

## Core theory course (Disciplinary)

# CPH-501: ELECTRODYNAMICS AND MICROPROCESSOR

### UNIT- I

#### (a) Maxwell's equations:

Maxwell's equation in matter, Boundary condition, Charge and energy : The Continuity equation, Poynting's Theorem, Momentum : Newton's Third Law, Maxwell's Stress Tensor, Conservation of Momentum, Angular Momentum.

#### (b) Potentials and Fields:

Continuous Distributions : Retarded potentials, Point charges : Lienard Wiechert potentials .

#### Basic reference:

Introduction to Electrodynamics by D. J. Griffiths 1999: 3<sup>rd</sup> edition, PHI, EEE, New Delhi.

### UNIT – II

#### Radiation and Relativity:

Dipole radiation, What is radiation ?, Electric dipole radiation, Magnetic dipole radiation, Radiation from an arbitrary source, Point charges : Power radiated by a point charge, Radiation reaction, The Physical basis of radiation reaction.

Dynamics, Relativistic electrodynamics, How the fields transform? , The field tensor, Electrodynamics in tensor notation.

#### Basic reference :

Introduction to Electrodynamics by D. J. Griffiths 1999: 3<sup>rd</sup> edition, PHI, EEE, New Delhi.

### UNIT- III

Microprocessors, Advances in semiconductor technology, Organization of Microprocessor based system, Microprocessors instruction set and computer Languages: Machine language, 8085-Machine language, 8085 - Assembly Language, Writing and Executing an assembly language program, High level language, Operating systems, Microprocessors architecture and its operational, M.I.O. and 8085 Bus organization, Internal data operations and the 8085 registers, Peripheral or externally initiated operations, Memory, Flip -Flop or latch as a storage element, Memory Map and addresses, Memory address range of a 1K memory chip, Memory classification, Logic Devices for interfacing : Tri-state Devices, Buffer, Decoder, Encoder, The 8085 MPU : The 8085 microprocessors(Pinout), Demultiplexing the bus AD7-- ADo , Generating control signals.

#### Basic reference :

Microprocessor Architecture, Programming and Applications with 8085 by Ramesh S. Gaonkar PIP Pub.

### UNIT-IV

Introduction to 8085 Assembly Language Programming: Instruction classifications, Instruction word size, Opcode.format, Data Format, How to write assemble and execute simple programme, Overview of 8085 Instruction Set, Data Transfer Operations, Arithmetic Operations. Logical operations; OR, Exclusive-OR and NOT, Data Masking with logic AND, Examples, ORing data from two input ports, Branch Operations, Unconditional jump, Unconditionaljump to set up a continuous loop conditional jumps, Programming Techniques; Looping, Counting and Indexing, conditional loop, counter, Examples, Additional Data transfer and 16-bit Arithmetic instructions, 16-bit data transfer to Registers pairs (LXI), Data transfer from Memory to Microprocessor, Examples, Data transfer from the Microprocessor to Memory or directly into Memory, Logic operations: Rotate-Left, Right with and without carry.

#### Basic reference :

Microprocessor Architecture, Programming and Applications with 8085 by Ramesh S. Gaonkar PIP Pub.

#### Other references :

- (1) Classical electrodynamics by J. D. Jackson, 2nd edition 1964,- Jhon Wiley & Sons, Inc, and 3rd edition 2000.
- (2) Electromagnetics by B. B. Laud. Willley Eastern Ltd.
- (3) Electrodynamics by Kumar and Gupta, Pragati prakashan Meeruit, India.
- (4) Introduction to microprocessor by R. Zalls B. P. B. Publication Delhi.
- (5) An introduction to microprocessor and applications by Krishna Kant, Macmillan.