activities⁵. Actinomycetes are Gram positive, filamentous, spore shaping, oxygen consuming microscopic organisms with cell divider containing L-L diaminopimelic corrosive and with high G + C content (57-75%) in their DNA. Rare actinomycetes deliver remarkable antibacterial effectiveness with the most assorted, unique, and exceptional, with low toxicity⁶. Antibiotics such as imidazole compounds have been employed to treat dermatophytic infections possess a series of limitations such as undesirable side effects or rapid

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development of resistance⁷. Screening for novel secondary metabolites was focused, so different types of colonies were isolated. There are many unexplored regions and still need evaluation for a greater diversity of novel actinomycetes with novel bioactive for this reason, the present study evaluates morphological characteristics of isolates, characterization of compounds extracted and their antimicrobial activity against test pathogens.

Material and method

Location of sample collection

Samples were collected from rhizospheric soil of different plants from different regions of Rajasthan state. Collected soil samples were named as JPSN, UDSN, KOSN, ALSN, because of their locations like Jaipur, Udaipur, Kota and Alwar. To avoid any contamination, soil was collected with hand gloves in clean, dry, sterile air tight bags from above mentioned four locations. From 12-15 cm deep soil samples were collected and brought to laboratory for storage at 4°C for further processing of samples.

Isolation and characterization of actinomycetes

Different samples were collected from different sites of Rajasthan, India. These samples were collected from 12-15 cm depth in rhizospheric region in sterile polythene bags in turn to keep away from the other sources of contamination. For isolation of actinomycetes dilutions were prepared upto 10^{-5} and pour plate and spread plates were used for isolation of actinomycetes. Other technique used was sprinkle method and plates were kept inverted at 37°C in incubator for 5-7 days. Media used for isolation of Actinomycetes was 'Actinomycetes Isolation Agar (AIA) media. Total sixty five isolates were isolated on Actinomycetes Isolation Agar (AIA) media. Among them some isolates were having potential activity against indicator organisms. In the present study AIA29 isolate was further studied for their antibacterial activity. Isolate AIA 29 was referred to gram staining and biochemical tests. Morphology of the actinomycetes colonies was determined and tests like Catalase, Urease, Casein hydrolysis, Citrate utilization, Starch hydrolysis, Triple sugar test(TSI), Motility, etc were performed⁸.

Primary screening

Primary screening was done for detection of antimicrobial activity of isolates against five indicator organisms. Two methods were used for primary screening:- Disc diffusion and well agar method^{9,10}.

Indicator organisms

Screening was done by disc diffusion method and agar well diffusion method for the determination of antimicrobial activity of isolates with some of the test pathogens spread onto media plates. Antimicrobial activity of isolates was performed against standard cultures of IMTECH Chandigarh. 5 cultures were used as: *Staphylococcus aureus* (MTCC-3160), *Pseudomonas aeruginosa* (MTCC-1688), *Klebsiella pneumonia* (MTCC-432), *Proteus vulgaris* (MTCC-7306), *Bacillus subtilis* (MTCC-441).

Fermentation and centrifugation

Luria broth was used for the construction of the antimicrobial metabolites in broth. For this process 500 ml of the broth was prepared and distributed into two sterilized Erlenmeyer flasks, 250ml broth in each flask. Culture was added to each flask. Flasks were kept in the shaker incubator at 150 Rpm at 30°C for two-three weeks. Immediate after incubation period is over, the cell suspension was centrifuged at 5,000 Rpm for 20 min to separate the supernatant and the biomass. Only supernatant was collected separately and used for further procedures¹⁰.

Isolation of mixture of compounds from culture broth

After fermentation, from the fermented broth the mycelium was removed by filtration and then clear filtrate was used to check antimicrobial activity. Then the isolation of anti-microbial compound was done from the filtrate by solvent extraction method. Antimicrobial compounds were extracted from the filtrate by solvent extraction with Pet ether, Benzene, Ethyl acetate and Chloroform. Liquid - liquid extraction was done with solvent mixed to the filtrate in 1:1 (v/v) ratio and shaken vigorously for complete extraction of metabolites. It was kept undisturbed for at least half an hour till 2 different layers get separated clearly. Two layers when separated collected in different beakers. Solvent was evaporated by keeping beakers on water bath at 50-60°C and crude remaining in beakers were measured and used for further testing¹¹.

Antimicrobial potential of crude extract

After solvent extraction process with Pet ether, Benzene, Chloroform and Ethyl acetate solvent system and crude obtained from this was applied on test pathogens/indicator organisms on the Muller Hinton Agar (MHA) petri plates. By the Disc diffusion method antibacterial activity test was carried out against selected above mentioned cultures. Plates were kept at 37°C for 24-48 hrs and results were noted

and complete zone of inhibition (IZ) was measured in millimeter (mm)⁸.

GC-MS analysis of bioactive compounds

For the analysis of bioactive compounds Shimadzu model QP-2010 plus, column-Rtx -Ms, 30 m × 0.25 mmi.d.× 0.25 μm film thickness was used for detection Samples were prepared accordingly for analysis of compounds. 100ml beaker was used for the collection of extracts and was mixed with methanol and filtered properly to remove any crystal particle. Then that solution was collected in eppendorf tube after testing it with microinjection. Samples were loaded in injector and processed further. Chromatograms with compounds detected were recorded for each solvent of sample and compared with compounds PMW_TOX2.LIB¹².

Results and Discussion

Actinomycetes have been isolated from different soil types and locations for example arid, tropical forest, mining, cave, swamp, desert and savannah. They are mainly rich in slightly alkaline soils rich in organic matters and generate several structurally varied secondary metabolites of pharmaceutical and agricultural value. Soil samples were collected from four different sites. Isolation of actinomycetes was carried out on AIA media and sixty five isolates were isolated from rhizospheric regions. Upon testing some isolates exhibited antimicrobial activity against indicator organisms. Among them AIA29 isolate (Figure-1) further studied in the present study. So isolate was referred to gram staining as it was positive. After cultural and biochemical tests, primary screening was done for isolate against 5 test microbes. After observing positive results in screening, isolate AIA29 kept for fermentation and extraction of bioactive compounds. 5 test pathogens *Staphylococcus aureus* (MTCC-3160), *Pseudomonas aeruginosa* (MTCC-1688), *Klebsiella pneumonia* (MTCC-432), *Proteus vulgaris* (MTCC-7306), *Bacillus subtilis* (MTCC-441) brought from IMTECH Chandigarh were used for antibacterial activity test for isolate AIA29. Extraction of crude from ethyl acetate solvent was performed and inhibition zones (IZ) of antibacterial activity of isolate

AIA29 was noted against three test pathogens like *Staphylococcus aureus*, *Proteus vulgaris*, *Bacillus subtilis* and no activity was recorded against *Pseudomonas aeruginosa* and *Klebsiella pneumonia*. Inhibition zone against *Staphylococcus aureus* was noted as (IZ=33mm), *Proteus vulgaris* it was (IZ=23mm) and *Bacillus subtilis* activity was (IZ=28mm) (Table-1, Graph-1). Therefore isolate AIA29, was selected for further GCMS analysis for detection of compounds. GCMS analysis showed various information about compounds like, Compounds name, RT time, Molecular formula, Molecular weight, Percent area, Structure of compounds etc. GCMS exposed presence of various compounds in AIA29 isolate. The RT of peaks shows different compounds in chromatogram. Area of peaks

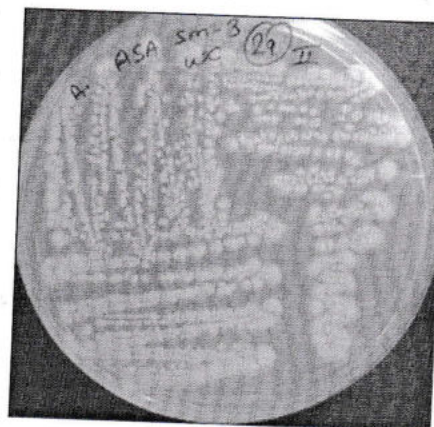
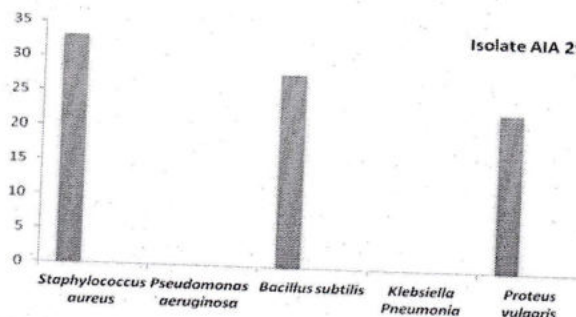


Fig. 1 — Isolated AIA 29 colony on Actinomycetes isolation agar (AIA) media



Graph. 1 — Graphical representation of antibacterial potential of AIA 29 isolate against different indicator pathogens

Table 1 —Antibacterial screening of AIA29 Isolate against different Test pathogens

Test Pathogens		Test Pathogens		
<i>Staphylococcus aureus</i> (MTCC-3160)	<i>Pseudomonas aeruginosa</i> (MTCC 1688)	<i>Bacillus subtilis</i> (MTCC 441)	<i>Klebsiella Pneumonia</i> (MTCC 432)	<i>Proteus vulgaris</i> (MTCC 7306)
33mm	-	28mm	-	23mm

is directly proportional to the amount of compound that is present in solvent. Compounds were analyzed with PMW_TOX2.LIB and compared with the list generated. From mixture of compounds we focussed on compounds which have medical importance like antibacterial, antifungal, antimicrobial, anti-inflammatory activities shown in table-3. Table-2 shows total compounds present in sample of GCMS analysis. Isolate AIA29 showed bioactive compounds having activities of antibacterial, antifungal, anti-

Table 2 — Compounds present in AIA 29 isolate- Name, Retention Time (RT), Peak area%, of compounds present in sample of GCMS analysis

S. No.	Name	R.Time	% Sum of Area
1.	Skatole	11.662	0.09
2.	4-Hydroxyphenylacetic acid	12.407	0.65
3.	3-Methylpentane	12.639	1.54
4.	Metenolone acetate	12.91	0.26
5.	Amiphenazole	14.531	3.08
6.	Myristic acid	15.677	0.42
7.	Cyclohexadecane	16.297	2.77
8.	Hexadecane	16.458	0.5
9.	Phencyclidine prec.	16.917	0.14
10.	Steviol	17.453	0.05
11.	Linoleic acid	18.431	0.83
12.	Heptadecane	18.833	0.82
13.	Nonadecane	18.943	1.89
14.	1,3-Dimethylcyclopentane	19.058	0.67
15.	Octadecane	19.417	1.45
16.	Cyclotetradecane	19.8	0.96
17.	Triacotane	20.062	12.04
18.	Stearyl alcohol	20.721	11.32
19.	Vinylbital	21.43	5.91
20.	Ethosuximide-M (oxo-)	22.036	3.44
21.	Butyl-2-methylpropylphthalate	22.361	0.82
22.	N-Acetyl-Proline	23.833	0.16
23.	Palmitic acid	24.255	3.04
24.	Erucic acid	26.777	0.46
25.	2-Octadecyloxyethanol	26.892	0.3
26.	Diisooctylphthalate	27.061	37.64
27.	Octacosane	27.175	0.19
28.	Stearic acid	27.933	0.59
29.	Butylhexadecanoate	28.314	1.68
30.	Diisononylphthalate	29.687	0.38
31.	Butyl stearate	31.717	0.99
32.	Propylbenzene	32.02	0.14
33.	Nonane	32.468	0.35
34.	Yohimbine	32.75	0.05
35.	Hexacosane	32.921	0.06
36.	Roxatidine	37.992	0.07

inflammatory, antiviral, antiepileptic activities. Compounds like - .09% Skatole (3-methylindole) at RT time -11.662, 1.20% 3-methylpentane at RT time-12.639, 2.64% Cyclohexadecane at RT time -16.297, .50% hexadecane at RT time-16.458, .75% Linoleic acid at RT time 18.431, .11% Heptadecane at RT time 18.833, 1.89% Nonadecane at RT time- 18.943, .96% Cyclotetradecane at RT time- 19.800, 12.04% Triacotane at RT time- 20.062, 5.91% Vinylbital at RT time 21.430, 3.44% Ethosuximide at RT time-22.036, 11.23% Stearyl alcohol at RT time-24.762 and 37.89% Dioctylphthalate at RT time- 35.421 with different activities (Table-3). Natural products have been the most prosperous foundation of potential drugs from the ancient period. Secondary metabolites have been recognized to obtain beneficial effects in virulent factors of various diseases like compound skatole has antibacterial activity, 3-methylpentane has antioxidant, antimicrobial activity, Compound Cyclohexadecane is a antibacterial, antifungal compound, Linoleic acid has a good antiplasmodial activity, Hexadecane, Heptadecane and Nonadecane have antibacterial activity, Triacotane is potential antibacterial, antidiabetic and antitumor activity. Cyclotetradecane and vinylbital have antimicrobial activity, Ethosuximide has good antiepileptic activity, Stearyl alcohol is having good anti-inflammatory, antipyretic activity, Dioctylphthalate compound has antifungal, antibacterial, antiviral antioxidant activity. The raw materials and pharmaceuticals required for the preparation of important drugs are largely obtained from the organisms and plants however, due to the emergence of new human diseases with the varying environment, constant screening and validation of secondary metabolites in the form of drug identification/designing needs to be updated. Clinically important drugs having antibacterial, antifungal, antiviral, anti-inflammatory and other properties can be isolated on a nominal approach. Soil in which actinomycetes are abundantly present and a very major source of natural drugs. In past few years, antimicrobial drug resistance has increased and many more diseases are increasingly hard to treat because of the emergence of drug-resistant organisms. The designing of novel, effective and helpful dosing regimens that suppress or hold back the emerging and proliferating resistant microbial populations, is critical. As resistance has increased to an alarming fraction, a safe and cheaper drug source is always be the choice to the routine therapeutics.

Table 3 — Major compounds present in AIA 29 isolate- Name, Retention Time (RT), Molecular formula, Molecular weight, Peak area%, Activity of compounds present in sample of GCMS analysis

RT	Name of compound	Molecular formula	Molecular weight	Peak area %	Structure of compounds	Activity
11.662	Skatole	C ₉ H ₉ N	131.178	0.09		Antibacterial ¹³
12.639	3-methylpentane	C ₆ H ₁₄	86	1.54		Antioxidant, Antimicrobial ¹⁴
16.297	Cyclohexadecane	C ₁₆ H ₃₂	196	2.77		Antibacterial, Antifungal ¹⁵
16.458	Hexadecane	C ₁₆ H ₃₄	224	0.50		Antibacterial ¹⁶
18.431	Linoleic acid	C ₁₈ H ₃₂ O ₂	280.452	0.83		Antiplasmodial ¹⁷
18.833	Heptadecane	C ₁₇ H ₃₆	240	0.82		Antibacterial ¹⁶
18.943	Nonadecane	C ₁₉ H ₄₀	268	1.89		Antibacterial ¹⁸
19.800	Cyclotetradecane	C ₁₄ H ₂₈	196	0.96		Antimicrobial ¹⁹
20.062	Triacotane	C ₃₀ H ₆₂	422.826	12.04		Antibacterial, Antidiabetic, Antitumor ¹⁸
21.430	Vinylbital	C ₁₁ H ₁₆ N ₂ O ₃	224.260	5.91		Antimicrobial ²⁰
22.036	Ethosuximide	C ₇ H ₉ NO ₂	155	3.44		Antiepileptic ²¹
24.762	Stearyl alcohol	C ₁₈ H ₃₈ O	270	11.32		Anti-inflammatory, Antipyretic ²²
35.421	Diisooctylphthalate	C ₂₄ H ₃₈ O ₄	390	37.64		Antimicrobial, Antifouling ¹⁸

Conclusion

Secondary metabolites production may vary considerably due to the influence of several biotic and abiotic factors. In general, knowing these factors and the potential may constitute an important role in disease control by inducing new drugs. Actinobacteria from soil origin are priceless natural resources of many therapeutically valuable drugs having enormous biosynthetic potential to be useful in biotechnological and industrial point of view. Many antibiotics are produced from soil actinomycetes till now, Thus isolation characterization and purification of economically important secondary metabolites from actinomycetes of sites from where samples are collected is very important task for exploring antimicrobial compounds from natural sources. Therefore present study brings forward a good promise for future drug development.

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GCMS analysis & assessment of antimicrobial potential of rhizospheric Actinomycetes of AIA3 isolate

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Plants have been used for medicine to support human health in many regions in the world by researchers since ancient times. Plants and soil organisms have been found to have very high therapeutic potential as they produce many natural products. Evolving drug resistance towards nearly all anti-infection drugs, lead to the fast development of new drugs. Many natural products or secondary metabolites have been used for animal and human health. Recently, many new secondary metabolites from actinomycetes have been isolated and reported as important compounds with different activities like anti-microbial, anti-oxidant, anti-inflammatory, anti-androgenic and anticancer agents, etc. In this study isolation of actinomycetes was carried out on actinomycetes isolation agar media (AIA). Characterization and biochemical tests were performed and followed by fermentation and solvent extraction by four solvents for example- Benzene, pet ether, ethyl acetate, chloroform. GCMS was performed for identification of compounds present in culture broth. Major compounds present were Octanal, Pyrrolo[1,2-a]pyrazine-1,4-dione, hexahydro-3-(2-methylpropyl), Dibutyl phthalate, N-hexadecanoic acid, 1-nonadecene, Heptadecane, Octadecanoic acid, 3,7,11,15-tetramethyl-2-hexadecene, Dihydroergotamine, Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester, Octadecanoic acid, 2,3-dihydroxypropyl ester, 13-docosenamide, and 4-tert-butylcalix[4]arene. Crude obtained was checked for their antimicrobial activity and inhibition zones (IZ) were noted on Mullar Hinton agar (MHA) media against indicator organisms like *Staphylococcus aureus* (MTCC-3160) (IZ=Ben-18 mm, E.A-25 mm), *Pseudomonas aeruginosa* (MTCC 1688) (IZ=Ben-11 mm, Chl-14 mm, E.A-24 mm), *Klebsiella pneumonia* (MTCC-432) (IZ=Ben-19 mm, Chl-20 mm, E.A-34 mm), *Proteus vulgaris* (MTCC-7306) (IZ=Benzene-10 mm, E.A-30 mm), *Bacillus subtilis* (MTCC-441). Identification of compounds was carried out by NIST 14 library.

Keywords: Actinomycetes, Antibacterial, Bioactive compounds, Inhibition zones, Solvents

IPC Code: Int. Cl.²⁰: C12N 15/82, A61P 31/04, A61K 38/00, C11D 3/43

In nature, various ecological interactions occur; they can be either negative or positive means for the living beings involved¹. The rhizosphere is one of the most complex and dynamic microbial living habitat on the earth. In the rhizospheric region, plants and microbes work together and make a special biological community; this incorporates carbon and water cycling, supplement and mineral trapping etc. Considering the plant-organism collaborations, their co-metabolism creates a wide scope of metabolites, which are of incredibly important and are generally known to encourage different purposes including energy sources and signaling components². Secondary metabolites depict a diverse, low molecular weight and complex structural compounds. Microorganisms

specifically are productive anti-toxin factories, and have been considered as great potent source of bioactive metabolites³. Microbial bioactive components are worldwide known to have good biological activity for human and animal wellbeing. Secondary metabolites are useful as anti-toxins, different medicinal toxins, pesticides, and animal and plant development factors⁴. An ecological niche is a composition of microhabitat that has microscopic structural variety which incorporates microorganisms, protozoa, parasites, nematodes, and a macroscopic variety that incorporates plants and insects. In nature, all organisms need to compete so as to get by in their habitat. This natural biological work can be accomplished by the advancement of competitive mechanisms, for example, the production of toxins, enzymes and antimicrobial components like

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Table 1 — Characterization of AIA3 isolate

Characteristics	Result
Gram staining	+ve
Aerobic growth	+ve
Anaerobic growth	-ve
Sugar fermentation test	
Starch hydrolysis	+ve
Triple sugar iron (TSI) agar	+ve
Casein hydrolysis	+ve
Citrate Utilization	-ve
Methyl red	-ve
Voges-Proskauer	-ve
Nitrate reduction	-ve
Indole production	-ve
Catalase test	+ve
Other tests	
Urease production	+ve
Hydrogen sulphide production (H ₂ S)	-ve
Motility test	-ve
Carbon utilization	
Mannitol	-ve
Lactose	-ve
Dextrose	-ve
Sucrose	+ve

Engineering College and Research Centre (JECRC) University Jaipur, Rajasthan. The screening was done by both disc diffusion and agar well method^{12,13}. (Fig. 1). These pathogenic strains were maintained in the Nutrient agar media slants for routine laboratory use and stored for the long term usages¹⁴.

Fermentation of actinomycetes and extraction of antimicrobial metabolites

Luria broth was used as the base for the production of the antimicrobial metabolites. Around, 500 mL of the broth was prepared and distributed 500 mL into two Erlenmeyer flasks, 250 mL in each flask and sterilized both flasks. After sterilization, flasks were inoculated with culture and kept in the shaker incubator at 150 rpm at 30°C for two weeks. Immediately after incubation period is over, the cell suspension was centrifuged at 5,000 rpm for 20 min to separate the supernatant and the biomass. Four solvents were used as Pet ether, Benzene, Ethyl acetate and Chloroform for compounds extraction from AIA3 culture broth. Solvent and broth containing isolate was mixed to 1:1 (v/v) quantity and shaken well. Further they kept without interruption for 30 min till two isolate layers got completely separated from each other^{13,15}. Solvent beakers (containing bioactive metabolites) were kept at 60°C on water bath for complete evaporation so that we can have only metabolites remain in the container¹⁵. Crude antimicrobial metabolites were extracted using four

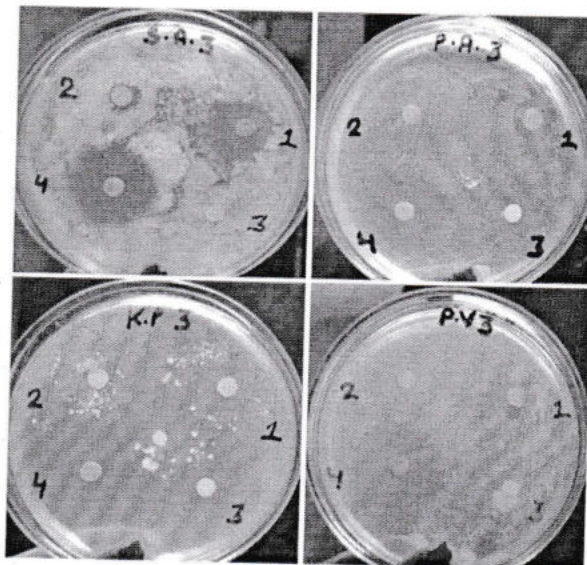


Fig. 1 — Inhibition zones (IZ) of Antibacterial susceptibility test of AIA3 isolate against test pathogens.

solvents with the help of separating funnel. Mixture of bioactive metabolites was transferred to small eppendorf tube for further Gas Chromatography Mass Spectroscopy (GCMS) study^{13,16}.

Inhibition zones (IZ) of antibacterial activity against indicator pathogens

Inhibition zones (IZ) of activity of the crude extracts of benzene, pet ether, ethyl acetate, chloroform was performed against *Staphylococcus aureus* (MTCC-3160), *Pseudomonas aeruginosa* (MTCC-1688), *Klebsiella pneumonia* (MTCC-432), *Proteus vulgaris* (MTCC-7306), *Bacillus subtilis* (MTCC-441) indicator pathogens. Standard Kirby-Bauer disc diffusion method and agar well diffusion methods were used for antimicrobial activity of crude extracts on petri plates containing 20 mL of Muller Hinton Agar (MHA) media. The indicator strains were swabbed on the solidified MHA media and hold for 10 min for drying of plates. The tests were conducted with each crude extracts. The sterilized discs with crude were placed on the MHA media and kept it for 30 min at normal room temperature. So that complete diffusion of compounds can be done. The plates were incubated over night at 37°C and Inhibition zones (IZ) were measured (mm) against each pathogen^{17,18}. (Fig. 1, Table 2, Fig. 1A)

Identification of main bioactive components present in Gas Chromatography-Mass Spectrometry (GC-MS) analysis.

The composition of the active extracts of AIA3 isolate was determined by GCMS analysis using

Table 2 — Inhibitions zones (IZ) of antibacterial activity of AIA3 Isolate against different Test pathogens

Test Pathogens					
Solvents	<i>Staphylococcus aureus</i> (MTCC-3160)	<i>Pseudomonas aeruginosa</i> (MTCC 1688).	<i>Bacillus subtilis</i> (MTCC 441)	<i>Klebsiella Pneumonia</i> (MTCC 432)	<i>Proteus vulgaris</i> (MTCC 7306)
Benzene	18 mm	11 mm	-	19 mm	10 mm
Pet ether	-	-	-	-	-
Chloroform	-	14 mm	-	20 mm	-
Ethyl acetate	25 mm	24 mm	-	34 mm	30 mm

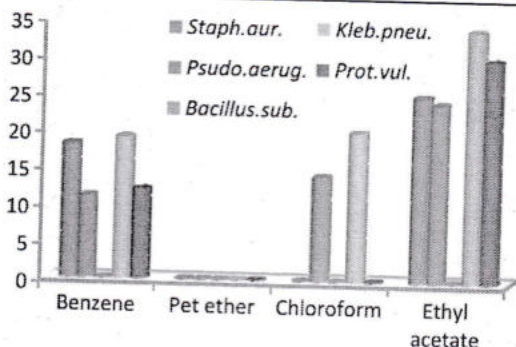


Fig. 1A — Graphical representation of Antibacterial activity of AIA3 isolate against five test pathogens

Shimadzu QP2010, ultra and gas chromatograph interfaced to a mass spectrometer GC-MS. The instrument was built with Elite-1 fused silica capillary. Helium gas (99.9%) was used as the carrier gas and with the flow rate of 1.21 mL/min. Helium gas (99.99%) was the carrier gas with a constant flow rate of 1.21 mL/min and with split ratio: 10. Temperature of Injector was 260°C; Ion-source temperature 200°C. The oven temperature was intended from 60°C (constant for 3 min.) with an increment as of 280°C for 22 min. Mass spectra were taken at 70eV; a scan interval of 0.5 seconds. The chemical composition of the extract was determined by measuring the peak area and the retention time by comparing the NIST 14 library¹⁹.

Results & discussion

Secondary metabolites have been considered the reliable source of therapeutic drugs since ancient time. On the contrary, because of drug resistance emergence of diverse human diseases with the changing environment, continuous screening along with validation of bioactive secondary metabolites in the form of effective drug needs to be updated. Secondary metabolites are potent bioactive components isolated from plants and soil organisms as well. Isolation of actinomycetes was done on Actinomycetes isolation agar (AIA) media. Biochemical test like Starch hydrolysis, Triple sugar

iron (TSI) agar, Casein hydrolysis, Citrate Utilization, Methyl red, Voges-Proskauer, Nitrate reduction, Indole production, Catalase test, Urease production, Hydrogen sulphide production (H₂S), Motility test, Mannitol, Lactose, Dextrose, Sucrose were carried out with actinomycetes AIA3 isolate. Isolate was positive in Gram staining, aerobic growth, Starch hydrolysis, Triple sugar iron (TSI) agar, Casein hydrolysis, Catalase test, Urease production and Sucrose test. Characterization of pure colony, broth fermentation and extraction of bioactive components from four solvents like pet ether, benzene, ethyl acetate and chloroform from the soil actinomycetes was performed. For the presence of compounds in isolate were characterized by means of GCMS. Isolate was checked for antimicrobial activity against selected indicator pathogens which was brought from IMTECH Chandigarh. Extraction of components was processed by layer separation technique and sterilized discs with components were applied on prepared plates of Muller Hinton Agar (MHA) media already occupied with pathogenic growth. Antimicrobial susceptibility test was performed against indicator strain *Staphylococcus aureus* (MTCC-3160), *Pseudomonas aeruginosa* (MTCC 1688), *Klebsiella pneumonia* (MTCC-432), *Proteus vulgaris* (MTCC-7306), *Bacillus subtilis* (MTCC-441) brought from IMTECH Chandigarh. Major compounds obtained in Ethyl acetate extract of AIA3 isolate were, Octanal with RT-14.353, Pyrrolo[1,2-a]pyrazine-1,4-dione with RT-20.360, hexahydro-3-(2-methylpropyl) with RT- 22.875, Dibutyl phthalate with RT-22.875, N-hexadecanoic acid with RT-22.993, 1-nonadecene with RT-23.342, Heptadecane with RT- 23.418, Octadecanoic acid with RT-25.332, 3,7,11,15-tetramethyl-2-hexadecene with RT-25.737, Dihydroergotamine with RT- 27.314, Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester with RT- 29.578, Octadecanoic acid, 2,3-dihydroxypropyl ester with RT- 33.172, 13-docosenamide with RT- 33.893, and 4-tert-butylcalix[4]arene with RT- 54.173. A relative concentration of compounds

was shown by chromatogram of AIA3 isolate. (Fig. 2) Height of every peak is proportional to its present concentration of compounds. Inhibition zones (IZ) of antibacterial activity of crude extracts were recorded against *Staphylococcus aureus* (IZ=Ben-18 mm, E.A-25 mm) *Pseudomonas aeruginosa* (IZ=Ben-11 mm, Chl-14 mm, E.A-24 mm), *Klebsiella pneumonia* (IZ=Ben-19 mm, Chl-20 mm, E.A-34 mm) *Proteus*

vulgaris (IZ=Benzene-10 mm, E.A-30 mm) and no activity was recorded against *Bacillus subtilis*. (Table 2, & Fig. 1A) Structure, Molecular weight, Molecular formula, Retention time (RT) and Area percentage of components obtained in GCMS was identified from NIST14 library. Fatty acids (saturated, unsaturated), phenols, terpenes, alkaloids, alcohols, amide compounds etc. were present in good to moderate amount (Table 3).

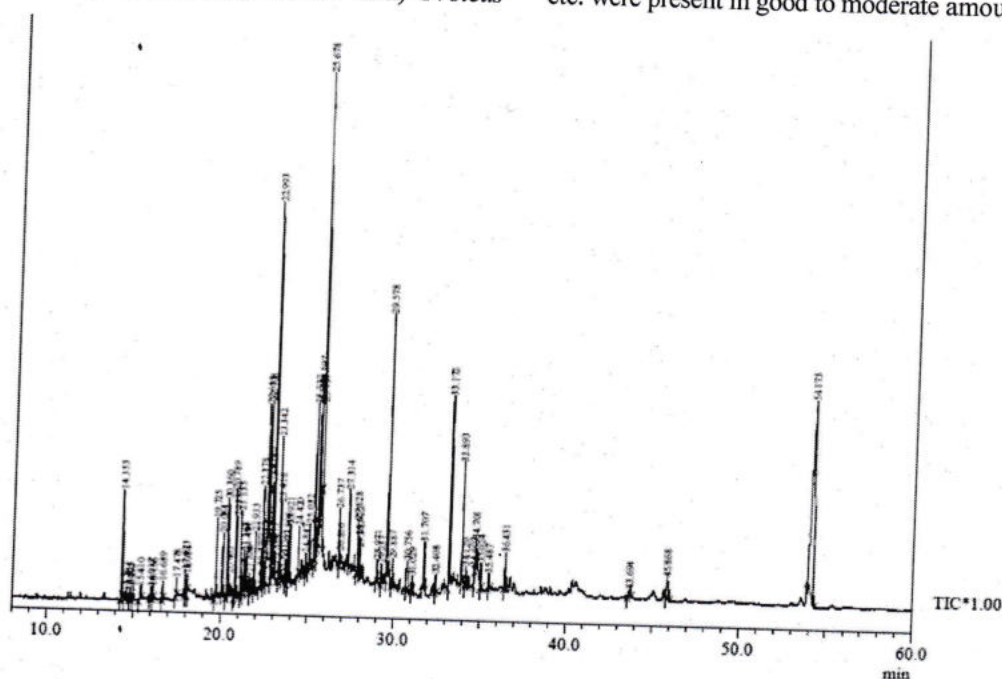


Fig. 2 — Chromatogram of AIA3 isolate showing peaks of compounds in GCMS analysis

Table 3 — Composition of Ethyl acetate extract of rhizospheric AIA3 isolate by GCMS analysis

RT	Compound name	Molecular formula	Molecular weight
14.353	Octanal	C ₈ H ₁₆ O	128.215
14.567	2,3-dimethylcyclohexanol 1	C ₈ H ₁₆ O	128.215
14.825	1-tridecene	C ₁₃ H ₂₆	182.351
14.959	Tridecane	C ₁₃ H ₂₈	184.367
15.410	Benzeneethanol, 4-hydroxy-	C ₉ H ₁₂ O	136.194
16.017	2,6-di-butyl-2,5-cyclohexadiene-1,4-dione	C ₁₄ H ₂₀ O ₂	220.312
16.156	Hexadecane, 1-chloro-	C ₁₆ H ₃₃ Cl	260.890
16.689	Acetamide, n-(2-phenylethyl)-	C ₁₀ H ₁₃ NO	163.220
17.478	Dodecanoic acid	C ₁₂ H ₂₄ O ₂	200.322
17.973	1-pentadecene	C ₁₅ H ₃₀	210.405
18.084	Tetradecane	C ₁₄ H ₃₀	198.394
19.725	3-methyl-1,4-diazabicyclo[4.3.0]nonan-2,5-dione, n-acetyl-	C ₁₀ H ₁₄ N ₂ O ₃	210.229
20.360	Pyrrlo [1,2-a] pyrazine-1,4-dione, hexahydro-	C ₇ H ₁₀ N ₂ O ₂	154.169
20.789	1-heptadecene	C ₁₇ H ₃₄	238.459
20.880	Nonadecane	C ₁₉ H ₄₀	268.529
21.287	Pentadecanoic acid	C ₁₅ H ₃₀ O ₂	242.403
21.368	Tyrosol, acetate	C ₁₀ H ₁₂ O ₃	180.203
21.484	3-isobutylhexahydropyrrlo [1,2-a] pyrazine-1,4-dione	C ₁₁ H ₁₈ N ₂ O ₂	210.277

(Contd.)

Table 3 — Composition of Ethyl acetate extract of rhizospheric AIA3 isolate by GCMS analysis (Contd.)

RT	Compound name	Molecular formula	Molecular weight
21.669	Phthalic acid, butyl undecyl ester	C ₂₃ H ₃₆ O ₄	376.537
21.933	1-hexadecanol	C ₁₆ H ₃₄ O	242.447
22.277	7,9-di-tert-butyl-1-oxaspiro (4,5) deca-6,9-diene-2,8-dione	C ₁₇ H ₂₄ O ₃	276.376
22.317	Nonane, 5-methyl-5-propyl-	C ₁₃ H ₂₈	184.367
22.480	Hexadecanoic acid, methyl ester	C ₁₇ H ₃₄ O ₂	270.457
22.708	2,5-piperazinedione, 3,6-bis (2-methylpropyl)-	C ₁₂ H ₂₂ N ₂ O ₂	226.320
22.736	5,10-diethoxy-2,3,7,8-tetrahydro-1h,6h-dipyrrolo[1,2-a:1,2-3i	C ₁₄ H ₂₂ N ₂ O ₂	250
22.875	Dibutyl phthalate	C ₁₆ H ₂₂ O ₄	278.348
22.993	N-hexadecanoic acid	C ₁₆ H ₃₂ O ₂	256.430
23.073	Nonadecane, 3-methyl-	C ₂₀ H ₄₂	282.556
23.275	9,10-anthracenedione	C ₁₄ H ₈ O ₂	208.216
23.342	1-nonadecene	C ₁₉ H ₃₈	266.513
23.418	Heptadecane	C ₁₇ H ₃₆	240.475
23.663	Isopropyl palmitate	C ₁₉ H ₃₈ O ₂	298.511
23.702	Heptadecanoic acid	C ₁₇ H ₃₄ O ₂	270.457
23.808	9-octadecenoic acid (z)-	C ₁₈ H ₃₄ O ₂	282.468
23.921	Palmitic acid, tms derivative	C ₁₉ H ₄₀ O ₂ Si	328.612
24.420	Carbonic acid, monoamide, n-decyl-, 2-ethylhexyl ester	C ₁₉ H ₃₉ NO ₂	388
24.847	Octadecane	C ₁₈ H ₃₈	254.502
25.332	Octadecanoic acid	C ₁₈ H ₃₆ O ₂	284.484
25.413	Tetracosane	C ₂₄ H ₅₀	338.664
25.678	Acetamide, n-[2-(1h-indol-3-yl) ethyl]-	C ₁₃ H ₁₆ N ₂ O	216.284
25.737	3,7,11,15-tetramethyl-2-hexadecene	C ₂₀ H ₄₀	280.540
26.737	Oxiraneoctanoic acid, 3-octyl-, methyl ester, cis-	C ₁₉ H ₃₆ O ₃	312.494
26.816	Tetratetracontane	C ₄₄ H ₉₀	619.204
27.314	Dihydroergotamine	C ₃₃ H ₃₇ N ₅ O ₅	583
27.987	Octacosane	C ₂₈ H ₅₈	394.772
28.971	Octadecanoic acid, 3-oxo-, ethyl ester	C ₂₀ H ₃₈ O ₃	326.521
29.237	D-ribose, 2-deoxy-bis(thioheptyl)-dithioacetal	C ₁₉ H ₄₀ O ₃ S ₂	380.509
29.578	Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester	C ₁₉ H ₃₈ O ₄	330.509
29.887	1,2-benzenedicarboxylic acid	C ₆ H ₈ O ₄	166.132
30.756	L-prolinamide, 5-oxo-l-prolyl-l-phenylalanyl-4-hydroxy-	C ₁₉ H ₂₄ N ₄ O ₅	388
31.029	N-tetracosanol-1	C ₂₄ H ₅₀ O	354.663
32.408	Hexadecanoic acid, 2-(acetyloxy)-1-[(acetyloxy) methyl]ethyl ester	C ₂₃ H ₄₂ O ₆	414.576
33.172	Octadecanoic acid, 2,3-dihydroxypropyl ester	C ₂₁ H ₄₅ BO ₇	420.394
33.893	13-docosenamide, (z)-	C ₂₂ H ₄₃ NO	337.592
34.603	Phosphonic acid, dioctadecyl ester	C ₃₆ H ₇₅ O ₄ P	602.966
34.701	9-octadecenoic acid (z)-, 2,3-bis (acetyloxy) propyl ester	C ₂₅ H ₄₄ O ₆	440.621
35.024	Eicosanoic acid, 2,3-bis (acetyloxy) propyl ester	C ₂₇ H ₅₀ O ₆	470.691
35.487	Pentatriacontane	C ₃₅ H ₇₂	492.961
36.431	9-octadecenamide	C ₁₈ H ₃₅ NO	281.484
43.694	beta.-sitosterol	C ₂₉ H ₅₀ O	414.718
45.868	1,6,10,14-hexadecatetraen-3-ol, 3,7,11,15-tetramethyl-	C ₂₀ H ₃₄ O	290.490
54.173	4-tert-butylcalix[4]arene	C ₄₄ H ₅₆	584.932

Actinomycetes have capability and produces diverse compounds showing a good range activity against variety of indicator pathogen. Octanal is a major component of essential oil found in *Hydnora Africana* having antioxidant and antimicrobial activity. In traditional medicine, the root of *Hydnora africana* species have been used to treat a variety of human diseases with inflamed throat, tuber, fruits, leaves and

fruit pulp is used for the cure of infectious diseases such as dysentery, diarrhoea, amenorrhoea, bladder and kidney complaints²⁰. Octanal is also having cytotoxic properties, reported in *Syzygium polyanthum* plant. *Syzygium polyanthum* plant is being traditionally used for the treatment of diseases that include diarrhea, rheumatism, diabetes mellitus, hypercholesterolemia, hypertension, gastritis and

hyperuricemia²¹. Pyrrolo [1,2-a]pyrazine-1,4-dione, hexahydro-3-(2-methylpropyl) compound have antifungal activity and isolated from *Streptomyces* species²². Dibutyl phthalate reported as effective antibacterial compound from plant *Ipomea carnea*. *Ipomea carnea* leaves used in a skin disease in some rural areas of Chhattisgarh, India. There are some findings on synergistic effect of insecticides with plant extracts against malarial Vector *Anopheles stephensi*²³. Presence of Hexadecanoic acid, Octadecanoic acid and 13-Docosenamamide have been reported in the plant *Clerodendrum phlomidis*. Hexadecanoic acid and Octadecanoic acid have antioxidant, antimicrobial, hypocholesterolemic, antiarthritic, anti-inflammatory activity and 13-Docosenamamide have been reported as antimicrobial activity. The plant *Clerodendrum phlomidis* belongs to the family verbenaceae and it has importance as it is medicinally very useful in the treatment of nervous disorders, inflammation, asthma, rheumatism, digestive disorders, urinary disorders and diabetes etc. In clinic they have been reported as powerful drug having anti-inflammatory, hypoglycemic, immune modulatory, anti-diarrhoeal and anti-plasmodial properties²⁴. 1-Nonadecene compound has antifungal activity reported in *Croton bonplandianum* plant. Plant is useful to anticipation of liver infections, ring worms and skin diseases, body swelling²⁵. Heptadecane has antifungal activity in *Lepidagathis cristata* Willd. (Acanthaceae). *Lepidagathis cristata* is a medicinal herb and very useful tonic in fevers and in

pneumonia, flu, mouth infections, eczema, psoriasis and other skin problems. The ash of whole herb is applied externally on chronic wounds of pet animals. The roots used in stomachic and dyspepsia, leaves are important for fevers²⁶. 3,7,11, 15-tetramethyl-2-hexadecene has been known for its antimicrobial, anti-inflammatory activity in *Fluggea leucopyrus* plant. *Fluggea leucopyrus* Wild. Plant is sweet, cooling, diuretic, aphrodisiac, tonic useful in vitiated conditions of pitta, burning sensation, strangury, seminal weakness and general debility. Its leaves act as a anti-infection and its paste is useful to extract any extraneous substance from tissues without surgery. Paste of its leaves if mixed with tobacco is used to destroy worms in sores²⁷. Dihydroergotamine works as anti-migraine therapy. It is useful in acute Migraine problem and used as vasopressor^{29,30}. Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester have Hemolytic, pesticide, flavour, antioxidant activity isolated from *Pistia stratiotes* L. Leaves of *Pistia stratiotes* are traditionally used against ringworm infection of scalp, boils and syphilitic eruptions. Traditionally, its oil extracts is useful for the treatment of tuberculosis, asthma and dysentery. *Eichhornia crassipes* plant is also useful for medical purpose³¹. Octadecanoic acid, 2,3-dihydroxypropyl ester have strong anti-microbial and anti-cancerous compound isolated from *Cenchrus biflorus* plant³². 4-tert-butylcalix [4] arene compound have been reported as allelopathic suppression in *Cassia tora* L. and mitotic changes on *Allium cepa* L³³ (Table 4).

Table 4 — Major Components present in Ethyl acetate extract of isolate and their biological activity

RT	Name of Compound	Nature of compound	Other Sources of compounds	Parts used	Activity
14.353	Octanal	Saturated fatty aldehyde	<i>Hydnora .africana</i> <i>Syzygium polyanthum</i>	Roots, Tuber, fruits, Leaves & Fruit pulp Leaves	Treatment of infectious Diseases such as dysentery, Diarrhea, amenorrhoea, bladder & kidney ²⁰ Cytotoxicity ²¹
20.360	Pyrrolo[1,2-a]pyrazine-1, 4-dione, hexahydro-3-(2-methylpropyl)	Pyrrolizidine	<i>Streptomyces</i>	Ethyl acetate extract	Antifungal & Antibacterial ²²
22.875	Dibutyl phthalate	Colorless oily liquid	<i>Ipomoea carnea</i>	Stem	Antibacterial ²³
22.993	N-hexadecanoic acid	Saturated long chain fatty acid	<i>Clerodendrum phlomidis</i> L. (<i>Verbenaceae</i>)	Leaves	Anti-oxidant Nematicide ²⁴
23.342	1-nonadecene	Unbranched alkene	<i>Croton bonplandianum</i> (<i>Euphorbiaceae</i> family)	Leaves	Antifungal ²⁵
23.418	Heptadecane	Straight chain alkane	<i>Lepidagathis cristata</i> Willd. (<i>Acanthaceae</i>)	Leaves	Antifungal ²⁶

(Contd.)

Table 4 — Major Components present in Ethyl acetate extract of isolate and their biological activity (Contd.)

RT	Name of Compound	Nature of compound	Other Sources of compounds	Parts used	Activity
25.332	Octadecanoic acid	Straight chain saturated fatty acid	<i>Pterocarpus angolensis</i>	Stem bark	Antimicrobial Activity ²⁴
25.737	3,7,11,15-tetramethyl-2-hexadecene	Terpene alcohol	<i>Fluggea leucopyrus</i> Willd. (<i>Euphorbiaceae</i>)	Aerial parts	Antimicrobial, Anti-inflammatory ²⁷
27.314	Dihydroergotamine	Alkaloid	<i>Pseudomonas aeruginosa</i>	Methanolic-extract	Unkonwn activity ²⁸ Anti Migraine therapy ²⁹ Vasopressor ³⁰
29.578	Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl)ethyl ester	Amino compound	<i>Pistia stratiotes</i> L. & <i>Eichhornia crassipes</i>	Leaves	Hemolytic, pesticide, flavour, antioxidant ³¹
33.172	Octadecanoic acid, 2,3-dihydroxypropyl ester	Fatty acid	<i>Cenchrus biflorus</i> Roxb	Leaves	Anticancer, antimicrobial ³²
33.893	13-docosenamide, (z)-	Amino compound	<i>Clerodendrum phlomidis</i> L. (<i>Verbenaceae</i>)	Leaves	Anti-microbial ²⁴
54.173	4-tert-butylcalix[4]arene	Peptides	<i>Nicotiana plumbaginifolia</i>	Stem	Allelopathic suppression in <i>Cassia tora</i> L. and mitotic changes on <i>Allium cepa</i> L. ³³

Conclusion

The present study concluded that rhizospheric soil actinomycetes possess strong antimicrobial activity against the indicator pathogens. The extracellular components secreted by the actinomycetes isolate were extracted using organic solvents which were present and displayed antimicrobial activity. GCMS studies have demonstrated the presence of variety of group of bioactive compounds at different concentration level. Inhibition zones (IZ) of antimicrobial activity of the extracts of actinomycetes isolate against the drug resistant clinical pathogens were comparable with the other researcher's studies. On the whole, the microorganism recovered from unexplored rhizospheric regions of Rajasthan was the promising source for the revival of secondary metabolites with broad level of activities which guided for the development of new antibiotics.

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Conflict of Interest: The authors declare no conflict of interest.

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Isolation and Structural Characterization of Alkali and Alkaline Earth Metal Salts with Synthetic Non Cyclic Ionophores

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Abstract

In the present study, an investigation on the complex formation between mono- and divalent metal ions (Na^+ , K^+ , Li^+ and Mg^{2+}) in the form of salt with different podands using various solvents has been carried out. Isolated complexes were characterized by different spectroscopic techniques *viz.* IR, NMR and elemental analysis. On the basis of the obtained data, it was observed that number of donor sites, ionic potential, size fit concept in pseudocyclic cavity *etc.* are the deciding factors for complexation which make it differ between solid and solution complexation using ionophores.

Keywords: Podands; Complexation; Pseudocyclic cavity.

Introduction

Molecular informatics field is related to the molecular storage and the supramolecular processing of information. The organizational ability of membranes mimics in the host-guest systems [1]. Podands having donor groups can interact with alkali and alkaline earth metal cations and are known to be effective host molecules. Variation in the structure leads to variation in cation binding strengths and selectivities and works on the basis of the cooperative coordination through interaction between host and guest in pseudocyclic cavity of ionophore.

Certain polyethers, particularly those containing 5-10 oxygen atoms each separated from the next by two carbon atoms were shown to form crystalline complexes of alkali [2] and alkaline earth metal salts. It was reported that the stoichiometry of these complexes may

be 1:1, 2:1 or 3:1 [metal ion(s): poly- ether] regardless of valency of metal.

Materials and Methods

The complexes [3, 4] were prepared by mixing different proportions of alkali and alkaline earth metal salts with ionophores (P_1 - P_3) (Figures 1-3) in different solvents like methanol, ethyl acetate, (Methanol+ ethyl acetate), (isopropanol+ethyl acetate) and acetonitrile. The mixture was heated on a water bath, thus reduced and then allowed to crystallize at room temperature. Crystallisation generally occurs within two or three days. The crystals were vacuum filtered and recrystallised from the same solvent from which they were isolated.

The characterization of isolated complexes was carried out by melting point determination and confirmed by elemental and spectral analysis (C,H,N analysis, IR and ¹H NMR). The stoichiometry of the complexes was

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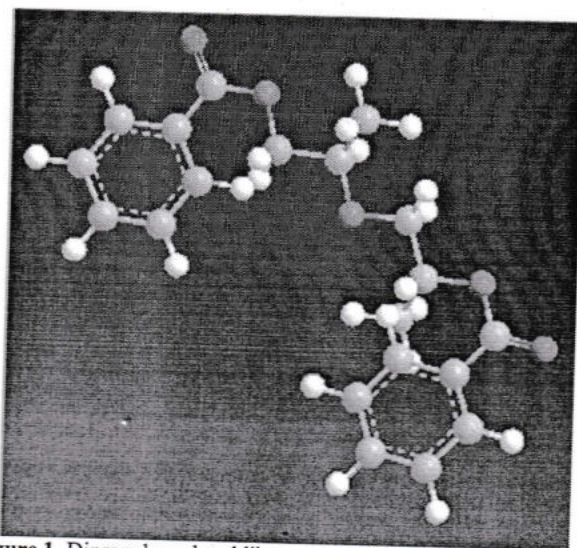


Figure 1. Dipropylenglycoldibenzoate $[(C_6H_5CO_2C_3H_6)_2O]$ $[P_1]$

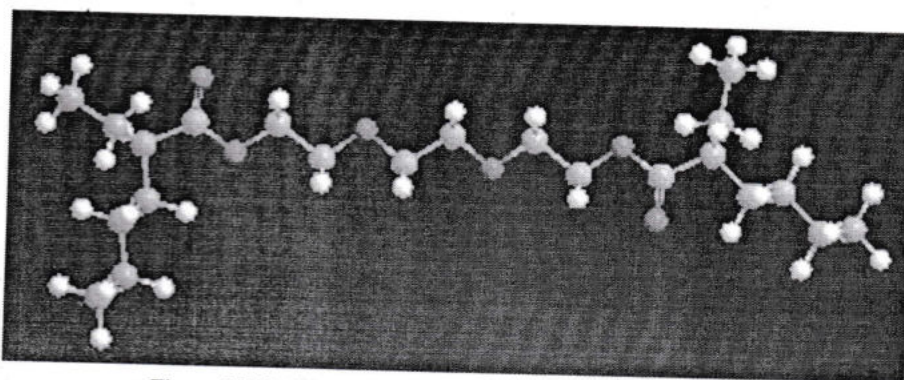


Figure 2. Triethylenglycolbis(2-ethylhexanoate) $[C_{22}H_{42}O_6]$ $[P_2]$

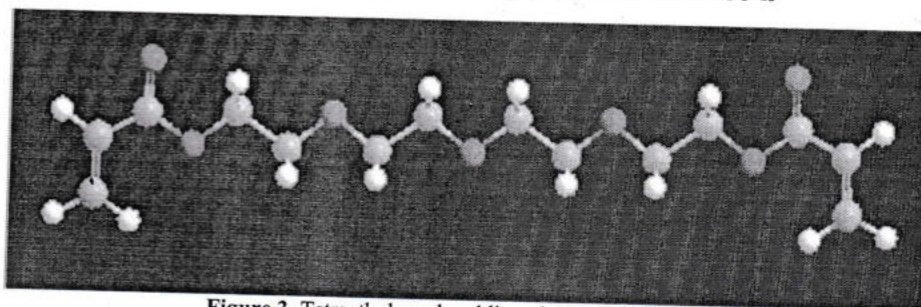


Figure 3. Tetraethyleneglycoldiacrylate $[C_{14}H_{22}O_7]$ $[P_3]$

determined by metal estimation on digital flame photometer (Systronics 128) and atomic absorption spectrophotometer (Shimadzu 6300).

Results and Discussion

The isolation studies of metal salts with ionophores (P_1 - P_3) have been carried out and it is observed that P_1 , P_2 and P_3 form complexes with metal salts and the

characterization of complexes are summarized in Tables 1-3.

In the formation of complexes the solvation of metal ion and solvation of the ligand are two deciding factors. Complexes were isolated in ethyl acetate and methanol.

Almost all complexes were isolated with $M(\text{Pic})_x$ and $M(\text{Dnp})_x$ salts while $M(\text{Onp})_x$ salts were failed to complex with non cyclic ligands.

Table 1. Properties of isolated complexes of alkali and alkaline earth metal salts with podands P₁, P₂ and P₃

S.No.	Metal Salt	Ionophore	Solvent	Stoichiometry M:L	M.P. (°C)	Molecular formula	Elemental Analysis (%)			
							C	H	N	M
1	NaPic	P ₁	CH ₃ COO C ₂ H ₅	1:1	245	C ₂₆ H ₂₄ O ₁₂ N ₃ Na	C 52.58	4.04	7.08	3.88
2	KPic	P ₁	CH ₃ COO C ₂ H ₅	1:1	255	C ₂₆ H ₂₄ O ₁₂ N ₃ K	F 52.56	4.01	7.11	3.92
3	LiDnp	P ₁	CH ₃ OH	1:1	101	C ₂₆ H ₂₅ O ₁₀ N ₂ Li	C 51.20	3.94	6.89	6.40
4	KPic	P ₂	CH ₃ OH	1:1	257	C ₂₈ H ₄₄ O ₁₃ N ₃ K	F 51.13	3.92	6.90	6.37
5	NaPic	P ₂	CH ₃ OH	1:1	260	C ₂₈ H ₄₄ O ₁₃ N ₃ Na	C 58.40	4.70	5.26	1.30
6	LiDnp	P ₂	CH ₃ OH	1:1	91	C ₂₈ H ₄₅ O ₁₁ N ₂ Li	F 58.40	4.74	5.18	1.35
7	Mg(Dnp) ₂	P ₂	CH ₃ OH	1:1	73	C ₃₄ H ₄₈ O ₁₆ N ₄ Mg	C 50.18	6.57	6.27	5.82
8	Mg(Dnp) ₂	P ₃	CH ₃ OH	1:1	63	C ₂₆ H ₂₈ O ₁₇ N ₄ Mg	F 50.15	6.52	6.31	5.79
							C 51.41	6.73	6.43	3.52
							F 51.45	6.74	6.40	3.49
							C 56.71	7.59	4.72	1.17
							F 56.65	7.57	4.79	1.21
							C 51.48	6.06	7.06	3.03
							F 51.37	6.12	7.11	2.99
							C 45.06	4.04	8.09	3.47
							F 45.14	3.99	8.15	3.42

Table 2. IR spectral data of alkali and alkaline earth metal complexes with podands P₁, P₂ and P₃

Ionophore	Complex	Selected IR absorption bands in ionophore and respective shift in complex (cm ⁻¹)	
		Ionophore	Complex
P ₁	P ₁ .NaPic	3064.12 (Ar C-H), 1714.36 (C=O), 1584.84(C-C), 1451.52 (C-H in CH ₂), 1378.43 (C-H in CH ₃), 1315.17 (C-O in ester), 1176.59 (C-O-C)	3100 (Ar C-H), 1700 (C=O), 1530(C-C), 1436.62 (C-H in CH ₂), 1370.57 (C-H in CH ₃), 1279.65 (C-O in ester), 1162.60 (C-O-C)
	P ₁ .KPic	3087.57 (Ar C-H), 1869.04 (C=O), 1568.64(C-C), 1430.38 (C-H in CH ₂), 1372.93 (C-H in CH ₃), 1278.93 (C-O in ester), 1162.78 (C-O-C)	
	P ₁ .LiDnp	3109.28 (Ar C-H), 1829.71 (C=O), 1540.06(C-C), 1435.66 (C-H in CH ₂), 1335.20 (C-H in CH ₃), 1255.44 (C-O in ester), 1137.04 (C-O-C)	
P ₂	P ₂ .KPic	1734.83 (C=O), 1460.74 (C-H in CH ₂), 1382.74 (C-H in CH ₃), 1175.09 (C-O-C)	
	P ₂ .NaPic	1869.05 (C=O), 1430.43 (C-H in CH ₂), 1371.98 (C-H in CH ₃), 1162.95 (C-O-C)	
	P ₂ .LiDnp	1860 (C=O), 1437.41 (C-H in CH ₂), 1370.09 (C-H in CH ₃), 1278.72 (C-O-C)	
P ₃	P ₂ .Mg(Dnp) ₂	1829.74 (C=O), 1435.66 (C-H in CH ₂), 1335.91 (C-H in CH ₃), 1136.80 (C-O-C)	
	P ₃ .Mg(Dnp) ₂	1800 (C=O), 1435.61 (C-H in CH ₂), 1336.16 (C-H in CH ₃), 1183.86 (C-O-C)	
		2873.48 (=C-H), 1730.17 (C=O), 1135.28 (C-O-C), 1453.09 (C-H in CH ₂)	
		3109.00 (=C-H), 1829.73 (C=O), 1107.91 (C-O-C), 1435.73 (C-H in CH ₂)	

Ionophore P₁ shows complexing ability with Li⁺, Na⁺ and K⁺, P₂ with Li⁺, Na⁺, K⁺ and Mg²⁺ while P₃ with Mg²⁺. It is clear from elemental analysis and metal estimation of isolated complexes that stoichiometric ratio of metal salt and ionophore for P₁, P₂ and P₃ is 1:1.

From Table 2, It is observed that characteristics IR peaks of the ionophore P₁ at 1714.36 (C=O), 1315.17 (C-O in ester) and 1176.59 (C-O-C) are shifted in the complexes. It shows the participation of these groups in the complexation and slight shift in the case of NaPic

indicates the lesser amount of participation of these groups in complexation which may be attributed to the conformational changes in the non cyclic ionophores.

Ionophore P₁ forms complexes with sodium picrate, potassium picrate and lithium dinitrophenolate (Figure 4). The shifting of the peaks are greater in P₁.LiDnp complex than P₁.NaPic and P₁.KPic. The selectivity of ionophore P₁ for Li⁺ can be explained by pseudocyclic cavity fit concept. It may be suggested that the ionic diameter of Li⁺ (1.36 Å) matches with pseudocavity

Table 3. ^1H NMR spectral data of alkali and alkaline earth metal complexes with podands P_1 , P_2 and P_3

Ionophore	Complex	Selected NMR absorption bands in ionophore and respective shift in complex (δ ppm)
P_1	$\text{P}_1\text{.NaPic}$	1.33-1.37 (CH_3), 3.55-3.99 (CH), 4.31-4.48 (OCH_2), 8.00-8.06 (ArH)
	$\text{P}_1\text{.KPic}$	1.27-1.35 (CH_3), 3.47-3.55 (CH), 4.76-4.84 (OCH_2), 8.45-8.49 (ArH)
	$\text{P}_1\text{.LiDnp}$	1.29-1.36 (CH_3), 3.57-3.60 (CH), 4.76-4.84 (OCH_2), 8.59-8.88 (ArH)
P_2	$\text{P}_2\text{.KPic}$	1.25-1.58 (CH_3), 3.65-3.69 (CH), 4.51-4.53 (OCH_2), 8.45-8.49 (ArH)
	$\text{P}_2\text{.NaPic}$	1.27-1.31 (CH_2), 3.64-3.69 (CH), 4.23-4.26 (OCH_2)
	$\text{P}_2\text{.LiDnp}$	1.1-1.3 (CH_2), 3.25 (CH), 4.62-4.70 (OCH_2), 8.51-8.52 (ArH)
	$\text{P}_2\text{.Mg(Dnp)}_2$	1.31-1.39 (CH_2), 3.5-3.7 (CH), 4.62-4.68 (OCH_2), 8.42-8.43 (ArH)
P_3	$\text{P}_3\text{.Mg(Dnp)}_2$	1.61 (CH_2), 3.65 (CH), 4.46-4.97 (OCH_2), 8.45-8.49 (ArH)
		1.60 (CH_2), 3.57-3.65 (CH), 4.47-4.79 (OCH_2), 8.46-8.49 (ArH)
		1.91 (CH_2), 3.52-3.88 (CH), 4.32-4.46 (OCH_2)
		1.92 (CH_2), 3.64 (CH), 4.39-4.47 (OCH_2), 8.35-8.49 (ArH)

formed due to ion-dipole interaction.

Ionophore P_2 forms complexes with NaPic, KPic and LiDnp. The ionophores P_1 , P_2 and P_3 have donor sites, and frequency lowers in case of LiDnp, KPic and Mg(Dnp)_2 complexes which indicates the interactions of donor sites of ionophores with Li^+ , K^+ and Mg^{2+} due to ion-dipole interactions. The results are further supported by ^1H NMR spectral data.

^1H -NMR spectral data of the ionophores (P_1 , P_2 and P_3) and complexes are shown in Table 3. The data in case of P_1 reveal that the signals for the protons at δ 1.33-1.37 (CH_3), δ 4.3-4.4 (OCH_2), δ 8.45-8.49 (ArH) found to be shifted downfield in the complexes. In case of P_2 and its complexes with sodium, potassium, lithium and magnesium ions, downfield shifting was observed from δ 1.27-1.31 (CH_2), δ 4.23-4.26 (OCH_2) while signals from δ 1.91 (CH_2), δ 3.52-3.88 (CH), δ 4.32-4.46 (OCH_2) also show downfield shifting in case of P_3 with magnesium as well as the peaks at δ 8.42-8.52 and δ 8.35-8.49 indicate the presence of aromatic moiety in

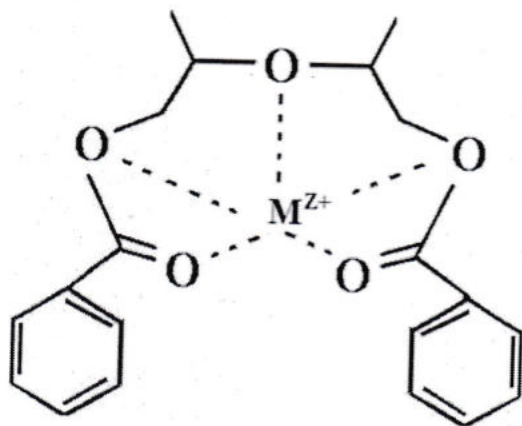


Figure 4. Schematic representation of binding of metal ion in pseudocyclic cavity of podand

complexes which were absent in P_2 and P_3 . Hence, the interaction of the metal ions with ionophores results the formation of complexes. The splitting of the signals into multiplet indicates the change in conformation of the ionophore during complexation.

On the basis of the above characterization, the metal is supposed to be caged in the pseudocyclic cavity of the ligand species made by $-\text{O}-$ groups of ether and ester.

It is concluded from the spectral data of the complex that there is a prominent role of oxygen donor sites during complexation. The number of donor sites and pseudocavity diameter affect the ion-dipole interaction and hence the cation binding property.

The adoptability of the ionophore according to the size and charge density of the metal ions is an important factor for complexation and for molecular recognition. It was reported among various crown ethers; 12-crown-4, 15-crown-5 and 18-crown-6 are best extractants [5] for lithium, sodium and potassium cations respectively. This supports the approach of adoptability in podands and lariat ethers but the size fit concept does not exist which loss in specificity [6, 7].

From the results, it is concluded that the noncovalent interactions, structural aspects of the ionophore and the factors such as size and charge density of the metal ions are important for the molecular recognition.

Although the above discussion concerns with the complexation in solid phase (isolation studies) but the chemistry involved may qualitatively be extrapolated to the solution state because failure to isolate a complex is not being attributed to its absence of interaction in the solution.

Conclusions

It was observed that Li^+ and Mg^{2+} show complexation in the solid state with P_1 , P_2 and P_3 in the isolation studies. But these ionophores fail to extract and transport of these metal ions in the solution state. By considering the charge density of M^{Z+} ,

nucleophilicity of X^- and the conformational aspects of the ligand, we can predict the complexation behavior of isolated complexes. The stoichiometry of the isolated complexes is found to be 1:1.

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Article

A Hybrid Fault Recognition Algorithm Using Stockwell Transform and Wigner Distribution Function for Power System Network with Solar Energy Penetration

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Abstract: Penetration level of solar photovoltaic (PV) energy in the utility network is steadily increasing. This changes the fault level and causes protection problems. Furthermore, multi-tapped structure of distribution network deployed to integrate solar PV energy to the grid and supplying loads at the same time also raised the protection challenges. Hence, this manuscript is aimed at introducing an algorithm to identify and classify the faults incident on the network of utilities where penetration level of the solar PV energy is high. This fault recognition algorithm is implemented in four steps: (1) calculation of Stockwell transform-based fault index (STFI) (2) calculation of Wigner distribution function-based fault index (WDFI) (3) calculation of combined fault index (CFI) by multiplying STFI and WDFI (4) calculation of index for ground fault (IGF) used to recognize the involvement of ground in a fault event. The STFI has the merits that its performance is least affected by the noise associated with the current signals and it is effective in identification of the waveform distortions. The WDFI employs energy density of the current signals for estimation of the faults and takes care of the current magnitude. Hence, CFI has the merit that it considers the current magnitude as well as waveform distortion for recognition of the faults. The classification of faults is achieved using the number of faulty phases. An index for ground fault (IGF) based on currents of zero sequence is proposed to classify the two phase faults with and without the ground engagement. Investigated faults include phase to ground, two phases fault without involving ground, two phases fault involving ground and three phase fault. Fault recognition algorithm is tested for fault recognition with the presence of noise, various angles of fault incidence, different impedances involved during faulty event, hybrid lines consisting of overhead line (OHL) and underground cable (UGC) sections, and location of faults on all nodes of the test grid. Fault recognition algorithm is also tested to discriminate the transients due to switching operations of feeders, loads and capacitor banks from the faulty transients. Performance of the fault recognition algorithm is compared with the algorithms based on discrete wavelet transform (DWT), Stockwell transform (ST) and hybrid combination of alienation coefficient and Wigner distribution function (WDF). Effectiveness of the fault recognition algorithm is established using a detailed study on the IEEE-13 nodes test feeder

modified to incorporate solar PV plant of capacity 1 MW in MATLAB/Simulink. Algorithm is also validated on practical utility grid of Rajasthan State of India.

Keywords: fault recognition; solar photovoltaic energy; power system fault; Stockwell transform; Wigner distribution function

1. Introduction

Penetration level of renewable energy (RE) in the power network of utilities is continuously increasing and expected to be 20% by 2022 [1,2]. Solar photovoltaic (PV) energy is emerging as a best solution to achieve this penetration level in the regions where solar radiation of sufficient intensity is available. However, due to its intermittent characteristics of power generation, it is required to be operated in association with the flywheel, battery, super-capacitors and PV integrated in parallel with the conventional generators [3]. Furthermore, multi-tapped transmission and distribution lines are deployed for grid integration of the solar PV plants and supplying loads at the same time [4]. These have created challenges related to the system protection, reliability and power quality (PQ) [5,6]. The protection challenges are pronounced due to change in nature of the feeders from the passive and radial power flow nature to the active and bidirectional power flow nature (due to integration of solar PV plants near load centers). Hence, with high penetration level of solar energy in the grid, the protection issues are becoming complex. Hence, intelligent fault recognition algorithms are required to be designed to identify and classify the faults incident on the network of utilities where penetration level of solar PV energy is high. In recent years, the signal processing, mathematical and artificial intelligence (AI) methods have been employed for recognition of the faults to design protection schemes for the network of power interfaced with solar PV energy. A detailed study of the schemes used for protection of the grid integrated solar PV plants is reported in [7]. A detailed comparative study of the mother wavelets of DWT to classify the power system faults and to investigate the impacts of type of mother wavelet on accuracy of the algorithm to classify the faults is reported in [8]. An algorithm using current features computed using WDF and alienation coefficient is implemented to protect the transmission line (TL) [9], utility grid in the presence of solar energy [10] and renewable energy (RE) sources-based hybrid grid [11]. This protection scheme has the advantage of low fault recognition time. Harrou et al. [12], introduced a design of protection scheme for direct current (DC) side of the solar PV plant. This is effective to provide protection in the noisy environment. A fault recognition method for both the grid connected and off-grid photovoltaic systems is reported in [13]. This approach is effective for identification of the type and location of the faults with low computational burden. In [14], authors introduced a convolution neural network (CNN)-based protection scheme using current and voltage signals. This is effective for identification of the faults in islanded mode of the micro-grid with solar energy.

In view of above discussed literature review, algorithms implemented for recognition of faults in the presence of solar PV energy has some demerits. It is pointed out from the above discussed literature that most of the fault recognition techniques are based on the use of a single signal processing approaches. Hence, the reported fault recognition methods have one or more demerits which can be overcome by hybridization of the various techniques to combine the merits of the reported method to design a new technique. A DWT supported fault recognition algorithm is reported in [15] which suffers from the problem of generating false tripping signals and reduced performance in the presence of noise. This drawback is mitigated by the use of ST supported algorithm [16]. However, fault detection time of this approach is high and greater compared to time of half cycle. This has been overcome by the hybrid combination of WDF and alienation coefficient [10]. However, the alienation coefficient used in this algorithm has high magnitude for both the healthy and faulty phases at the time of fault incidence. Thereof, a protection algorithm for recognition of faults in the presence of solar PV

energy is required which has merits including fast protection, independent of noise, high accuracy and free from false tripping. These have been considered in this research work with main contributions as follows:

- This manuscript is aimed to introduce a protection algorithm to identify and classify the faults incident on the network of utilities where penetration level of the solar PV energy is high.
- This algorithm combines the merits of Stockwell transform and WDF to recognize faults incident in the presence of the solar PV energy using the proposed CFI. Using the number of faulty phases and IGF based on zero-sequence currents, the types of faults are classified effectively.
- Algorithm is so robust that its performance is least affected by the noise and effective to recognize faults with various angles of fault incidence, different impedances involved during faulty event, hybrid lines with OHL and UGC sections, and location of faults on all nodes of the test grid.
- This protection algorithm will not generate tripping commands when the transients due to switching operations of feeders, loads and capacitor banks are present.

Eight sections are used for arranging the contents in this manuscript. Section 1 describes the introduction and contribution of research work. Fault recognition algorithm, STFI, WDFI, CFI and IGF are described in Section 2. IEEE-13 node modified test feeder and solar PV plant are described in Section 3. Simulation results related to implementation of the fault recognition algorithm are discussed in the Section 4. Implementation of fault recognition algorithm to recognize faults in different cases is discussed in Section 5 whereas Section 6 discusses discrimination of switching and faulty transients. Validation of protection algorithm for practical power utility network with penetration of solar energy is discussed in Section 7. It also includes the performance comparison of the proposed protection algorithm with the existing methods. Finally research work is concluded in Section 8.

2. Proposed Fault Recognition Algorithm

The proposed fault recognition algorithm introduced in this manuscript is implemented for detection and classification of faults for the grids with solar PV energy penetration. Fault detection stage can be implemented in three steps which include (1) calculation of Stockwell transform-based fault index (STFI) (2) calculation of Wigner distribution function-based fault index (WDFI), and (3) calculation of proposed combined fault index (CFI) using STFI and WDFI. The STFI and WDFI are the intermediate indices, the advantages of which are combined in the proposed CFI. Main contribution of this paper is CFI, hence the fault recognition results are discussed in detail using the CFI. This CFI is used to detect the faulty events and to identify the faulty phases. Fault classification stage is implemented using the number of faulty phases to classify the different types of faults. Involvement of ground in the two phase faults will be identified using the index for ground fault (IGF). All the steps involved in the proposed protection algorithm are illustrated in the Figure 1.

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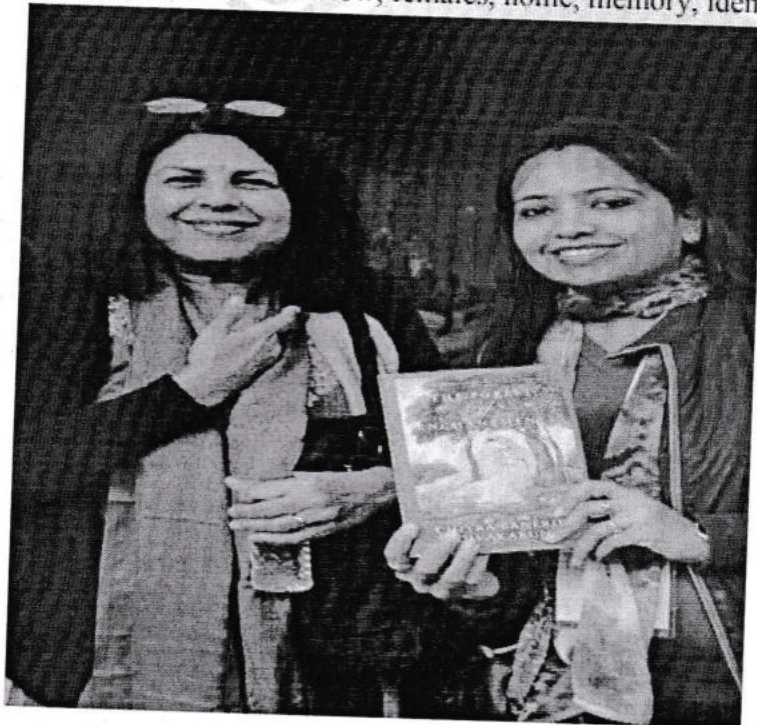
2 | In conversation with Chitra Banerjee Divakaruni

In conversation with Chitra Banerjee Divakaruni

Neelu Jain

ABSTRACT: This is an interview transcript of an e-mail interview taken on 1st March 2019 with Indian American writer Chitra Banerjee Divakaruni, a widely known name in Indian as well as American setting whose prime focus is on emancipation of women thereby highlighting the power of an Indian woman. In pursuing this she takes various diasporic concerns of home, identity, culture, memory into consideration. Chitra Banerjee Divakaruni was in Jaipur, Rajasthan for the Jaipur Literature Festival in January 2019 for *The Forest of Enchantments* book launch during which I got the chance to meet my favourite author. It was indeed very kind and humble of Murthy sir (Chitra Banerjee Divakaruni's spouse) to give her email id so as to conduct the interview. In the following interview, Chitra Banerjee Divakaruni speaks on the power of Indian woman taking into consideration her latest novel *The Forest of Enchantments*. She also talks about the elements that make a good story highlighting her idea of 'Home' and the role of memory for a diasporic writer.

KEYWORDS: Interview, females, home, memory, identity



In conversation with Chitra Banerjee Divakaruni: A woman whose females have the knowledge of their inner strengths yet balance between tradition and modernity thereby emerging as 'New Woman'

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Experiential Validation of ELT in Various Countries

Abstract

Before taking the language learning scenario into account of other foreign countries, we need to see the broad picture of history of using English language in India. In the year 1600, the British came in India with the aim of trading. To do business with huge profits, it was the requirement that the Indians must know English to do the clerical work for them in the trading

A REVIEW BASED STUDY IN ENGLISH TEACHING LEARNING AT GRADUATE LEVEL

Ms. Sonia Khubchandani
Assistant Professor of English,
Research scholar at JNU ,University
Jaipur Rajasthan ,India

Abstract:

Human Expression needs language and in the modern era the accepted language is English language. No wonder there are many challenges faced by both the teachers and the students in learning English language .This paper will throw light on my teaching learning experiences and will try to bring out some of the basic requirements for those who want to take their career in English teaching learning process and also help them to explore the common challenges that they will be facing in teaching English language. With the current scenario of fast

Challenges of Teaching and Learning of English in the 21st Century

Sonia Khubchandani

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KEYWORDS Language, Task-Based Learning and Teaching (TBLT), Teaching English (TE) Model, TEC12, Remix Literacy, CCE

ABSTRACT The traditional chalk and talk method is of less interest in today's scenario for teaching English language. Instead of 'Edu+cation', 'Owl+cation' systems are hampering the language learning process in India. Students of the present time need up to date method which takes care of their interest too without generating any type of enmit. Now, it is a challenge for a genuine teacher that he or she has to do something surprising and interesting for the students to make them learn English language without any fuss. The language learning process is such where the teacher plays an irreplaceable role with the selection of the tool and the right effective approach ensuring results. This is possible if the teacher is able to realize and identify the basics which are generally missed under pressure of syllabus completion or lack of knowledge. The latter is the major reason which is directly connected to delivery of topics in the classrooms.

INTRODUCTION

The National Council of Teacher Education (NCTE) is a statutory body of the Government of India and it has made specific recommendations to "break out of intellectual isolation and share experiences and insights with others in the field of both teaching and academics. At the level of teachers, it is very important to share their teaching strategies with other companions or compatriot teacher as they can invent new strategy as per their need in the classrooms. Sometimes teachers try to hide their strategies from the other teachers and thus they are able to give benefit to only a few students. Learning of

Teaching and Learning International Survey TALIS (2009) identifies these three dimensions as triarchic model for improving the learning of the students. Snow and Lohman in 1984 revealed that the students with low capability are more benefited by teacher-centered classes and the students with high skills get profit from the less structured classes according to the Study Teaching Practices (2009).

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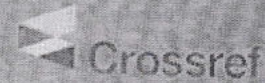
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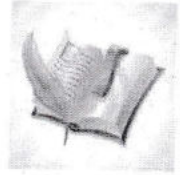
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