Jaipur Engineering College & Research Centre
Department of Applied Science
PROGRAM OUTCOMES

After completion of the program, the students will be able to -

PO1 - Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.

PO2 – Problem analysis:

Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 - Design/development of solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4 - Conduct investigations of complex problems:

Use research -based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 - Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling to complex engineering activities, with an understanding of the limitations.

PO6 - The engineer and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 - Environment and sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 - Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - Communication:

Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 - Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 - Life-long learning:

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. Tech First Year Semester- II

Subject: Engineering Mathematics-II   Code: 2FY2-01

CO-1	To understand the concept of rank of matrix, inverse, Eigen values & vectors along with solution of linear simultaneous equation determine inverse of a matrix using Cayley Hamilton Theorem
CO-2	To solve Ordinary D.E of first order, first degree and first order higher degree using various methods
CO-3	To find the complete solution of D.E of higher order with constant coefficient & variable coefficients & their methods of solution.
CO-4	To solve partial differential equations with its applications in Laplace equation, Heat & Wave equation

Subject: Programming for Problem Solving   Code: 2FY3-06

CO-1	Understand concept of low-level and high-level languages, primary and secondary memory. Represent algorithm through flowchart and pseudo code for problem solving.
CO-2	Represent and convert numbers & alphabets in various notations.
CO-3	Analyze and implement decision making statements and looping.
CO-4	Apply array, function, recursion, structure, pointers, memory allocation and data handling through files in 'C' Programming Language.

Subject: Engineering Chemistry   Code: 2FY2-03

CO-1	Explain the impurities of water (mainly hardness) and boiler troubles.
CO-2	Describe processing technologies of fuel with numerical aspects of combustion of fuel.
CO-3	Describe the engineering material (cement,glass and lubricant) with respect to their manufacturing, composition, classification & properties.
CO-4	Explain corrosion with its controlling measures, organic reaction mechanism and synthesis of drugs (Aspirin & Paracetamol) with their properties and uses.

Subject: Engineering Physics   Code: 2FY2-02

CO-1	Students will be able to explain the basic concepts, theoretical principles and practical applications of interference, diffraction phenomena and their related optical devices in visible range and X-ray diffraction by crystals (i.e., Bragg's law).
CO-2	Students will be able to acquire knowledge of fundamental concepts, principles of quantum mechanics to understand numerous atomic and molecular scale phenomena.
CO-3	Students will be able to learn all basic aspects of laser action, properties (coherence etc.), types of LASER devices and its applications in fibre optics, holography, medical science and industry etc.
CO-4	Students will be able to describe key concepts, fundamental laws of Hall effect, Fermi Dirac distribution, electrical conductivity, Fermi energy etc. to understand the Physics of semiconductors and materials. Students will also acquire basics of electrostatics and electromagnetism (e.g., Maxwell's equations) to explain electromagnetic waves propagation and generation in free space, dielectrics and conducting media.

Subject: Communication skills   **Code: 2FY1-04**

CO-1	able to express themselves better and use English for communicating in an effective manner both professionally and in real life situations.
CO-2	able to write formal letters, reports and proposals, as well as speak fluently through correct usage of the various parts of speech.
CO-3	able to get an exposure to the culture, values, ethics and social norms reflected in the prose and poetry of authors from around the world and respond accordingly coupled with their imagination

Subject: Human Values   **Code: 2FY1-05**

CO-1	Enable to learn and understand the essential co-relationship between 'Values' and 'Skills' to ensure persistent happiness and prosperity, which are the primary aspirations of all human beings.
CO-2	Facilitated a holistic developmental perspective towards Self(I), body and Worldly needs; via keeping equity of human values like samman (respect), Vishwas(Trust) and sanyam(control), Swasthya(health) based on a correct understanding of Human reality (Natural Acceptance)and Existence (Experimental validation).
CO-3	Able to understand a holistic understanding of plausible implications of technology and management models, professional ethics, production system in order to maintain universal ethical human conduct/order (like trust, loyalty) Co-existence human being with nature, and mutually fulfilling human behaviour and enriching interaction with Nature.

Subject: Basic Civil Engineering   **Code: 2FY3-09**

CO-1	Comparing various surveying methods and understanding its principles along with the latest technological advancements in surveying.
CO-2	Understand building construction technology and identify construction materials along with sustainable construction technology with focus on Green buildings.
CO-3	Understand about traffic, road safety and various types of roads and railway systems along with road and vehicular characteristics required at obtaining a consistent and efficient traffic system
CO-4	Recognize various types of pollution and associated risks and identify their control measures; also understand municipal waste treatment methods and outline emerging and efficient technologies of solid waste management

Subject: Basic Electrical Engineering   **Code: 2FY3-08**

CO-1	Analyze the DC and AC electrical circuits using network theorems.
CO-2	Understand the construction and working principle of the transformer, AC and DC rotating machines.
CO-3	Understand the concepts of power converters and switchgear requirements.

Subject: Basic Mechanical Engineering   **Code: 2FY3-07**

1.	Students will be able to **understand** the various machines and power transmission related to it.
2.	Students will be able to **describe** the importance of mechanical engineering in any industry and to relate with various concepts in thermal based industry.
3.	Students will be able to **understand** the refrigeration system and manufacturing process.
4.	Students will be able to **relate** the industrial issues with the environment and to consider key concepts in engineering materials.

Subject: Computer Programming Lab.   **Code: 2FY3-24**

CO-1	Identify and analyze the input /output operation, decision making statements and looping.
CO-2	Analyze and implement arrays, functions, pointers and dynamic memory allocation.
CO-3	Apply structure, union and data handling through files in 'C' Programming Language.

Subject: LANGUAGE LAB   **Code: 2 FY1-22**

CO-1	Develop better speaking skills through a theoretical and practical knowledge of English sounds through Phonetics
CO-2	Groom themselves in a holistic way through various activities like Group Discussion, Listening Comprehension Skills etc.
CO-3	Think out of the box and form dialogues for various life situations, and also develop confidence to speak in Public.

Subject: Human Values Activities and Sports   **Code: 2 FY1-23**

CO-1	Inculcate among themselves the awareness towards their capabilities of accepting, realizing and differentiating the basic needs of both the body and the soul, essential for good health and practicing ethical behavior in their profession.
CO-2	Evaluate themselves in terms of respect, trust, competence, their mutual fulfilment with the four orders of Nature through a series of narration of some decisive incidents of their own life, skits, stories, poems etc., paving way for understanding the environment and sustainability.
CO-3	Use their human values and human knowledge for moving towards the universal human order, serving the society through minor project work for the betterment of society.

Subject: Chemistry Lab.   **Code: 2FY2-21**

CO-1	Carry out, record and analyze the results of chemical experiments through different titrations.
CO-2	Analyze water with respect to dissolve impurities and coal with respect to proximate analysis.
CO-3	Determine the flash and fire point, cloud and pour point, viscosity of different lubricants and calorific value of coal, also to synthesize Aspirin

Subject: Physics Lab.   **Code: 2FY2-20**

CO-1	learn applicability of the concepts, verify some of the fundamental principles, team work and use of optical instruments to determine the monochromatic & polychromatic wavelength of the light sources, dispersive power of prism's glass material, vertical height (by Sextant).
CO-2	measure the time constant of resistance – capacitance (R-C) circuit, band gap of semiconductor, conversion & calibration of converted galvanometer into ammeter and voltmeter, numerical aperture of an optical fiber and Hall voltage and coefficient of semiconducting material.

Subject: Basic Civil Engineering Lab.   **Code: 2FY3-27**

CO-1	Conduct Survey and collect field data to interpret and compute distances and area from the collected data.
CO-2	Determine physical characteristics of water and waste water.
CO-3	Understand water supply and sanitary fittings.

Subject: Computer Aided Machine Drawing   **Code: 2FY3-29**

CO-1	Students will be able to **recognise** an orthographic & sectional drawing of machine components
CO-2	Students will be able to **relate** joints (permanent & temporary) &assembly drawings.
CO-3	Students will be able to **make** orthographic drawing of machine components in AutoCAD.

Subject: Manufacturing Practice Workshop   **Code: 2FY3-25**

CO-1	To **select** the appropriate tools required for specific operation.
CO-2	To **relate** basic mechanical engineering practices.

Subject: Computer Aided Engineering Graphics   **Code: 2FY3-28**

CO-1	To **explain** objects in First and third angle with different scale.
CO-2	To **illustrate** basic 3-D objects in 2-D drawing.
CO-3	To **introduce** about AutoCAD.

Subject: Electrical Engineering Lab   **Code: 2FY3-26**

CO-1	Understand the electrical and electronic components, measuring devices along with safety precautions required during their use.
CO-2	Determine the current, voltage and power consumption in transformer, AC and DC rotating machines by connecting the machine with the power supply.
CO-3	Understand the concepts of power converters along with hardware demonstration.

CO-PO Mapping

Subject Code	COs	Program Outcomes (POs)											
		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
2FY2-01	CO-1	3	1	-	-	-	-	-	-	1	1	-	1
	CO-2	3	1	-	-	-	-	-	-	1	1	-	1
	CO-3	3	1	-	-	-	-	-	-	1	1	-	1
	CO4	3	1	-	-	-	-	-	-	1	1	-	1
2FY3-06	CO-1	2	2	2	2	-	-	-	-	-	1	-	1
	CO-2	2	-	-	-	-	-	-	-	-	1	-	1
	CO-3	1	1	-	-	1	-	-	-	-	1	-	1
	CO-4	2	1	-	-	1	-	-	-	-	1	-	1
2FY2-03	CO-1	2	1	1	1	-	1	1	-	-	1	-	-
	CO-	2	1	-	-	-	-	-	-	-	-	-	-

	2												
	CO-3	2	1	1	1	-	-	1	-	-	1	-	-
	CO-4	2	1	1	-	-	2	1	-	-	1	-	-
2FY2-02	CO-1	2	1	-	-	-	-	-	-	1	-	-	1
	CO-2	2	1	-	-	-	-	-	-	1	-	-	1
	CO-3	2	1	-	-	-	1	-	-	1	1	-	1
	CO-4	2	1	-	-	-	-	-	-	1	-	-	1
2FY1-04	CO-1	-	1	1	-	-	-	1	-	-	3	-	1
	CO-2	-	1	1	-	-	-	2	-	-	3	-	1
	CO-3	-	1	1	-	-	-	1	-	-	3	-	1
2FY1-05	CO-1	-	-	2	-	-	3	2	3	2	1	-	1
	CO-2	-	-	2	-	-	3	2	3	2	1	-	1
	CO-3	-	-	2	-	-	3	2	3	2	1	-	1
2FY3-09	CO-1	1	1	-	-	-	-	1	-	-	-	-	○
	CO-2	2	1	1	-	-	-	1	-	1	-	1	1
	CO-3	2	1	1	-	-	-	-	-	1	-	1	-
	CO-4	1	1	-	-	-	1	-	1	1	1	-	-
2FY3-08	CO-1	3	3	1	2	1	-	-	-	2	1	-	-
	CO-2	3	2	1	1	1	-	-	-	2	-	-	-
	CO-3	2	2	1	1	2	-	-	-	2	-	-	-
2FY3-07	CO-1	3	3	2				2			2		1
	CO-2	3	2	2			2	2			2		1
	CO-3	3	2				2	2					1
	CO-4	3					1	2					1
2FY3-24	CO1	1	1	-	-	1	-	-	1	1	2	-	1
	CO2	2	2	1	-	1	-	-	1	1	2	-	1
	CO3	2	2	1	-	1	-	-	1	1	2	-	1
2 FY1-22	CO1	-	1	-	-	-	1	-	-	3	3	-	1
	CO2	-	1	-	-	-	1	-	-	3	3	-	1
	CO3	-	1	-	-	-	1	-	-	3	3	-	1
2 FY1-23	CO1	-	-	1	-	-	3	3	3	1	1	-	1

Subject	CO												
	CO2	-	-	1	-	-	3	3	3	1	1	-	1
	CO3	-	-	1	-	-	3	3	3	1	1	-	1
2 FY2-21	CO1	1	1	-	1	-	-	-	-	1	2	-	-
	CO2	2	2	-	1	-	-	1	-	1	2	-	-
	CO3	2	2	-	1	-	-	1	-	1	2	-	-
2 FY2-20	CO1	2	1	1	-	-	1	-	-	1	1	-	2
	CO2	2	1	1	-	-	-	-	-	1	1	-	2
2FY3-27	CO1	2	1	-	-	1	1	1	-	2	1	-	-
	CO2	1	2	1	-	-	1	1	1	1	1	-	1
	CO3	1	1	1	-	-	1	1	-	1	1	-	1
2FY3-29	CO1	3	2	-	-	1	2	2	-	-	2	-	2
	CO2	3	2	-	-	1	2	2	-	-	2	-	2
	CO3	3	2	-	-	2	2	2	-	-	2	-	2
2FY3-25	CO1	3	1	-	-	-	1	-	-	-	-	-	1
	CO2	3	2	2	1	-	1	1	-	2	1	1	2
2FY3-28	CO1	3	-	-	-	1	-	-	-	-	2	-	2
	CO2	3	-	-	-	1	-	-	-	-	2	-	2
	CO3	3	-	-	-	2	-	-	-	-	2	-	2
2FY3-26	CO1	3	3	1	2	2	-	-	-	3	1	-	1
	CO2	3	2	1	2	2	-	-	-	3	-	-	1
	CO3	3	2	1	1	2	-	-	-	3	-	-	1

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Principal