छत्रपति शाहू जी महाराज विश्वविद्यालय, कानपुर

CHHATRAPATI SHAHU JI MAHRAJ UNIVERSITY, KANPUR

(पूर्ववर्ती कानपुर विश्वविद्यालय कानपुर)

Formerly Kanpur University, Kanpur – 208024

A Documentary Support

For

Matric No. – 1.1.1

Programme Outcomes & Course Outcomes

Under the

Criteria - I

(Curriculum Design and Development)

Key Indicator - 1.1

In

Matric No. – 1.1.1

M.Sc. Electronics

Co-ordinator
Internal Quality Assurance Cell
CSJM University, Kanpur

(Registrar)
C.S.J.M.University
Kanpur

REGISTRAR
C.S.J.M. UNIVERSITY
KANPUR

University Institute of Engineering & Technology,
C.S.J.M.University, Kanpur
Department of Electronics and Communication Engineering

OFFERED PROGRAMMES

Department of Electronics & Communication Engineering offers three programs that are affiliated to C.S.J.M.University, Kanpur and recognized by AICTE:

- **Bachelor of Technology Degree in Electronics & Communication Engineering.**
- **M. Sc. (two years) Programme in Electronics.**
- **Integrated M. Sc. (four years) Programme in Electronics.**

Program Outcomes (POs):

- **PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
- **PO2: 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 the cultural, societal, and environmental considerations
- **PO3: Problem analysis:** Recognize, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
- **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: 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
- **PO7: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- **PO8: Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- **PO9: Communication:** Communicate effectively on complex engineering activities with the engineering community and with 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
- **PO10: 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

Program Specific Outcomes (PSOs)

- **PSO1: Circuit Design Concepts:** Apply basic and advanced electronics for implementing and evaluating various circuit configurations.
- **PSO2: VLSI and Signal Processing Domain:** Demonstrate technical competency in the design and analysis of components in VLSI and Signal Processing domains.
- **PSO3: Communication Theory and Practice:** Possess application-level knowledge in theoretical and practical aspects required for the realization of complex communication systems.

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	M.Sc. Electronics
ELC-102	**Course Outcome:** 1. Understand mathematical description and representation of continuous and discrete time signals and systems. 2. Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system. 3. Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms. 4. Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain. 5. Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event. 6. Understand the problems of probability and able to solve them. Also come to know the problems of measures of central tendency. 7. Learn about Newton-Cote's quadrature formula, Trapezoidal rule, Simpson's rules, Weddle's rule. 8. Understand the problems of Numerical methods for Solution of Ordinary Differential Equation-
ELC103	**Course outcomes:** 1. To describe the advantages of a high level language like C/C++, the programming process, and the compilation process. 2.To describe and use software tools in the programming process. 3.To apply good programming principles to the design and implementation of C/C++ programs 4.To design, implement, debug and test programs using the fundamental elements of C/C++. 5.To demonstrate an understanding of primitive data types, values, operators and expressions in C/C++,use of numeric arrays, pointers
ELC 104	**Course Outcome:** On successful completion of the course, the students will be able to 1. Describe the properties of materials and Application of semiconductor electronics 2. Apply the knowledge of semiconductors to illustrate the functioning of basic electronic devices. 3. Demonstrate the switching and amplification Application of the semiconductor devices. 4. Demonstrate the control Applications using semiconductor devices. 5. Classify and describe the semiconductor devices for special Applications and power electronics devices.

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ELC201	**Course outcomes (CO):** 1. The System Function 2. Characterization and Discussion of Responses in Networks 3. Properties of Input Impedance 4. Synthesis or LC or RC input impedances 5. Transfer Function Synthesis 6. Second Order Systems A. Low Pass B. High Pass C. Band Pass D. Band Stop E. All Pass 7. RC Oscillators 8. Magnitude and Phase Functions 9. Approximations A. Butterworth B. Chebyshev C. Linear Phase D. Phase Equalization
ELC-202	**Course outcomes:** 1) Explain about Electromagnetic Plane wave, smith chart and different types of theorem. 2) Differents types of transmission line 3) Different types of waveguides and their respective modes of propagation. 4) Understand about working of microwave passive circuits 5) Understand about working of microwave tubes and solid state devices and their applications. 6) Understand about the operation of RADAR systems and recite their applications.
ELC203	**Course Outcome:** On successful completion of the course, the students will be able to 1. Students will demonstrate the use of analog circuit analysis techniques to analyze the operation and behaviour of various amplifers circuits. 2. Students will demonstrate their knowledge by designing analog and op-amp circuits.
ELC204	**Course outcomes:** **Expected Course Outcomes Upon completion of this course, the students will be able to:** 1. Have a thorough understanding of the fundamental concepts and techniques used in

	digital electronics. 2. To understand and examine the structure of various number systems and its application in digital design. 3. The ability to understand, analyze and design various combinational and sequential circuits. 4. Ability to identify basic requirements for a design application and propose a cost effective solution. 5. The ability to identify and prevent various hazards and timing problems in a digital design. 6. To develop skill to build, and troubleshoot digital circuits.
ELC301	**Course outcomes :** 1. A thorough knowledge on open loop and closed loop control systems, concept of feedback in control systems. 2. Understanding of transfer function representation through block diagram algebra and signal flow graphs. 3. Time response analysis of different order systems through their characteristic equation. 4. Time domain specifications, stability analysis of control systems in s-domain through-H criteria. 5. Root locus techniques, frequency response analysis through Bode diagrams and Polar plots.
ELC302	**Course outcomes :** .Understand the fabrication process of IC technology · Analysis of the operation of MOS transistor · Analysis of the physical design process of VLSI design flow · Analysis of the design rules and layout diagram · Design of Adders, Multipliers and memories etc · Making sense of the ASICs · Getting the idea of design approach
ELC-303	**Course Outcome:** On completion of the course, student will be able to understand working of waveform coding techniques and analyse the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency. They can perform the time and frequency domain analysis of the signals in a analog & digital communication system. They can design analog & digital communication system

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ELC304	**Course Outcome:** After completing the course, the students should be able: 1. General concepts of measurement 2. Electrical measurement techniques and classical measuring instruments 3. Modern measurement techniques and instruments 4. Brief concepts of sensors and transducers 5. Electronic measurement systems and related components including signal generators, analysers, data acquisition systems, storage and display devices 6. Applications of the concepts of electrical and electronic
ELC401	**Course Outcome:** Several radical wireless technologies have been developed in the last 10 years to enable broadband wireless access with rates in excess of 100 Mbps. These have subsequently led to the development of 3G and 4G wireless technologies such as HSDPA (High Speed Downlink Packet Access), LTE (Long Term Evolution) and Wi MAX (Worldwide Interoperability for Microwave Access). This has been made possible through breakthrough wireless technologies such as Code Division for Multiple Access (CDMA), Multiple Input Multiple Output (MIMO). These techniques form the basis of understanding the world of 3G/4G wireless communication systems. After the completion of this course student can analyse and present an elaborate method to the principles and performances of fundamental 3G/ 4G wireless technologies.
ELC402	**Course Outcomes:** At the end of the course, a student will be able to: 1. Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's and Microcontroller's internal architecture and its operation within the area of manufacturing and performance. 2. Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller. 3. Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements. 4. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.

	5. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices. 6. Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems.
ELC403	**Course Outcomes:** 1. Recognize and classify the structures of Optical fiber and types. 2. Transmission Characteristics of fiber like attenuation and dispersion. Analyze various coupling losses. 3. Manufacturing techniques of fiber/cable. 4. Principle and operation of the optical sources and detectors such as LASER, LED & APD. 5. Optical Amplifier The basic concepts of optical networks, Describe about the SONET/SDH, WDM. 6. Familiar with Design considerations of fiber optic systems, OTDR. Non communicational applications of optical fiber
ELC404	**Course Outcome:** 1. Relate basic semiconductor physics to properties of power devices, and combine circuit mathematics and characteristics of linear and non-linear devices. 2. Describe basic operation and compare performance of various power semiconductor devices, passive components and switching circuits 3. Design and Analyze power converter circuits and learn to select suitable power electronic devices by assessing the requirements of application fields. 4. Formulate and analyze a power electronic design at the system level and assess the performance. 5. Identify the critical areas in application levels and derive typical alternative solutions, select suitable power converters to control Electrical Motors and other industry grade apparatus. 6. Recognize the role power electronics play in the improvement of energy usage efficiency and the applications of power electronics in emerging areas