S.Y.B.Sc. (Electronic Science) 2020
Proposed Syllabus

Sem-IV	**Paper-I: Instrumentation(ELE2401)**
Sem-IV	**Paper-II: CommunicationElectronics (ELE2402)**

S. Y. B. Sc. Electronic Science – Semester IV
Paper – I: Electronic Instrumentation (ELE2401)

Course Objectives:

1. To study the block diagram of electronic instruments.
2. Tounderstand the working principles of popular instruments.
3. To know important technical specifications of an instruments.
4. To learn the operating procedure of instruments.
5. Identify the various parameters that are measurable in electronicinstrumentation.
6. To learn various digital instruments.
7. To know the knowledgeof various parameters.

Course Outcomes :

1. Identify various types of electronic instrument suitable for specificmeasurement.
2. To completion of this course, the student will be able to ElectronicsMeasurements And Instrumentation.
3. To Understand construction, working principle and types of oscilloscopes.
4. Analyze the input/output behaviour of electronic devices to variable inputs andalso verify their operations.
5. Understand construction, working principle and specifications of various meter
6. To understand the concept of digital instruments.

To understand students knowledge of Instrumentation system.

Unit 1: Measurement principles and basic instruments (12)

Measurement of physical parameters, measurement system block diagram, Measurement characteristics like accuracy, precision, sensitivity, linearity, resolution, reliability, repeatability, errors. Construction and working principles of Volt meter, Current meter, Ohm meter, multi-range meters, multi-meter.

Unit 2: Signal sources and Oscilloscope (12)

Principle, block diagram, working and important specifications of signal and function generators, single trace CRO, dual channel and dual trace CRO comparison and applications, Concept of Digital Storage Oscilloscope (DSO).

Unit 3: Digital Instruments (12)

Block diagram, working principle and specifications of DPM, DMM, DFM, LCR meter, Digital

thermometer, Lux meter, Speedometer, pH meter.

Unit 4: Power Supplies (12)

Principle, block diagram, working, important specifications and operating procedures for- Fixed voltage power supply, variable power supply, dual power supply, CVCC supply, SMPS, Concept of UPS, Types and application areas.

Recommended Books:

1. Helfrik A. & Copper W., Modern Electronic Instrumentation and measurement techniques, PHI.
2. Kalsi H. S., Electronic Instrumentation, TMH.
3. Bouwens, Digital Instrumentations, TMH
4. Rashid Muhammad H, Power Electronics, PHI
5. B. S. Sonde, Power Supplies, TMH

Course Outcome	Program Outcomes								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	3	1	-	-	-	-	-	-
CO2	-	1	1	-	-	-	-	-	-
CO3	-	-	-	2	-	1	-	-	-
CO4	-	1	-	-	-		-	1	-
CO5	1	-	3	1	-	1	-	-	-
CO6	2	2	-	1	-	-	-	-	-
CO7	1	-	2	-	-	-	-	-	-

ustification for mapping:

PO1: disciplinary knowledge:

CO1:focus on the identification of electronic instruments and the broader understanding of electronics measurements, contributing to disciplinary knowledge by providing a comprehensive overview.

CO5:Students have get the construction, working principle, and specifications of various meters, adding specificity to students' knowledge in instrumentation.

CO6:Introduces the concept of digital instruments, staying aligned with the evolving nature of instrumentation technology.

CO7:assesses students' overall knowledge of an Instrumentation system, ensuring a holistic understanding of the discipline.

PO2: Critical Thinking and Problem solving:

CO1**:**Students develop essential skills in approaching complex challenges within the field of Electronics Measurements and Instrumentation.

CO2:involves the overall capability to comprehend and apply the principles of Electronics Measurements and Instrumentation. This requires critical thinking to integrate various concepts and methodologies.

CO4: Students will be the analysis of electronic devices under variable inputs, requiring students

to apply critical thinking to understand the behavior and troubleshoot potential issues. Verifying operations adds a problem-solving dimension.
CO6: Students it introduces the concept of digital instruments, a contemporary aspect in the field. Understanding this concept demands critical thinking to adapt to technological advancements and problem-solving skills to integrate digital instruments into measurement systems.

PO3: Social Competence:

CO1:Students it involve the identification and understanding of electronic instruments, fostering social competence by enabling students to communicate and collaborate with peers and professionals in the field.
CO2:It ensures that students not only acquire technical skills in Electronics Measurements and Instrumentation.
CO5: Students understanding the construction and specifications of meters, providing students with the knowledge to engage in discussions and share insights on measurement technologies.
CO7:students' overall knowledge of an Instrumentation system, emphasizing the importance of effective communication and collaboration in understanding complex systems.

PO4: Research related skills and Scientific temper:

CO3:requires students understand the construction, working principles, and types of oscilloscopes. This fosters a scientific temper by encouraging students to explore and understand the intricacies of this essential electronic instrument.
CO5:students with the foundation needed to critically evaluate and compare different metering instruments, aligning with research-related skills.
CO6: Understanding this concept requires students to stay updated on technological advancements, promoting a scientific temper in adapting to new methodologies.

S.Y.B.Sc. (Electronic Science)-Semester-IV
Paper-II: Communication Electronics (ELE2402)

Course Objectives:

1. To study basics of communication systems and telephone system.
2. To understand Amplitude Modulation /demodulation techniques and receiver
3. To understand Frequency Modulation /demodulation techniques and receiver
4. To learn the Digital communication system
5. This course introduces the fundamentals of electronic communication systems.
6. This course provides the student with the fundamental skills to understand thebasic of Communication Methods.
7. To understand and analyze digital communication system.

Course Outcomes:

1. To Understand various modulation & demodulation techniques used incommunication systems.
2. To Apply various methods used in communication systems for generation &reception of modulated & demodulated signals.
3. To Analyze the waveforms of various modulation & demodulation techniques.
4. To knowledge about the various types of communication.
5. To understand the concept of digital communication.its types.
6. To Understand the working operation of analog & digital modulation techniquesused in communication systems.
7. To introduce basic aspect of electronic communication systems.

UNIT- 1: Basics of communication and telephone systems (12)

Block diagram of communication system, Types of communication system: simplex, duplex, analog and digital communication, Electromagnetic spectrum ,base band and broad band communication, Noise concept and types, Signal to noise ratio, Noise figure, Noise temperature. Problems based on noise calculations.
Block diagram of Telephone handset, types of dialing, Block diagram of PSTN.

UNIT- 2: Amplitude Modulation and AM Receiver (12)

Need of modulation, Concept of modulation, AM waveform, mathematical expression of AM, Concept of sideband, Definition and problems: modulation index, power distribution. AM using diode/transistor, Demodulation principles, Demodulator circuit using diode.
AM Receiver: TRF and super-heterodyne receiver, characteristics of receiver: Selectivity, Sensitivity, Image frequency and Dynamic range.

UNIT-3: Frequency Modulation and FM receiver (12)

FM modulation: definition, mathematical representation, frequency spectrum, bandwidth and modulation index. FM using varactor diode,
FM Demodulator: Slope detector, Balanced slope detector, Foster-Seeley detector.
Block Diagram of FM Receiver.

UNIT- 4: Pulse Digital Communication Systems (12)

Block diagram of digital communication system, advantages of digital communication system, bit rate, baud rate and bandwidth. Serial and parallel communication, concept of sampling, Sampling theorem, concept of ASK, PSK, FSK, PAM, PWM, PPM, PCM, Concept of FDM and TDM, Concept of MODEM, Concept of Set Top Box.

Recommended Books:

1. Communication Electronics : Principles and applications by Louis E Frenzel 3rd edition TMH Publications.
2. Electronics Communication Systems : Keneddy
3. Telecommunication Switching Systems and Network : Vishwanathan Thiagarajan, PHI publication.
4. Electronics Communication Systems by Denis Roddy, John Coolen, PHI publication.

Course Outcome	Program Outcomes								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	2	-	1	-	-	-	-	-	-
CO2	-	2	1	-	-	-	-	-	-
CO3	2	-	2	2	-	1	-	-	-
CO4	-	1	-	2	-		-	-	-
CO5	1	1	3	1	-	1	-	-	-
CO6	2	2	-	-	-	-	-	-	-
CO7	1	-	2	1	-	-	-	-	-

Justification for mapping:

PO1: disciplinary knowledge:

CO1:students develop a strong foundation in the field of communication systems.

CO3: students understanding, applying, and analyzing modulation and demodulation techniques, contributing to disciplinary knowledge by delving into the core principles of communication systems.

CO5: Students introduces the concept of digital communication and its types, aligning with the evolving nature of communication technologies.

PO2: Critical Thinking and Problem solving:

CO2: students it requires the application of various methods for the generation and reception of modulated and demodulated signals**.**

CO4 :students it get involves acquiring knowledge about various types of communication, which requires critical analysis to understand the nuances and differences between different communication systems.

CO5: Students will focuses on understanding digital communication and its types, demanding critical thinking to adapt to the rapidly evolving landscape of digital technologies in communication.

PO3: Social Competence:

CO1:involves the practical application of methods in communication systems, requiring social competence for teamwork, communication, and collaboration during the generation and reception of signals.

CO2: students will get understanding modulation and demodulation techniques, which sets the foundation for effective communication. Social competence comes into play when individuals can discuss, share insights, and collaborate on implementing these techniques in real-world applications.

PO4: Research related skills and Scientific temper:

CO3:requires students to analyze waveforms of modulation and demodulation techniques. This involves applying a scientific temper by systematically examining and interpreting data, fostering research-related skills.

CO4:Students get knowledge about various types of communication, encouraging students to explore and comprehend diverse communication systems, aligning with research-related skills.

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Sem-IV	Paper- III: Practical Course (ELE2403)

S.Y.B.Sc. (Electronic Science)
Paper- III: Practical Course (ELE2403)

Course Objectives:

1. To make use different basic concepts for building different applications
2. To study basics of communication systems and telephone system
3. To build experimental setup and test the circuits.
4. To develop skills of analyzing test results of given experiments.
5. To understand Frequency Modulation /demodulation techniques and receiver.
6. To make students aware about and measuring instruments and understands the varioussensors.
7. To understand various multiplexing methods.

Course Outcomes:

1. Ability to describe the behavior of special purpose communication .
2. To understand the performance characteristics of instruments and fundamentals ofmeasurement.
3. To learn the construction, working principles of electrical/ analog instruments, digitalinstruments.
4. To Understand and identify the fundamental concepts and various components ofcommunication systems.
5. Compare the different analog and digital modulation schemes for transmission ofinformation.
6. To develop skills of analyzing test results of given experiments.
7. To understand design procedures of different electronic circuit as per requirement.

List of Practicals (Instrumentation): Any Four

1. Temperature measurement system using LM – 35
2. Study of Function generator
3. Multirange voltmeter
4. Study of CVCC/SMPS.
5. Study of LDR based system
6. Variable power supply using IC 317.

List of Practicals (Communication Principles): Any Four

1. Design, Build and test Amplitude Modulator and Demodulator.
2. Time Division Multiplexing circuit.
3. Frequency Shift Keying(FSK) using XR 2206
4. Delta Modulation circuit using opamp
5. Hamming Code generation and error detection.
6. Study of PAM,PPM and PWM

Course	Program Outcomes								
Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	1	-	1	-	-	-	-	-	-
CO2	-	2	1	-	-	-	-	-	-
CO3	-	-	-	-	-	1	-	-	-
CO4	-	1	-	1	-		-	-	-
CO5	1	1	1	1	-	1	-	-	-
CO6	-	1	-	-	-	-	-	-	-
CO7	1	-	-	1	-	-	-	-	-

Justification for mapping:

PO1: disciplinary knowledge:

CO1: This Understanding enhances disciplinary knowledge by delving into the specialized field of communication systems, requiring an understanding of unique behaviors and characteristics.

CO5: Students Focusing on the comparison of analog and digital modulation schemes, a critical aspect in the field of communication systems.

CO7: Students improve the practical application of disciplinary knowledge by requiring students to analyze test results from experiments, enhancing their ability to apply theoretical concepts.

PO2: Critical Thinking and Problem solving:

CO2: Critical thinking is necessary to interpret and analyze the performance characteristics of instruments. Engineers need to assess the suitability of instruments for specific tasks and make decisions based on their understanding of measurement fundamentals.

CO4: Critical thinking is essential to grasp the fundamental concepts of communication systems and identify the various components. Engineers need to think critically about how these components interact and how they can be optimized for specific communication requirement

CO5: Comparing modulation schemes requires critical thinking to assess the advantages and disadvantages of each. Engineers must analyze the trade-offs and choose the most suitable modulation scheme for a given communication systems.

PO3: Social Competence:

CO1: Social competence is enhanced through effective communication. Engineers with the ability to describe the behavior of special-purpose communication can convey complex technical information clearly to diverse audiences, promoting understanding and collaboration.

CO2: Understanding measurement fundamentals is crucial in collaborative projects. Engineers who possess this knowledge can communicate effectively with team members, ensuring a shared understanding of the performance characteristics of instruments and measurement principles.

CO5: Students need social competence to convey the advantages and disadvantages of different modulation schemes to team members, decision-makers. This skill ensures that informed decisions are made collectively.

PO4: Research related skills and Scientific temper:

CO4: Understanding fundamental concepts requires students to engage with existing research. This involves conducting a literature review to identify key theories, models, and findings in the field of communication systems.

CO5: Understanding the various components of communication systems, students inherently engage in problem identification. This skill is crucial for research, as it involves recognizing gaps, challenges, or areas that require further investigation within the field.