

M.Sc- Physics (Applied Electronics.)
Revised Structure of the Course
(w.e.f. June 2010)

Semester - I

PHAE-I - Mathematical Techniques(C)	- 100
PHAE - II -Condensed Matter Physics(C)	- 100
PHAE - III -Analog & Digital Electronics (C)	- 100
PHAE - IV - Classical Mechanics	- 100
Practical - I	-100
Practical - II	- 100

Semester - II

PHAE - V - Statistical Mechanics (C)	- 100
PHAE - VI - Quantum Mechanics (C)	- 100
PHAE - VII -Electromagnetic Theory	- 100
PHAE - VIII - Microprocessors & Microcontrollers	- 100
Practical - III	- 100
Practical - IV	- 100

Semester- III

PHAE - IX - Semiconductor Devices (C)	- 100
PHAE - X - Instrumentation (C) - Revised	- 100
PHAE - XI - Communication System (C)	- 100
PHAE - XII - Atomic and Nuclear Physics	- 100
Practical - V	- 100
Practical & Project - I	- 100

Semester IV

PHAE - XIII - Computational Methods & Programming (C)	- 100
PHAE - XIV - Microelectronics (C)	- 100
PHAE - XV - Microwave Engineering	- 100
PHAE - XVI - Microprocessors & Interfacing - Revised	- 100
Practical - VI	- 100
Practical & Project - II	- 100

The Practicals Examination at Sem.III & Sem. IV shall be of 3 laboratory practicals & 1 Project Presentation. Each practical & project presentation shall carry 50 Marks. (C) Indicates common courses of the school.

M.SC-II, SEMESTER -III, PHYSICS (APPLIED ELECTRONICS)

MS - X / PHAE - X: INSTRUMENTATION (C) - Revised

Unit 1: Transducers (Basic concepts and schematic of interface circuits) (14)

Transducers classification Resistance, Capacitance, Inductance, Piezoelectric, Thermoelectric, Hall effect, Tachogenerator, Optical and Digital transducers, Measurements of displacement, Velocity, Acceleration, Force, Torque, Strain, Speed and Sound, flow humidity, thickness, PH, position, Chemical Sensors, Bio-sensors, Fiber-optic sensor, Ferroelectric sensors.

Unit 2: Instrumentation Electronics: (06)

Instrumentation Amplifiers, basic characteristics, D.C. Amplifiers, Isolation amplifiers, feedback transducers system, feedback fundamentals, Inverse transducers, temperature balance system,

Unit 3: Signal processing circuits: (10)

Phase sensitive detection, Absolute value circuit, peak detector, sample and hold circuits, RMS converter, Logarithm (Amplifier, Frequency to Voltage and Voltage to Frequency Converter, Wave Generator Lock in Amplifiers, SMPS, UPS) Design of analog ON / OFF & proportional controller V to I and I to V converter for controlling process, design of PID controller

Unit 4: Measurements Instruments: (08)

Measurements of R,L, C bridge and potentiometer, Voltage, Current, Energy, Power, Frequency /Time, Phase, Digital Voltmeter, Digital multimeters, Digital Frequency meter, Q meter, CRO, DSO, Logic State Analyzer, Spectrum Analyzer, Proximity detector.

Unit 5: Interface Systems and Standards: (04)

Single channel and multichannel DAS and P.C. interface, Block diagram of typical interface. Standard interface Systems (Transducers, Termination, Protection, Static Signal Conditions, Dynamic Signal filtering, Signal manipulation).

Reference Books:

1. Transducer Theory and Application: Jhon A Alloca, Allen Stuart
(Reston Publishing Company Inc.)
2. Transducer and Display Devices: B. S. Sonde.
3. Integrated Electronics: K. R. Botkar.

M. Sc. II, SESEMSTER - IV, PHYSICS (APPLIED ELECTRONICS)

**Paper No. - XVI - MICROPROCESSORS AND INTERFACING -
(Revised)**

Unit 1: Basic Concept of Interfacing. (06)
Buffered system Bus of 8085, Isolated Memory and I/O Configuration, I/O Address Map, Interfacing, Simple I/O Devices and LS 373 as Input and output Port.

Unit 2: Interrupts (08)
Introduction, Polling and Interrupts, Classification of Interrupts, Interrupts in 8085, Hardware interrupts in 8085, Masking / Unmasking of Interrupts, Interrupts Acknowledgement , 8259A Interrupt Controllers, Features of 8259, Block diagram of 8259A, Programming the 8259 A , 8259A Interfacing with 8085.

Unit 3: Programmable Peripherals Interface 8255 (08)
Introduction, Features of 8255 A, Signal of 8255, Block Diagram, Data Bus Buffer, Control Logic, Group A and Group B Controls, Operating Modes, Control Word Formats, 8255A Interfacing with 8085.

Unit 4: Programmable Interval Timer 8253 (05)
Necessity and Introduction, Features, Block Diagram, Operation Description, Mode Definition, Interfacing of 8253 with 8085.

Unit 5: Keyboard and Display Interface 8279 (06)
Introduction, Keyboard Interfacing, Display Interfacing, IC 8279, Features, Signals, Block Diagram, Operating Modes, 8279 Commands. Interfacing with 8085.

Unit 6: A/D and D/A Converters (10)
Introduction, Digital to Analog Converter, DAC Characteristics, Basic Conversion Techniques, Binary Weighted Resistor D/A Converter, R/2R, Ladder D/A Converter, IC 1408 DAC, Interfacing DAC with 8085.

Analog to Digital Converter, ADC Characteristics, Basic Conversion Techniques, Successive Approximation ADC, Flash ADC, IC 0809 ADC, Interfacing with 8085.

Reference Book:

- 1) 8085A /8080 Microprocessors: Architecture, Programming and Applications, - Ramesh Gaonkar
- 2) Microprocessor Interfacing Techniques - Zaka Lasen - BPB Publisher.
- 3) 8 bit & 16 bit Microprocessors - B. Ram, S. Chand Publisher.
- 4) 8085 / 8080 A Microprocessor: Architecture, Programming & Interfacing by Raffic Zeeman.