6EX09 COMPUTER TECHNOLOGY - LAB

Student needs to complete minimum eight assignments based on the following:

- Computer Network: Basic hardware and terminology in networks, Classifications, The Internet, The Intranet and Extranet.
- Installation of operating systems, application software in Personnel Computer or laptop.
- Develop the simulation models for various tasks in electrical engineering using simulation software.
- Develop the computer programme for various tasks in electrical engineering using software.
- Study of PLCs used for Industrial automation & develop the ladder diagram for given task in automation using PLC.
- Basics of IoT, IoT based Monitoring & Controlling of various Electrical Equipments.

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SYLLABUS BE SEM. V ELECTRICAL ENGG. (ELECTRONICS & POWER)

5EP01 POWER SYSTEM- I

Course Outcomes:

After completing this course, the students will be able to:

1. Determine the parameters of transmission lines.
2. Evaluate the performance of transmission line
3. Describe transmission lines voltage control and power factor improvement methods.
4. Explain representation of power system, Ferranti effect and corona phenomenon.
5. Demonstrate various Insulators , its string efficiency & underground cables.

Syllabus:

Unit I: Transmission line parameters: calculation of resistance, inductance and capacitance of single phase and three phase transmission lines, skin effect and proximity effect, transposition, G.M.D. & G.M.R. methods, double circuit lines, bundled conductors, effect of earth on inductance and capacitance, interference with communication lines.

Unit II: Electrical characteristics of transmission line: V-I characteristics of short, medium and long lines, A, B, C, D constants, nominal T and equivalent ´ representations.

Unit III: Voltage control and power factor improvement: methods of voltage control and power factor improvement, use of static VAR generators and synchronous condenser, automatic voltage control. Receiving end and Sending end power circle diagrams.

Unit IV: Representation of power systems: single line diagrams, per unit system and one-line impedance and reactance diagrams. Ferranti effect, corona phenomenon, Introduction to Travelling waves.

Unit V: Insulators: materials used, types, comparison of pin type and suspension type insulators, voltage distribution and string efficiency, methods of increasing string efficiency, grading rings and arcing horns. Introduction to insulator testing, line supports for LV, HV, EHV and UHV.

Unit VI: Underground cables: material used for conductor & insulation, different types of cables and their construction, parameters of underground cable, grading of cable, losses, break down and rating, selection of cables.

Text Books:

1. Modern Power System Analysis by D. P. Kothari, I. J. Nagrath TMH Publishing
2. Elements of power system analysis by William D. Stevenson, Jr, McGraw-Hill International edition

Reference Books:

1. Power System Engineering by D. P. Kothari, I. J. Nagrath TMH company ltd., New Delhi
2. Narain G. Hingorani and Lazlo Gyugyi ñUnderstanding FACTS: Concepts and Technology of Flexible AC Transmission Systems.
3. Principles of power system by V. K. Mehta, S. Chand & company ltd., New Delhi.
4. Electrical Power Systems by C. L. Wadhwa, New Age International Publishers, New Delhi
5. Electrical Power Systems by Ashfaq Husain, CBS Publishers & Distributors Pvt. Ltd., New Delhi.
6. Electrical Power system design by M. V. Deshpande, TATA McGraw-Hill Publishing Company Limited, New Delhi.

5 EP02 MICROPROCESSORS & MICROCONTROLLER

Course Outcomes:

After completing the course the students will be able to

1. Recite Fundamentals and Architecture of Microprocessor 8085, Microcontroller 8051
2. Interpret Assembly Language Programming of Microprocessor 8085, Microcontroller 8051
3. Illustrate interfacing with Microprocessor 8085, Microcontroller 8051
4. Apply knowledge of Microprocessor 8085 for measurement of Electrical quantities
5. Discusss Fundamentals and Architecture of Microprocessor 8086
6. Explain Fundamentals and Architecture of Microprocessor 8051

Unit I: 8085-architecture and Pin Diagram, Microprocessor Operations (Initiated, Internal and External) BUS organization and register structure, instruction set of 8085, addressing modes, Machine Cycles & Bus Timings.

Unit II: Assembly Language Programming of 8085, counters and time delays, stack and subroutines, Memory mapped I/O and I/O mapped I/O, address decoding techniques. Interrupt system of 8085 (software and hardware interrupts), Data transfer schemes, serial data transfer through SOD and SID line.

Unit III: Programmable Interfacing devices: Internal architecture, programming and interfacing of Programmable Peripheral Interface PPI (8255), Programmable Interrupt Controller PIC (8259), and Universal Synchronous Asynchronous Receiver Transmitter USART (8251) and Programmable Interval Timer PIT (8253)

Unit IV: Introduction to microcontroller: 8051 pin configuration and architecture, 8051 Internal resources, pin diagram, I/O pins, ports and their internal logic circuits, counters, serial ports, interrupt structure, SFRs and their addressing, watch-dog timer, internal code memory, data memory, stack pointer, flags, bit addressable memory.

Unit V: Instruction set of 8051.Addressing modes. Various groups of instructions: data transfer. Arithmetic-logical group. Interrupt, timer counter related instructions. Interfacing of 8051with external memories. Programming 8051 with interfacing examples.

Unit VI: 8085 Microprocessors / 8051 Microcontroller Applications: hardware & software developments: signal conditioning & data acquisition system components. Measurement of Pulse width and Magnitude using 8085. Measurement of fundamental quantities -voltage, current, frequency, speed using 8051 Microcontroller.

Text Book: Microprocessor Architecture, Programming, and Applications with the 8085, Romesh Gaonkar PHI Publication - 2006

Reference Books:

1. An Introduction to Microcomputers Volume 1 Basic Concepts, Adam Osborne Osborne-McGraw Hill, Berkely California, 1980
2. Introduction to Microprocessor L. Gibson, Prentice-Hall, 2003
3. Advance Microprocessor and Peripherals, K. M. Bhurchandi & A. K. Ray, 2nd Edition, Tata McGraw Hill, 2006.
4. Microprocessor 8086 ,Sunil Mathur PHI 2010
5. The 8051 Family of Microcontrollers Richard Barnett Prentice-Hall, Inc -2000
6. The 8051 Microcontroller and Embedded Systems: Using Assembly and C,M A Mazidi,J.GMazidi and Mckinlay, 2nd Edition, Pearson.

5EP03 ELECTRICAL MACHINES – II

Course Outcomes:

After completing this course students will be able to

1. Describe the construction, working operation & performance characteristics of three phase Induction Motor
2. Analyze the starting, braking and speed control of three phase induction motors by various methods.
3. Describe the construction, working operation & performance characteristics of single-phaseInduction Motor
4. Demonstrate the construction, working operation & performance characteristics of synchronous machine.
5. Explain the construction & working of special motors like Universal, Reluctance, PMSM & BLDC Motor

Unit I: Three phase induction motor – I:
Construction, Types (squirrel cage and slip-ring), Rotating Magnetic Fields, principles of operation, Working, Torque Slip Characteristics, Starting and Maximum Torque. Effect of parameter variation on torque slip characteristics (variation of rotor and stator resistances, stator voltage, frequency).Equivalent circuit. Phasor Diagram, Performance evaluation by direct & indirect testing, circle diagram.

Unit II: Three phase induction motor – II :
Starters for squirrel cage &slip-ring type IM, Methods of speed control, electric braking, High Torque IM, single phasing, cogging and crawling, Generator operation Self-excitation, Doubly-Fed Induction Machines.

Unit III: Single phase Induction Motor : Double revolving field theory, Constructional features, equivalent circuit, working, Split-phase starting methods and applications of single-phase Induction motors.

Unit IV: Synchronous Generator:
Constructional details, working principle, operation, armature reaction, circuit model, determinations of parameters of the circuit model and phasor diagram, methods of determining the regulations and efficiency, Parallel operation of alternators - synchronization and load division.

Unit V: Synchronous Motor:
Construction, principle of operation, working, starting methods, torque equation - V-curve, Inverted V curve & power angle characteristics, hunting & damping, applications. Transient, sub transient & steady state reactance of synchronous machines.

Unit VI: Special Motors:
Construction, working principle, operation, characteristics and applications of Universal motor, Reluctance Motor, Permanent Magnet Synchronous Motor & BLDC Motor.

Text Books:

1. D.P.Kothari & I.J. Nagrath, ñElectrical Machinesò- 5thEdition, TMH Publication.
2. S. Langsdorf, ñAlternating Current Machinesò, McGraw Hill Publication

Reference Books:

1. Stephen D. Umans, ñFitzgerald and Kingsleyôs Electric Machineryò, 7th Edition, McGraw Hill Publication, 2020.
2. M. G. Say, ñPerformance and design of AC machinesò, CBS Publishers, 2002.
3. P. S. Bimbhra, ñElectrical Machineryò, Khanna Publishers, 2011.
4. C L Dawes, ñA Course in Electrical Engineering (Volume -2)ò, McGraw Hill Publication.

5EP04 Professional Elective-I SIGNALS AND SYSTEMS

Course Outcomes :

After completing this course student will be able to

1. Demonstrate knowledge of continuous-time and discrete-time signals and systems.
2. Analyze the continuous-time systems using continuous Time Fourier transform.
3. Explain the concept of sampling, Sampling Theorem, aliasing and the Nyquist rate.
4. Analyze DT systems & their realization using Z-transforms.
5. Analyze the discrete time systems using DTFT and DFT

Unit I: Introduction to Signals and Systems: Classification of Signals Classification of Systems, Systems Modeling Some Ideal Signals, Energy and Power Signals Frequency Response, Discrimination of Continuous-Time Signals Topological Models, Analysis of Continuous-Time Systems Properties of Elementary Signals Linear Convolution Integral, Response of Continuous-Time Systems

Unit II: Fourier Transform Properties of Fourier Transform, Tables of Fourier Transform Pairs Fourier Transform of Periodic Signals, Ideal Low-Pass Filter Frequency-Domain Analysis of Systems Fourier analysis of Sampled Signals

Unit III: Analysis of LTI Discrete-Time Systems: Time Domain and Frequency Domain, Properties of Discrete-Time Sequences Linear Convolution, Discrete-Time System Response.

Unit IV: Sampling: Representation of continuous time signals by its samples, reconstruction of a signal from its samples, aliasing, discrete time processing of continuous time signals, sampling of discrete time signals

Unit V: Z- Transform: Z- transform, the region of convergence for the z-transform, Inverse z- transform, properties of Z transform, analysis and characterization of LTI systems using z transforms, System function algebra and block diagram representations, the unilateral z ï transform.

Unit VI: Discrete Fourier Transform and Fast Fourier Transform Representation of Discrete-Time aperiodic signals and the Discrete-Time Fourier Transform; Fourier Transform for Periodic Signals; Properties of the Discrete-Time Fourier Transform; Discrete-Time LTI Systems and Discrete-Time Fourier Transform. Fast Fourier Transform (FFT)

Text Books:

1. Alan Oppenheim &Alan Willsky ,"Signals and Systems" Prentice Hall India Learning Private Limited; 2nd edition
2. P. Ramesh Babu R. Ananda Natarajan "Signals and Systems." Scitech Publications

Reference Books:

1. Fred Taylor,Principles of Signals and Systems ñTata McGraw-Hill, 1998, New Delhi
2. Nagrath, Sharan, Ranjan Rakesh and Kumar Sukhbinderò Signals and Systemsò Tata McGraw-Hill, 1998, New Delhi.
3. S Haykin and B Van Veen, ñSignals and Systems ñJohn wiley & sons

5EP04 Professional Elective - I

2. NETWORK ANALYSIS AND SYNTHESIS

Course Outcomes :

After completing this course student will be able to

1. Analyze the transient response of series and parallel A.C. circuits
2. Demonstrate the properties of network functions.
3. Demonstrate the properties of positive Real Functions
4. Synthesize driving point functions of RL, RC and RLC
5. Synthesize two port network functions
6. Design passive filters to meet desired specifications

Unit I: Transient Analysis:

Transient response of RC, RL and RLC circuit to various excitation signals such as step, ramp, impulse and sinusoidal signals.Network solution with Laplace transformation, initial and final value theorem and convolution integral.

Unit II: **Network Functions:**

Network Functionsfor one port & two-port networks, poles and zeroes of network functions. Restrictions on poles and zeroes locations for driving point functions and transfer functions. Time domain behavior of electrical network from the pole- zeroes plot.

Unit III: Positive Real function: Driving point function, Bruneôs positive real function, properties of positive real function, testing of driving point function. An application of Maximum Modulus Theorem, properties of Hurwitz polynomial, computation of residue, even and odd functions

Unit IV: Synthesis of One Port Networks
Properties of LC, RC and RL driving point functions and their synthesis in canonical (Foster and Cauer) forms. Synthesis of RLC driving point functions which can be synthesized by partial fraction or continued fractions

Unit V: **Synthesis of Transfer Functions**
Properties of transfer functions, Zeros of Transmissions (ZOTs), synthesis of Y21 and Z21 with 1ohm termination. Synthesis of transfer functions using constant resistance single and double terminated lattice and bridge T networks. Synthesis of open circuit transfer function

Unit VI: Filter fundamentals
Classification of filters, Analysis of prototype filter section, Analysis of a prototype Low Pass Filter, High Pass Filter, Band Pass Filter, Band Stop Filter, M–Derived Filter, Low Pass Filter with RC and RL Circuits, High Pass Filter with RC and RL Circuits, Low Pass Filter with RLC Circuit. Introduction of Different Types of Active Filters

Text Books :
1. Van Valkenberg, ñNetwork Analysisò,, Prentice Hall of India (PHI)
2. Sudhakar and Shyammohan,"Circuits and Networks: Analysis and Synthesis ,McGraw-Hill Education

Reference Books:
1. Van Valkenburg ñIntroduction to Network Synthesisò, Prentice Hall of India (PHI)
2. Kelkar, Pandit, ñLinear Network Theoryò, Pratibha Publication.
3. Franklin Kuo, ñNetwork Analysis and Synthesisò, Wiley international.
4. A.Chakrabarti, ñCircuit Theoryò Dhanpat Rai & Co.
5. C.L Wadhwa, ñNetwork Analysis and Synthesisò New Age International Publishers, 2007.

5EP04 Professional Elective – I

3. **ELECTRONIC COMMUNICATION THEORY**

Course Outcomes:
After successfully completing the course, the students will be able to
1. Explain various types of signal & elements of communication system.
2. Analyze the signal using Fourier Transform
3. Apply Amplitude modulation & Frequency modulation on the communication signal
4. Compare Pulse communication & Digital communication
5. Describe microwave communication system.

Unit I: Introduction to Electronics Communication Systems:
Signals: Analog & digital, Deterministic & Non-deterministic, Periodic & non periodic,Elements of Communication Systems, Transmitter, Receiver, Need for Modulation, bandwidth requirements, Noise, External, internal noise, noise calculation, noise figure.

Unit II: Signal Analysis:
Fourier Series, Exponential Fourier Series, Fourier Transform, Properties of Fourier Transform, Dirac Delta Function, Fourier Transform of Periodic functions, Fundamental of Power Spectral Density & Energy Spectral Density.

Unit III: Amplitude Modulation:
Amplitude Modulation Theory, Generation of Amplitude Modulation, Single Side band Communication, suppression of carrier, suppression of unwanted sideband, AM receiver.

Unit IV: Frequency Modulation:
Theory of Frequency Modulation, characteristics of FM, Generation of FM, pre-emphasis, De-emphasis, wide &Narrowband FM Transmission, FM receiver.

Unit V: A. Pulse Communication:
Information Theory, Classification of pulse modulation, Sampling process, pulse amplitude modulation, PWM and PPM modulation pulse code modulation.

B. Digital Communication:
Fundamentals of data communication systems, data sets and interconnection requirements.

Unit VI: Microwave communication system
Analog microwave communication: LOS, OTH microwave system Satellite communication: Satellite orbits, frequencies, attitude, transmission path.

Text Book: Electronic Communication System by Kennedy, Davis, TMH

Reference Books:
1. Electronics Communication by K.Shoenbcle PHI, India.
2. Electronics Communication techniques, Paul Young, Willey Eastern Pub.
3. Principle of C.E TMIL Taub Schilling.
4. Electronics Communication - Robert Shrader McGraw Hill.

5FEEP05 Open Elective – I
1. ELECTRICAL DRIVES

Course Outcomes:
After completing this course, Students will be able to:

1. Explain the basic Concept of electrical drives
2. Describe Power Electronics devices & their Applications
3. Demonstrate various starting, braking and speed control methods of D.C. Motors
4. Demonstrate various starting, braking and speed control methods of three phase Induction Motor.
5. Describe the construction, working principle and applications of single phase Induction Motor& special motors.

Unit I: Concept of electric drives, classification and comparison of electrical drive system, Cooling and heating of electric motors. Types of duties: continuous, intermittent and short time. Selection of an electric drive for particular applications.

Unit II: Theory, principle, Characteristics of Power Transistor, SCR, Power MOSFET and IGBT. Introduction to single phase & three phase fully controlled bridge convertors.

Unit III: D.C. Motors: Types, characteristics, Torque equation, Starting and braking, Speed controland Applications.

Unit IV: Three phase Induction Motors: Types, construction, principle of working, characteristics and applications. Starting and braking. Speed control methods: Thyristorized stator voltage control of three phase induction motor.

Unit V: Single phase Induction Motors: Double revolving field theory, Cross field theory,types, construction, principle of working, starting methods and applications.

Unit VI: Special Motors: Construction, Principle of working, and applications of D.C. servo motors, stepper motors, Brushless D.C. motors and Universal motor.

Text Books :

1. S.K.Pillai : A First Course on Electrical Drives by New Age International Publishing Co. Ltd
2. I.J.Nagrath & D.P.Kothari : Electric Machines by Tata Mc Graw Hill Publishing Co Ltd.

Reference Books :

1. VedamSubrahmanyam: Electric Drives : Concepts & Applications by Tata Mc Graw Hill Publishing Co Ltd.
2. Ion Boldea, Nasar. S A : Electric Drives by CRC Press India
3. Ashfaq Husain: Electric Machines by Dhanpat Rai & Co. Ltd
4. M.D.Singh &K.B.Khanchandani : Power Electronics by Tata Mc Graw Hill Publishing Co Ltd
5. V.K.Mehta: Principles of Electronics by S.Chand and Co Ltd ,New Delhi

5FEEP05 Open Elective-I:
2. POWER SUPPLY SYSTEM

Course Outcomes:
After completing this course student will be able to

- Describe the Structure of Power system
- Explain construction and working of various generation plants
- Describe layout and working of Substations
- Compare various power distribution system
- Explain Electrical wiring required for various Installations

Unit I: Structure of Power System :
Generation, transmission and distribution. Power generating stations ï different types. Steam power stations: Main parts and working, Water tube boiler, Fire tube boiler and their characteristics. Main flow circuits of steam power station. Power station auxiliaries,

Unit II: Gas-turbine power stations:
Main parts, plant layout and Bryton cycle operation. Combined cycle generation & Cogeneration. Nuclear power stations- Layout of nuclear power station, types of power reactors, main parts and control of reactors, nuclear waste disposal, radioactivity and hazards.

Unit III: Hydro-electric stations:
Site selection, constituents and schematic arrangement of hydroelectric stations, principles of working, types of turbines, Layout and working of Pumped storage plant.

Unit IV: Substation:

Classification of substations, Major equipment, Selection & location of site for substation, Main Electrical connections, Symbols for various apparatus & circuit elements in substation, 66/11kV and 11kV/400V substation Key diagram, Busbar layouts. Auxillary supply, substation earthing.

Unit V: Power distribution system:
Primary and secondary distribution, types of conductors in Distribution system. Connection Scheme: radial, parallel, ring main, comparison of distribution systems

Unit VI: Electrical wiring and installation:
Domestic, commercial and industrial wiring, main, sub-main and sub-circuit wiring.Types and need of Earthing.Fuse and disconnecting devices. Electrical Safety precautions.

Text Books :
1] Principles of Power System, by V K Metha and RohitMetha, S Chand Publication
2] Generation of Electrical Energy, by B R Gupta, S Chand Publication

Reference Books :
1] A Course in Power System J B Gupta, S Chand Publication
2] Elements of Electrical Power Station Design, by M. V. Deshpande, Wheeler publications
3] Electrical Installation Estimating & Costing by J. B. Gupta
4] Transmission & Distribution by H. Cotton.

5FEEP05 Open Elective – I
3. POWER PLANT ENGINEERING

Course Outcomes: -

1) Describe different Sources of Energy Generation
2) Explain the Working and layout of steam power plant & hydro power plant.
3) Discuss the working principle and basic component of Nuclear, Diesel & gas power plant
4) Illustrate various terms related to power plant economics & tariff.

Unit-I: Introduction:
Energy resources and their availability, types of power plants, selection of the plants, Introduction to basic thermodynamic cycles used in power plants, Conventional and non-conventional energy sources, Indian Energy Scenario.

Unit-II: Hydro Electric Power Plant:

Rainfall and run-off measurements and plotting of various curves for estimating stream flow and size of reservoir, Layout of Hydro power plant, operation of different components of hydro-electric power plant , classification of hydro Electric power plant, Pump Storage Plant, site selection, advantages & disadvantages

Unit-III: Steam Power Plants:

Flow sheet and working of modern-thermal power plants, super critical pressure steam stations, Layout of Thermal power plant , Site selection, coal storage, coal handling systems, ash handling systems, working of various parts: Economizer, air preheater, condenser, cooling tower, Electrostatic Precipitator, advantages & disadvantages

Unit-IV: Nuclear Power Plants:

Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANada Deuterium- Uranium reactor (CANDU) fast breeder reactor, Gas Cooled and Liquid Metal Cooled Reactors. Safety measures for Nuclear Power plants.

Unit-V: Diesel & Gas power plant:

Layout of Diesel power plant, functions of different components of diesel plant, advantages & disadvantages, Principle of Operation of Gas Turbine Plants, Open cycle gas turbine plant, closed cycle gas power plant, Combined gas and steam cycle.

Unit-VI: Power Plant Economics:

Load curve, energy load curve, energy duration curve, connected load, maximum demand, demand factor, load factor, diversity factors, plant capacity and utilization factor, types of loads, operating cost, annual plant cost, Generation cost, Depreciation, Objectives of Tariff, Types of Tariff.

Text Books:

1. Generation of electrical energy by B.R.Gupta, Eurasia Publishing House, New Delhi.
2. Power Plant Engineeirng; R. K. Rajput ; Laxmi Publications.

Reference Books:
1. Non conventional energy resources. By G.D.Rai, Khanna Publishers New Delhi
2. Principles of Power System by V.K.Mehta, S.Chand publication.
3. Conventional energy technology by S.B.Pandya, Tata McGraw Hill Publication.
4. Power Plant Engineeirng. P. K. Nag.

5EP06 POWER SYSTEM – I LAB

Student should perform minimum eight practicals based on the syllabus

List of Experiments:

1. To study the performance of a transmission line using a nominal T model.
2. To study the performance of a transmission line using a nominal ´ model.
3. To calculate A,B,C,D parameters for a transmission line by using nominal T model
4. To calculate A,B,C,D parameters for a transmission line by using nominal ´ model.
5. To study skin effect, proximity effect and Ferranti effect in transmission line.
6. To study Corona phenomenon and corona loss and its control in transmission line.
7. To study conversion of single line diagram to impedance diagram and reactance diagram for a typical power system.
8. To draw the circle diagram for a typical power system.
9. Study of a tap changing transformer (ON load and OFF load tap changing).
10. Study of static VAR generator and synchronous condenser.
11. To study different types of insulators used in power system & their comparison.
12. To conduct a dry and wet test on a pin type insulator.
13. To conduct a flashover test on an insulator.
14. To study a horn gap.
15. To study different types of power cables.
16. To study testing of cables.
17. To draw different Tower structures

Note: Above experiments may be conducted by using models, simulation, numerical, drawing sheets or experimentation.

5EP07 MICROPROCESSOR & MICROCONTROLLER- LAB

List of Experiments:

Student should perform minimum eight practicals based on the syllabus

1. Write an Assembly Language Program for the Addition of two 8-bit/16-bit numbers
2. Writean Assembly Language Program for the Subtraction of two 8-bit numbers
3. Write a Program for Finding the larger and smaller one among the two 8- bit numbers
4. Write a Program for Finding the largest/smallest number in array of 8-bit numbers
5. Write a Program for Masking and setting of nibbles
6. Write a Program for Block data transfer in same and reverse order
7. Write a Program for Sorting of even and odd numbers from an array of 8-bit numbers
8. Write a Program for Multiplication of two 8-bit numbers
9. Write a Program for Square wave generation using 8255 PPI
10. Write a Program for Stepper motor control using 8255 PPI
11. Write a Program for Interfacing ADC with 8085/8051using 8255 PPI
12. Write a Program for Interfacing DAC with 8085/8051 using 8255 PPI
13. Write a Program for Lamp load control using 8255 PPI
14. Write a Program for measurement of DC Voltage /Current using ADC, 8255 PPI
15. Study of Architectural Differences: Microprocessor 8085, and Mcrocontroller 8051

5EP08 ELECTRICAL MACHINES-II LAB

Student should perform minimum eight practicals based on the syllabus**.**

List of Experiments:

1. Perform the load test on three phase IM & plot its performance characteristics.
2. Perform the No load test on three phase IM to separate out its no load losses.
3. Estimate the performance parameters of three phase IM from its circle diagram.
4. Plot the equivalent circuit of three phase Induction motor.
5. Study of different types of starters used for three phase IM
6. Speed control of three phase squirrel cage Induction motor by various methods like stator voltage control method, frequency control method, changing number of poles.
7. Speed control of three phase Induction motor.
8. Perform the electric braking of three phase Induction motor.
9. Perform the load test on single phase IM & plot its performance characteristics.
10. Load test on three phase alternator to determine its performance parameters.
11. Synchronize the three-phase alternator with infinite bus-bar
12. Perform the OC & SC test on synchronous generator to estimate its regulation by EMF & MMF methods
13. Estimate the regulation of three phase alternator using ZPF method.
14. Perform the load test on three phase Synchronous motor.
15. Plot the V & inverted V curves of synchronous motor.

5EP09 INFORMATION & COMMUNICATION TECHNOLOGY - LAB

Student needs to complete minimum eight assignments based on the following:

Word Processing with MS-Word:

- Basic operations- Editing and Formatting text, paragraphs and pages, printing the documents.
- Working with tables, figures, images.
- Mail merge. Working with Charts, Equations, symbols.

Working with workbooks /work sheets.

- Data Entry techniques & Defining data set as a Table.
- Setting, Previewing, and Printing under MS-Excel.
- Performing Calculations, using Excel Formulas, Functions and Charts.
- Sorting/ Filtering data in excel sheet.

Working with MS Power Point.

- Presentation Basics. Adding more components to the slides, Printing the slides.
- Formatting Presentations, backgrounds and layout. Applying Themes. Using Slide Master.
- Working with Graphics, Images and Clips.
- Working with Multimedia. Inserting Sound and Narration.
- Delivering Presentations. Animating Objects. Adding Action effects.
- Live Presentation. Using Custom Shows.
- Saving/Protecting the Presentation.

Working with Latex:

- Basic operations- Editing and Formatting text, paragraphs and pages, printing the documents.
- Working with tables, figure & images.

Web Page Development:

- Introduction to HTML, CSS, JAVA Coding.
- Development of Web page.

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6EP01 POWER ELECTRONICS

Course Outcomes:

After completing this course student will be able to

1. Explain the concepts and techniques used in power electronics
2. Apply the knowledge of series and parallel connection of SCRs in power control applications
3. Analyze various single phase and three phase power converter circuits
4. Analyze the single phase and three phase Inverter circuits
5. Explain the operation of DC/DC and AC/AC converter circuits
6. Demonstrate the applications of power electronic circuits.

Unit I: SCR, Triac, Diac ï Construction and Applications, two Transistor Analogy of SCR, SCR turn ON mechanism, different methods for turning ON SCR, turn OFF mechanism, Thyristor firing circuits, introduction to Power MOSFET and IGBT their construction and characteristics.

Unit II: Series-Parallel operation of SCRs, firing circuits for series and parallel operations, static and dynamic equalizing circuit, equalization of current in parallel connected SCRs ,string efficiency, de-rating factors, protections of SCRs against di/dt, dv/dt, over-voltage and over-current protection, Gate protections, Electro Magnetic Interference(EMI) and Shielding.

Unit III: Principle of phase control, half wavecontrolled rectifier, half controlled bridge and fully controlled bridge rectifier for R, RL and RLE load, derivation for output voltage and current, effect of freewheeling diode, effect of source inductance.

Three phase half controlled bridge and fully controlled bridge rectifier.

Unit IV: Classification of circuit for forced commutation, series inverter, improved series inverter, parallel inverter, single phase PWM inverters, principle of operation of three phase bridge inverter in 120^0 and 180^0mode,single phase transistorized bridge inverter.

Unit V: Basic principle of Chopper, Time ratio control and current limit controlled technique, Voltage commutated Chopper circuit, Jones Chopper, Step up Chopper, Step down Chopper and AC Chopper.

Unit VI: Basic principle of cycloconverter, single phase to single phase cycloconverter, Introduction, principle of operation of single-phase voltage controllers for R and R-L load

Speed control of DC series motor using chopper, Speed control of DC shunt motor using phase controlled rectifier. Speed control of three phase Induction motor by stator voltage control method, V/f control.

Text Books:

1. M.D. Singh & K.B. Khanchandani, ñPower Electronics ñTata Mc-Graw Hill, New Delhi
2. Rashid Muhammad, H., ñPower Electronics: Circuits, Devices and Applicationsò, 2nd Edition. Prentice-Hall, 1998

Reference Books:

1. Mohan Ned, Undeland Tore, M. and Robbins William, P., ñPower Electronics: Converter, Applications and Designò, John Wiley & Sons, 1994.
2. LandevCyrill, W., ñPower Electronicsò, McGraw Hills, London, 1981.
3. Dewan, S.B. and Satrughan A., ñPower Semiconductor Circuitsò, John Wiley & Sons,
4. Dubey, G.K., Doradlla, S.R., ñThyristerised Power Controllersò, Wiley Eastern, 1987.

Reference Books:

1. Control Engineering, D.Ganesh Rao, k. Chennavenkatesh, 2010, PEARSON
2. Ogata K.: Modern Control Systems, Prentice Hall of India.
3. Control Systems by K.R.Varmah TMH edition 2010
4. Linear Control Systems, Ashfaq Hussain, Haroon Ashfaq, Dhanpat Rai &Co.

5EX02/ 5 EP02 MICROPROCESSORS & MICROCONTROLLER

Course Outcomes:

After completing the course the students will be able to

1. Recite Fundamentals and Architecture of Microprocessor 8085
2. Interpret Assembly Language Programming of Microprocessor 8085
3. Illustrate interfacing of programmable devices with Microprocessor 8085
4. Apply knowledge of Microprocessor 8085 for measurement of Electrical quantities
5. Discuss Fundamentals and Architecture of Microprocessor 8086
6. Explain Fundamentals and Architecture of Microcontroller 8051

Unit I: 8085-architecture and Pin Diagram, Microprocessor Operations (Initiated, Internal and External) BUS organization and register structure, instruction set of 8085, addressing modes, Machine Cycles & Bus Timings

Unit II: Assembly Language Programming of 8085, counters and time delays, stack and subroutines, Memory mapped I/O and I/O mapped I/O, address decoding techniques. Interrupt system of 8085 (software and hardware interrupts), Data transfer schemes, serial data transfer through SOD and SID line.

Unit III: Programmable Interfacing devices: internal architecture and programming of PPI (8255), PIC (8259), and USART (8251). PIT (8253)

Unit IV: 8085 Microprocessors applications: hardware & software developments: signal conditioning & data acquisition system components. Measurement of pulse width using parallel port, SID lines, interrupts and timer and counter. Magnitude measurement techniques: rectification, sampling etc. measurement of fundamental quantities (voltage, current, frequency, speed) and derived quantities (resistance, inductance, capacitance, phase angle, power factor).

Unit V: Microprocessor 8086 General Idea of Architectural Advancements of Microprocessors: Pipelining, Cache memory, Memory Management, Virtual Memory System Features of 8086 Microprocessor
Register Organization of 8086: General Data Registers Segment Registers Pointer and Index Registers Flag Register Internal Organization of 8086 Bus Interface Unit (BUI) Execution Unit (EU) Memory Segmentation Flag register and description of all flag bits Interrupts

Unit VI: Introduction to microcontroller: 8051 architecture , 8051 Internal resources, pin diagram, I/O pins, ports and their internal logic circuits, counters, serial ports, interrupt structure, SFRs and their addressing, watch-dog timer, internal code memory, data memory, stack pointer, flags, bit addressable memory, study of instruction set of 8051.

Text Book: Microprocessor Architecture, Programming, and Applications with the 8085, Romesh Gaonkar PHI Publication - 2006

Reference Books:

1. An Introduction to Microcomputers Volume 1 Basic Concepts, Adam Osborne Osborne-McGraw Hill, Berkely California, 1980
2. Introduction to Microprocessor L. Gibson, Prentice-Hall, 2003
3. Advance Microprocessor and Peripherals, K. M. Bhurchandi & A. K. Ray, 2nd Edition, Tata McGraw Hill, 2006.
4. Microprocessor 8086 ,Sunil Mathur PHI 2010
5. The 8051 Family of Microcontrollers Richard Barnett Prentice-Hall, Inc -2000
6. The 8051 Microcontroller and Embedded Systems: Using Assembly and C,M A Mazidi,J.GMazidi and Mckinlay, 2nd Edition, Pearson.

5EX03/5EP03 ELECTRICAL MACHINES – II

Course Outcomes:

After completing this course students will be able to

1. Describe the construction, working operation & performance characteristics of three phase Induction Motor
2. Analyze the starting, braking and speed control of three phase induction motors by various methods.
3. Describe the construction, working operation & performance characteristics of single-phaseInduction Motor
4. Demonstrate the construction, working operation & performance characteristics of synchronous machine.
5. Explain the construction & working of special motors like Universal, Reluctance, PMSM & BLDC Motor