Birla Institute of Technology, Mesra, Patna Campus
Department of Electrical & Electronics Engineering
Syllabus of 5th Semester

EE 5201 MICROPROCESSOR & MICROCONTROLLER Credits: 3

MODULE – I
Digital computer, Computer languages, Main frame, Mini computers, Microcomputers, Architecture of 8085 microprocessor, Functions of different pins, Bus Concept.

(5)

MODULE – II
Memory organization, Memory map, Interfacing devices, Memory interfacing, Different machine cycles

(5)

MODULE – III
Instruction set, Instruction classification, Instruction format, Addressing modes of 8085, Simple illustrative programs and flow chart, System timing diagram.

(7)

MODULE – IV
Programming techniques, Looping, Counting, Logic operations, Sorting, Counter and time delays, Stack and subroutine, Code conversion BCD to binary, Binary to BCD, Binary to ASCII and ASCII to Binary, BCD Arithmetic.

(6)

MODULE – V
Data transfer schemes, Memory mapped I/O and I/O mapping, I/O port Intel 8212 interfacing with multiplexed 7-segment LED and matrix keyboard, Intel 8255 all modes, Timer 8253/8254 Keyboard/Display Interface 8279, Control words and interfacing.

(8)

MODULE – VI
Interrupt structure of 8085, Hardware and software interrupts, EI, DI, RIM and SIM instructions, Interfacing DAC 1408 and staircase ramp and triangular wave form generation, Interfacing ADC 0801, Applications.

(6)

MODULE – VII
Introduction to microcontroller, Popular microcontroller, Applications, Architecture of 8051 microcomputer, Internal and external memories, Interrupts.

(8)

Text Books:

1. Ramesh S. Gaonkar, Microprocessor Architecture - Programming, Applications
2. Raj Kamal, Microcontrollers - Architecture, Programming, Interfacing and System Design, Pearson Education.

Reference Books:

1. Renu Singh and B. P. Singh, Microprocessors, Interfacing and Applications, New Age International Publication.
2. A.P. Malvino, Digital Computer Electronics
3. S. K. Venkatram, Advanced Microprocessor & Microcontroller
4. A. P. Mathur, Introduction to Microprocessors

EE 5203 ELECTRICAL MACHINES – II Credits: 3

MODULE – I

Basic Concept of A.C. Rotating Machines: Introduction to Armature winding, Integral slot and fractional slot winding, Distribution factor (Kd), Pitch factor (Kp) and winding factor (Kw). Production of rotating magnetic field, EMF and torque equations, Effect of tooth harmonics and methods of reduction.

(4)

MODULE – II

Synchronous Generator: Construction, Cylindrical rotor and salient pole rotor, Principle of operation, Excitation system, Effect of winding factor on EMF, Armature reaction, Circuit model, Phasor diagram, O.C. and S.C. tests, Short-circuit ratio, Determination of voltage regulation by synchronous impedance, MMF and zero power factor methods.

(8)

MODULE – III

Performance Characteristics of Synchronous Generator: Two reaction theory, Phasor diagram, Power-angle characteristic of synchronous generators, Synchronizing power and torque, Synchronizing methods, Parallel operation of synchronous generator, Effect of change in excitation and mechanical power input on load sharing, Operation of alternator on infinite bus bars, Slip test.

(7)

MODULE – IV

Synchronous Motor: Construction, Principle of operation, Equivalent circuit, Phasor diagram, Circuit model, Effect of change in excitation on armature current and power factor, Starting of synchronous motor, Synchronous condenser, Hunting, Applications.

(7)

MODULE – V

3-ϕ Induction Motor : Introduction, Construction, Principle of operation, Slip and rotor frequency, Comparison with transformer, Equivalent circuit model, Representation of mechanical load, No load and blocked rotor tests. Torque and power output, Losses and efficiency, Separation of losses.

(7)

MODULE – VI

Performance Characteristics of 3-phase Induction Motor: Circle Diagram, Torque-slip characteristics, Effect of rotor resistance, Starting torque and maximum torque, Starting and speed control methods, Cogging and crawling, Introduction to induction generator, Applications.

(7)

MODULE –VII

Single-phase Induction Motor: Introduction, Double revolving field theory, Crossfield theory, Torque-speed characteristic, Equivalent circuit model, Starting methods, Applications.

(5)

Text Book:

1. A.S. Langsdorf, Alternating Current Machines
2. A.E. Fitzgerald, Electric Machinery

Reference Books:

1. P. S. Bimbhra, Electrical Machines, Khanna Publishers
2. I. J. Nagrath, D.P. Kothari, Electric Machines, TMH, New Delhi, 2002.
3. P. K. Mukherjee, S. Chakravarti, Electrical Machines, Dhanpat Rai & Sons.

EE 5205 POWER ELECTRONICS Credits: 4

MODULE – I

Scope of power electronics, Overview of high power semiconductor switches, Two transistor analogy of SCR terminal characteristics, Rating and protection of SCR, UJT and Industrial firing circuit.

(6)

MODULE – II

Dynamic characteristics of SCR, Gate characteristics, series and parallel operation of SCR, power diodes.

(6)

MODULE – III

Single phase controlled, Half wave, Full wave rectifier with R, RL and RLE loads, Single phase semiconverter, Effect of Source impedance performance, Evaluation of converter using Fourier series analysis.

(7)

MODULE – IV

Three phase uncontrolled rectifier with resistive load, Three phase half wave, Full wave rectifiers with R-load, 3-phase semiconverter, RMS, Average value, Fourier analysis,THD, HF and PF of converter.

(6)

MODULE – V

Chopper, Introduction, Principle of operation control, Strategies, Step-up and step-down chopper, Chopper configuration, Type A,B,C,D & E chopper uses.

(6)

MODULE – VI

Single phase inverter, VSI and CSI, Analysis with R, RL, and RLC loads, 180^o and 120^o mode of operation of 3-phase VSI, SPM, MPM and Sinusoidal PWM techniques, Series inverters use.

(7)

MODULE – VII

AC voltage regulators, 1-phase ac voltage controller with R and RL loads, Integral cycle control. **Cycloconverters:** Introduction, The basic principle of operation, Steps up and step-down cycloconverter, Single phase to single phase cycloconverters.

(7)

Text Book:

1. M.H. Rashid, Power Electronics: Circuits, Device and Applications, 2nd Ed.n, PHI, New Jersey, 1993.
2. M.D. Singh, K.B. Khanchandani, Power Electronics, TMH, Delhi 2001.

Reference Books:

1. S.N.Singh, A Text Book of Power Electronics, Dhanpat Rai & Co., New Delhi 1st Edn., 2000.
2. Mohan, Underland, Robbins; Power Electronics Converters, Applications and Design, 3rd Edn., 2003, John Wiley & Sons Pte. Ltd.
3. R.S. Ramshaw, Power Electronics Semiconductor Switches, 2nd Edition, 1993, Chapman & Hall, Chennai.
4. V.R. Murhty, Power Electronics, Oxford Publishers.

EE 5207 **POWER SYSTEM – I** **Credits: 3**

MODULE – I

Introduction: Structure of a power system, Effect of transmission voltage, Different curves: load curves, Load duration curve, Different factors for Power plant operation: Demand factor, Load factor, diversity factor, plant capacity factor, plant utilisation factor, cost of electrical energy, different types of tariff: simple type, flat rate types, bulk rate, two part, three-part tariff, availability based tariff.

(9)

MODULE – II

Constants of O/H lines: Types of conductors, bundle conductor, resistance calculation, skin effect, inductance and capacitance of overhead lines: Inductance and capacitance of single phase and three phase line, Transposition, Double ckt. three phase lines.

(7)

MODULE – III

Over head line insulators: Types of insulators, potential distribution over a string of suspension insulators, methods of enhancing string efficiency, Underground cable: types, extra high voltage cables: electrostatic stresses, grading of cables.

(7)

MODULE – IV

Mechanical design of transmission line: Sag tension, length calculation, effect of wind and ice loading. corona effect.

(5)

MODULE – V

Distribution Systems: Feeders, distributors, and service mains, redial and ring main system, different types of DC and AC distribution systems, calculation.

(7)

MODULE – VI

Transmission System: Performance of transmission line, representation of short, medium and long transmission lines, Ferranti effect, SIL, Tuned Power Line, Power flow through transmission lines.

(7)

MODULE – VII

Voltage control: Dependency on reactive power, method of reactive power injection at load end.

(3)

Text Books:

1. Power System Analysis – Hadi Saadat, Tata McGraw-Hill Edition.
2. Electric Power System – C. L. Wadhwa, New Age International Publishing.

Reference Books:

1. Modern Power System Analysis – D. P. Kothari, I. J. Nagrath, Tata-McGraw Hill.
2. Electric Energy Systems Theory - An Introduction – O. I. Elgerd, TMH Edition.
3. Power System Engineering – A. Chakrabarti, M. L. Soni, P. V. Gupta, U. S. Bhatnagar, Dhalpat Rai & Co.

MSH 1131 PRINCIPLES OF MANAGEMENT Credits: 3

Module-1:

Introduction of Management: Definition, Nature, Objective, Functions of Management, Managerial Skills, Managerial Role.

Module-2:

Evolution of Management Thought: Classical Theory- Max Weber's Beaurocratic Theory's, Taylor's Scientific Theory, Fayol's Functional Theory's.

Module-3:

Planning: Definition, Nature, Purpose, Importance, Types of planning, and Types of plan.

Module-4:

Organizing: Definition, Basic concepts of organization, Organizing process and its importance, Formal & Informal organization, Tall & Flat structure, Span of control.

Module-5:

Staffing: Recruitment, Selection, Placement, Training & Development, Performance Appraisal.

Module-6:

Directing: Meaning Leadership- Styles and Theories, Motivation, Maslow theory of motivation, Communication process.

Module-7:

Controlling : Nature, Purpose, Basic Elements of Control and Process.

Books Recommended

1. Elements of Management – Koontz and O'Donnell
2. Principles and Practices of Management – L.M.Prasad
3. Management Today – principles and Practices by Gene Burton & Manab Thakur
4. Management by Stoner & Freeman.