

SARDAR PATEL UNIVERSITY
SYLLABUS FOR INSTRUMENTATION
SEMESTER – 3 : Core I – Paper I (Theory)
INSTRUMENTATION COURSE CODE : US03CINS21 (4 Credit Course)
COURSE TITLE : Electronic Instrumentation
(According to new course structure – Effective from June 2019)

Unit 1: Indicators and display devices

Introduction, basic meter movement, taut band instrument, electro-dynamometer, classification of displays, display devices, LED, LCD, gas discharge plasma displays, segmented gas discharge displays, segmented displays using LEDs, dot matrix displays, bar graph displays, electroluminescent displays, incandescent displays, electrophoretic image displays (EPID)

Unit 2: Ammeters and voltmeters

Introduction, DC ammeter, multirange ammeter, Ayrton shunt, extending of ammeter range, DC voltmeter, multirange voltmeter, extending voltmeter range, solid state voltmeter, differential voltmeter, AC voltmeter using rectifiers (half wave and full wave), multirange AC voltmeter, calibration of DC instrument, Multimeter, dual slope integrating type DVM (voltage-time conversion), integrating type DVM (voltage-frequency conversion)

Unit 3: Digital instruments


Introduction, digital frequency meter, digital measurement of time, digital measurement of frequency (mains), digital tachometer, digital pH meter, automation in digital instruments, digital phase meter, digital capacitance meter, microprocessor based instruments, IEEE 488 bus


Unit 4: Measuring instruments and bridges

Introduction, output power meter, field strength meter, stroboscope, phase meter, vector impedance meter, Q meter, LCR bridge, RX meter, automatic bridge, transistor tester, megger, telemetry, resonance bridge, Maxwell-Wien bridge, Owen bridge, De Sauty bridge, Carey Foster/Heydweuller bridge, precautions to be taken when using a bridge

Text Books:

1. Electronic instrumentation, H. S. Kalsi, Third edition
2. Electronic Instrumentation and Instrumentation Technology by M.M.S.Anand


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SARDAR PATEL UNIVERSITY
SYLLABUS FOR INSTRUMENTATION
SEMESTER – 3 : Core I – Paper II (Theory)
INSTRUMENTATION COURSE CODE : US03CINS22 (4 Credit Course)
COURSE TITLE : Transducers, Probes and LASERS
(According to new course structure – Effective from June 2019)

UNIT: 1 Transducers - I

Introduction, Electrical Transducers: Advantages of electrical transducers, active and passive transducers, Selecting a Transducer: Resistive transducers, Potentiometer, advantages and disadvantages of potentiometer, Resistive pressure transducers, Resistive Position Transducer, Strain Gauges, Resistance wire gauge, Types of Strain Gauges (Wire), Foil Strain Gauge, Semiconductor Strain Gauge and Resistance Thermometer, Numericals.

UNIT: 2 Transducers - II

Inductive transducers, Change in self-inductance with numbers of turns, Transducer working on the principle of change in self-inductance with change in permeability, Variable reluctance type transducer, Differential output Transducers, Linear variable differential transducers with advantages and disadvantages, Rotational variable differential transducers, Capacitive transducers, Piezoelectric Transducers, Temperature Transducers: Introduction to temperature transducers, Resistance temperature detector, Thermistor, Thermocouple, Numericals.

UNIT: 3 Probes

Introduction, Types of probes, Passive voltage probes: Low impedance resistive divider probe, High impedance resistive divider probe, High voltage passive probe, Active voltage probes, Differential probe, Current probes: AC current probe, AC/DC current probe, Logic probes, Optical probes, Other probes; Probe loading and measurement effects: Resistive loading, Capacitive loading, Inductive loading; probe specifications.

UNIT- 4 LASERS

Lasers: Characteristics: Monochromaticity, Directionality, Coherence, Peak power and Brightness, Numerical Problems, Principles of LASER: Introduction, The active laser medium, Laser pumping energy, Optical pumping, Electrical pumping, Chemical pumping, Laser oscillator, Absorption and emission of light by atoms,

Absorption and spontaneous emission, Stimulated emission, , Gas Laser: Nitrogen Laser, Carbon dioxide laser, Solid State Laser: Nd: YAG laser, Applications of Nd: YAG laser, Semiconductor Laser, Dye Lasers and his applications, Other technological applications by Laser, Application of laser in chemistry, Military applications,

Text Books:

1. Electronic Instrumentation by Kalsi
2. Electronic Instrumentation and Instrumentation Technology by M.M.S.Anand
3. Lasers and Optical Fiber Communnication by P.Sarah



SARDAR PATEL UNIVERSITY
SYLLABUS FOR INSTRUMENTATION
SEMESTER – 3 : Core I – Paper I (Practicals)
INSTRUMENTATION COURSE CODE : US03CINS23 (2 Credit 4 hours)
COURSE TITLE : INSTRUMENTATION PRACTICALS
(According to new course structure – Effective from June 2019)

1. Introduction to electronic components and equipments
2. Study of Cathode Ray Oscilloscope (CRO)
3. Phase angle measurement using CRO
4. Study of Digital Multimeter
5. Study of Monostable Multivibrator using Transistor
6. Study of Monostable Multivibrator using IC 555
7. Study of Astable Multivibrator using IC 555
8. Study of Operational Amplifier (Op-Amp) - Inverting mode
9. Study of Operational Amplifier (Op-Amp) - Non Inverting mode
10. Study of Transformer
11. Series Ohm Meter
12. Characteristics of Thermistor
13. Study of Zener diode as a voltage regulator

COURSE TITLE : INSTRUMENTATION PRACTICALS
(According to new course structure – Effective from June 2019)

1. Introduction to electronic components and equipments
2. Study of Hartley Oscillator
3. Study of Voltage Controlled Oscillator using IC 555
4. Study of Phase Shift Oscillator
5. Shunt Ohm Meter
6. Study of Wein Bridge
7. Study of Kelvin Bridge
8. Study of Maxwell Bridge
9. Study of Field Effect Transistor as an Voltage Amplifier
10. Study of Potential Divider Biasing Circuit
11. Schmitt Trigger using Transistor
12. Characteristics of Photovoltaic Cell
13. Characteristics of Light Dependent Resistor (LDR)



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