T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

EEE- B. Tech - V Semester

S. No	Course Code	Course Title	Hour per week			Total	Credits
			Lecture	Tutorial	Practical		
1	**B25PC1**	Power Systems-I	3	0	0	3	3
2	**B25PC2**	Power Electronics	3	0	0	3	3
3	**B45PC3**	Microprocessors and Micro Controllers	3	0	0	3	3
4	**B25PE4**	Professional Elective-I 1. Electrical Machine Design 2. Power System Dynamics and Control 3. Digital Signal Processing	3	0	0	3	3
5		Open Elective – I	3	0	0	3	3
6	**B25PC6**	Power Electronics Lab	0	0	3	3	1.5
7	**B45PC7**	Microprocessor and Micro Controllers Lab	0	0	3	3	1.5
8	**BE23**	Advanced Communication skills Lab	0	0	3	3	1.5
						Total	**19.5**

EEE- B. Tech - VI Semester

S. No	Course Code	Course Title	Hour per week			Total	Credits
			Lecture	Tutorial	Practical		
1	**B26PC1**	Power Systems-II	3	0	0	3	3
2	**B26PC2**	Electrical Measurements and Instrumentation	3	0	0	3	3
3	**B26PC3**	Power System Analysis	3	0	0	3	3
4	**B26PC4**	Signals and Systems	3	0	0	3	3
5	**B26PE5**	Professional Elective-II 1. Electrical Energy Conservation and Auditing 2. Computer Architecture 3. Line-Commutated and Active Rectifiers	3	0	0	3	3
6		Open Elective – II	3	0	0	3	3
7	**B26PC7**	Electrical systems simulation Lab	0	0	3	3	1.5
8	**B26PC8**	Electrical Measurements and Instrumentation Lab	0	0	3	3	1.5
9	**B26PC9**	Electrical Workshop	0	0	3	3	1.5
						Total	**22.5**

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

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B.TECH. ELECTRICAL AND ELECTRONICSENGINEERING -R18

POWER SYSTEMS-I –B25PC1

B.Tech. V Semester **L/T/P/C 3/0/0/3**

COURSE OBJECTIVES:

1. To understand the hydro, thermal, nuclear and gas generating stations.
2. To examine A.C. and D.C. distribution systems.
3. To understand and compare air insulated and gas insulated substations.
4. To illustrate the economic aspects of power generation and tariff methods.

COURSE OUTCOMES: After Completion of this course the student is able to

1. Understand various layout of conventional and non conventional energy sources.
2. Evaluate the various calculations of A.C. and D.C. distribution systems.
3. Typical layout of different substations and grounding methods
4. Understand power factor improvement methods and determine economical power Factor.
5. Understand various types of underground cables and calculations.

UNIT- I: Introduction To Conventional Sources Of Energy:

Thermal Power System: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, sash and flue gasses. - Brief description of TPS components.

Nuclear Power Stations: Nuclear Fission and Chain reaction. Types of Nuclear reactors and brief description of PWR, BWR and FBR.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only).

Hydroelectric Power Stations: Elements of hydro electric power station-types Hydraulic Turbines: Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine, hydraulic design - draft tube- theory- functions and efficiency.

Diesel power Station.

UNIT – II:

Non Conventional Energy Sources Of Energy:

Solar power Generation, Wind Power Generation, Battery Storage System, Hybrid Power System, Introduction to Micro Grid, Fuel Cells

UNIT – III: Distribution Systems:

Classification of Distribution Systems.- Comparison of DC vs. AC and Under-Ground vs. Over-Head Distribution Systems.- Requirements and Design features of Distribution Systems.- Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

A.C. Distribution Systems: Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

UNIT-IV: Substations:

Classification of substations:

Air insulated substations - Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment.

Gas insulated substations (GIS) – Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations.

Introduction to Sub Station Grounding:

Soil Resistivity, Ground mat, Equal distribution of voltage concept of Touch voltage, walk voltage etc.

Underground Cables: Types of Cables, Construction, Types of Insulating materials, Calculation of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables – Capacitance grading – Numerical Problems, Description of Inter-sheath grading – HV cables.

UNIT-V: Economic Aspects of Energy: Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems.

Tariff Methods: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method.-Tariff Methods: Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods and Numerical Problems

TEXT BOOKS:

1. “C. L. Wadhawa”, “Generation and utilization of Electrical Energy”, New age International (P) Limited, Publishers 1997.

2. “C. L. Wadhawa”, “Electrical Power Systems”, New age International (P) Limited, Publishers 1997.

3. “M. L. Soni, P. V. Gupta, U. S. Bhatnagar and A. Chakraborti”, “A Text Book on Power System Engineering”, DhanpatRai and Co. Pvt. Ltd, 1999.

4. Subsstation Grounding : Material Book

REFERENCE BOOKS:

1. “M.V. Deshpande”, “Elements of Power Station design and practice” , Wheeler Publishing, 3rd Edition 1999.

2. “S. N. Singh”, “Electrical Power Generation, Transmission and Distribution”, PHI, 2003. 3. “V.K Mehta and Rohit Mehta”, “Principles of Power Systems”, S. Chand& Company Ltd, New Delhi, 2004.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

POWER ELECTRONICS –B25PC2

B.Tech. V Semester **L/T/P/C**

3/0/0/3

COURSE OBJECTIVES:

1. Understand the characteristics and performance of various power electronic devices.
2. Analyze single and three phase controlled rectifier circuits.
3. Understand choppers circuits and AC voltage controllers
4. Understand the performance of single phase and three phase inverter circuits.

COURSE OUTCOMES:

At the end of the course students will be able to

1. Understand the characteristics and performance of various power electronic devices.
2. Analyze single and three phase controlled rectifier circuits.
3. Understand choppers circuits and AC voltage controllers
4. Understand the performance of single phase inverter circuits.
5. Analyse the operation of three phase voltage source inverters.

UNIT-I

Power switching devices: Diode, Thyristor, MOSFET, IGBT: static and dynamic Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor; Gate drive circuits for MOSFET and IGBT.

UNIT-II

Thyristor rectifiers: Single-phase half-wave, full-wave and semi controlled rectifiers with R-load and highly inductive load; Three-phase half wave, full wave and semi controlled bridge thyristor rectifier with R-load and highly inductive load; Input current wave shape and power factor.

UNIT-III

DC-DC Converters: Elementary chopper with an active switch and diode, concepts of duty ratio and average voltage, power circuit and operation of buck, boost and buck-boost converters in continuous conduction mode, duty ratio control of output voltage.

AC-AC Converter: Power circuit and operation of single phase AC Voltage Controller with R & RL Load.

UNIT-IV

Single-phase inverter: Power circuit and operation of single-phase voltage source inverter in square wave mode, sinusoidal pulse width modulation (Unipolar and bi-polar), relation between modulation index and output voltage. Calculation of performance parameters of inverter.

UNIT-V

Three-phase inverter: Power circuit and operation of three-phase voltage source inverter in 180^0 and 120^0 modes, Bi-polar sinusoidal pulse width modulation, relation between modulation index and output voltage. Elementary operation of CSI, Comparison of Voltage Source Inverter and Current Source Inverter.

TEXTBOOKS

1. M. H. Rashid, "*Power electronics: circuits, devices, and applications*", Pearson Education India,2009.

2.N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons,2007.

3.R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media,2007.

4.L. Umanand, "Power Electronics: Essentials and Applications", Wiley India,2009.

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

MICROPROCESSORS AND MICROCONTROLLERS –B45PC3

B.Tech. V Semester **L/T/P/C**
3/0/0/3

PREREQUISITES: Switching Theory and Logic Design (STLD), Computer Organization (CO)

COURSE OBJECTIVES:

1. To develop an understanding of the operations of microprocessors and micro controllers; machine language programming and interfacing techniques.

COURSE OUTCOMES: After completion of this course the student will be able to:

1. Acquire the knowledge of internal architecture, organization of 8086 and can develop assembly language programming.
2. Acquire the knowledge of internal architecture, organization of 8051 and can develop assembly language programming.
3. Acquire the knowledge of interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessors/microcontroller based systems.
4. Acquire the knowledge of stands the internal architecture and organization of ARM processors/controllers and can develop assembly language programming.
5. Acquire the knowledge of internal architecture and organization of Advanced ARM Processors.

UNIT – I:

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization,8086 Flag register and function of 8086 flags, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Pin diagram of 8086, Signal descriptions of 8086-common function signals, minimum and maximum mode signals, Timing diagrams , Interrupts of 8086.

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT – II:

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT – III:

I/O And Memory Interface: 8255 PPI, Stepper motor interfacing to 8086,LCD, Keyboard, External Memory RAM, ROM Interface, ADC, DAC Interface to8051.

Serial Communication and Bus Interface: Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfaces-RS232,USB.

UNIT – IV:

ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions, Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions

UNIT – V:

Advanced ARM Processors: Introduction to CORTEX Processor and its architecture, OMAP Processor and its Architecture.

TEXT BOOKS

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, MHE, 2nd Edition2006.
2. The 8051 Microcontroller, Kenneth. J. Ayala, Cengage Learning, 3rdEd. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier,2012

REFERENCE BOOKS

1. Microprocessors and Interfacing, D. V. Hall, MGH, 2ndEdition2006.
2. Introduction to Embedded Systems, Shibu K.V, MHE,2009
3. The 8051Microcontrollers, Architecture and Programming and Applications - K.UmaRao, AndhePallavi, Pearson,2009.

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

ELECTRICAL MACHINE DESIGN (Professional Elective-I)–B25PE4

B.Tech. V Semester **L/T/P/C**
3/0/0/3

PREREQUISITE: Electrical Machines-I & II

COURSE OBJECTIVES: The main objectives of the course are

1. To introduces the basic concepts of machines and transformer
2. To teach the modeling of induction motor and synchronous motor
3. To develop Computer aided Design of machines

COURSE OUTCOMES: At the end of this course, students will demonstrate the ability to

1. Understand the construction and performance characteristics of electrical machines.
2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines
3. Understand the principles of electrical machine design and carry out a basic design of an ac machine.
4. Use software tools to do design calculations.

UNIT I:

Introduction: Major considerations in electrical machine design, electrical engineering materials, space factor, choice of specific electrical and magnetic loadings, thermal considerations, heat flow, temperature rise, rating of machines.

UNIT II:

Transformers: Sizing of a transformer, main dimensions, kVA output for single- and three-phase transformers, window space factor, overall dimensions, operating characteristics, regulation, no load current, temperature rise in transformers, design of cooling tank, methods for cooling of transformers.

UNIT III:

Induction Motors : Sizing of an induction motor, main dimensions, length of air gap, rules for selecting rotors lots of squirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, magnetic leakage calculations, leakage reactance of polyphase machines, magnetizing current, short circuit current, circle diagram, operating characteristics.

UNIT IV:

Synchronous Machines: Sizing of a synchronous machine, main dimensions, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of air gap length, design of rotor, design of damper winding, determination of full load field mmf, design of field winding, design of turbo alternators, rotor design.

UNIT V:

Computer aided Design (CAD): Limitations (assumptions) of traditional designs, need for CAD analysis, synthesis and hybrid methods, design optimization methods, variables, constraints and objective function, problem formulation. Introduction to FEM based machine design. Introduction to **c**omplex structures of modern machines-PMSMs, BLDCs, SRM and claw-pole machines.

TEXTBOOKS:

1. A. K. Sawhney, "A Course in Electrical Machine Design", DhanpatRai and Sons, 1970.
2. M.G. Say, "Theory & Performance & Design of A.C. Machines", ELBS London.
3. S. K. Sen, "Principles of Electrical Machine Design with computer programmes", Oxford and IBH Publishing, 2006.

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

POWER SYSTEM DYNAMICS AND CONTROL- B25PE4

B.Tech. V Semester **L/T/P/C**
3/0/0/3

COURSE OBJECTIVES: The main objectives of course are

1. To analyze the performance of Power system with stability criteria
2. To study the numerical methods to study the performance of system
3. To study and modeling of Synchronous motor with power system components

COURSE OUTCOMES: At the end of this course, students will demonstrate the ability to

1. Understand the problem of power system stability and its impact on the system.
2. Analyse linear dynamical systems and use of numerical integration methods.
3. Model different power system components for the study of stability.
4. Understand the methods to improve stability.

UNIT-I:

Introduction to Power System Operations: Introduction to power system stability. Power System Operations and Control. Stability problems in Power System. Impact on Power System Operations and control.

UNIT-II :

Analysis of Linear Dynamical System and Numerical Methods: Analysis of dynamical System, Swing Equation, Concept of Equilibrium, Small and Large Disturbance Stability. Equal area criteria to investigate transient, Modal Analysis of Linear System. Analysis using Numerical Integration Techniques. Issues in Modeling: Slow and Fast Transients, Stiff System.

UNIT-III:

Modeling of Synchronous Machines and Associated Controllers : Modeling of synchronous machine: Physical Characteristics. Rotor position dependent model. Park Transformation, Model with Standard Parameters. Steady State Analysis of Synchronous Machine. Short Circuit Transient Analysis of a Synchronous Machine. Synchronization of Synchronous Machine to an Infinite Bus, Modeling of Excitation and Prime Mover Systems. Physical Characteristics and Models. Excitation System Control, Automatic Voltage Regulator, Prime Mover Control Systems. Speed Governors.

UNIT-IV :

Modeling of other Power System Components: Modeling of Transmission Lines and Loads. Transmission Line Physical Characteristics. Transmission Line Modeling. Load Models - induction machine model. Frequency and Voltage Dependence of Loads. Other Subsystems – HVDC and FACTS controllers, Wind Energy Systems.

UNIT-V:

Stability Analysis And Enhancing System Stability: Rotor Angle stability analysis in SMIBS and MMBS – Modes of operation of area. Frequency Stability: Concept of Inertia and Virtual inertia. Load Sharing: Governor Droop. Single Machine Load Bus System: Voltage Stability. Introduction to Torsional Oscillations and the SSR phenomenon. Stability Analysis Tools: Transient Stability Programs, Small Signal Analysis Programs. Planning Measures. Stabilizing Controllers (Power System Stabilizers).Operational Measures-Preventive Control. Emergency Control.

TEXTBOOKS

1. K.R. Padiyar, “Power System Dynamics, Stability and Control”, B. S. Publications, 2002.
2. P. Kundur, “Power System Stability and Control”, McGraw Hill, 1995.
3. P. Sauer and M. A. Pai, “Power System Dynamics and Stability

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

DIGITAL SIGNAL PROCESSING- B25PE4

B.Tech. V Semester **L/T/P/C 3/0/0/3**

PREREQUISITES: To have knowledge of Signals and Systems.

COURSE OBJECTIVES: The objective of this subject is to

1. Provide background and fundamental material for the analysis and processing of digital signals.
2. Study fundamentals of time, frequency and Z plane analysis and to discuss the inter relationships of these analytic method.
3. Study the design and structures of digital filters from analysis to synthesis for a given specifications.
4. Acquaint in FFT algorithms, multi rate signal processing techniques and finite word length effects.

Course Outcomes: After completion of this course, the students will be able to

1. Acquire knowledge on various types of continuous and discrete time signals, solves linear constant coefficient difference equation also can realize digital filters.
2. Calculate time domain and frequency domain of signals using DFS,DFT and develop FFT Algorithm for faster realization of signals and systems
3. Design digital IIR filters from analog filters using various techniques.
4. Design digital FIR filters using Window techniques, Fourier methods and frequency sampling techniques.
5. Design Interpolator and Decimator, knows the impacts of Finite Word Length Effects in Filter design

.

UNIT –I:

INTRODUCTION: Introduction to Digital Signal Processing, Applications, Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations, Frequency domain representation of discrete time signals and systems.

Z-TRANSFORMS: Review of Z-transforms, Applications of Z – transforms, solution of difference equations of digital filters, system function, stability criterion, frequency response of stable systems.

UNIT – II :

DISCRETE FOURIER TRANSFORMS: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT: Over-lap save, Over-lap add methods, Relation between DTFT,DFS and Z-transform.

FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N, Linear filtering approach for computing DFT.

UNIT–III:

IIR DIGITAL FILTERS: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters-Backward difference algorithm, Step and Impulse invariant techniques, Bilinear transformation method, spectral transformations, Realization of IIR Digital filters, applications.

UNIT–IV:

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Fourier series method, Window Techniques, Frequency Sampling technique, Realization of FIR Digital filters, Comparison of IIR & FIR filters.

UNIT –V :

MULTIRATE DIGITAL SIGNAL PROCESSING: Introduction, Down Sampling, Decimation, Up sampling, Interpolation, sampling rate conversion, Multistage implementation of Interpolator and Decimator, Applications.

Finite Word Length Effects: Limit cycles, Overflow oscillations, Round-off noise in IIR digital filters, computational output round off noise, Methods to prevent overflow. Trade off between round off and overflow noise, Dead band effects.

Text Books

1.Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.

2.Discrete Time Signal Processing-A.V.Oppenheim and R.W.Schaffer, PHI,2009

3.Digital Signal processing –Tarun Kumar Rawat,Oxford University Press,2015

Reference Books

1. Analog and Digital Signal Processingby Ashok Ambardar -2nd Edition, Brooks/Cole Publishing Company,2006
2. Digital Signal processing-S.Shalivahanan, A.Vallavaraj and C.Gnanapriya,TMH,2009.
3. Fundamentals of Digital Signal processing- LoneyLudeman, John Wiley,2009

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

POWER ELECTRONICS LAB -B25PC6

B.Tech. V Semester **L/T/P/C**
0/0/3/1.5

COURSE OBJECTIVES:

1. Apply the concepts of power electronic converters for efficient conversion/control of power from source to load.
2. Design the power converter with suitable switches meeting a specific load requirement.

COURSE OUTCOMES: After completion of this course, the student is able to

1. Understand the operating principles of various power electronic converters.
2. Use power electronic simulation packages& hardware to develop the power Converters.
3. Analyze and choose the appropriate converters for various applications

Any eight experiments should be conducted

1. Study of Characteristics of SCR, MOSFET & IGBT,
2. Gate firing circuits for SCR's
3. Gate firing circuits for MOSFET, IGBT
4. Single Phase half controlled bridge converter with R and RL loads
5. Single Phase Fully controlled bridge converter with R and RL loads
6. Forced Commutation circuits (Class A, Class B, Class C, Class D & Class E)
7. Single Phase series and parallel inverter with R and RL loads
8. Operation of MOSFET based chopper.
9. Three Phase half controlled bridge converter with R-load
10. Single phase cyclo converter with R and RL loads

Any two experiments should be conducted

1. DC Jones chopper with R and RL Loads
2. Single Phase AC Voltage Controller with R and RL Loads
3. Three Phase fully controlled bridge converter with R-load
4. Single Phase dual converter with RL loads
5. (a)Simulation of single-phase Half wave converter using R and RL loads
   (b)Simulation of single-phase full converter using R, RL and RLE loads
   (c)Simulation of single-phase Semi converter using R, RL and RLE loads
6. Simulation single phase inverter with SPWM.

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

MICROPROCESSORS AND MICRO CONTROLLERS LAB–B45PC7

B.Tech. V Semester **L/T/P/C**

0/0/3/1.5

COURSE OBJECTIVES:

1. To develop an understanding of the operations of microprocessors and micro controllers; machine language programming and interfacingtechniques.

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

- Apply the fundamentals of assembly level programming for microprocessors/microcontrollers.
- Develop programs on a microprocessor using instruction set of 8086.
- Develop the assembly level programming using 8051 instruction set.
- Analyze different I/O devices which can be interfaced to microprocessor and microcontroller.
- Develop programs using instruction set of ARM.

Note: - Minimum of 12 experiments to be conducted.

The following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051kits.

List of Experiments:

1. Programs for 16 bit arithmetic operations 8086(using various addressing modes)
2. Programs for sorting an array for8086.
3. Programs for searching for a number of characters in a string for8086.
4. Programs for string manipulation for8086.
5. Programs for digital clock design using8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using8255.
8. Serial communication between two microprocessor kits using8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of8051.
11. Program and verify Timer/Counter in8051.
12. Program and verify interrupt handling in8051.
13. UART operation in8051.

14. Communication between 8051 kit and PC.
15. Interfacing LCD to8051
16. Interfacing Matrix/Keyboard to8051
17. Data transfer from peripheral to memory through DMA controller8237/8257.
18. Programs for arithmetic operations using ARM7 2148 plus.
19. Program for Digital output (blink LEDs) using ARM7 2148 plus.

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

ADVANCED COMMUNICATION SKILLS LAB –BE23

B.Tech. V Semester **L/T/P/C**
0/0/3/1.5

INTRODUCTION:

A course on Advanced Communication Skills (ACS) Lab is considered essential at the third year level of B.Tech and B.Pharmacy courses. At this stage, the students need to prepare themselves for their career which requires them to listen to, read, speak and write in English both for their professional and interpersonal communication. The main purpose of this course is to prepare the students of Engineering for their placements.

COURSE OBJECTIVES:

1. To improve students' fluency in spoken English
2. To enable them to listen to English spoken at normal conversational speed
3. To help students develop their vocabulary
4. To read and comprehend texts in different contexts
5. To communicate their ideas relevantly and coherently in writing
6. To make students industry-ready
7. To help students acquire behavioral skills for their personal and professional life
8. To respond appropriately in different socio-cultural and professional contexts
9. To sensitize the importance of Soft Skills and people skills

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

1. Acquire vocabulary and use it contextually
2. Listen and speak effectively
3. Develop proficiency in academic reading and writing
4. Increase possibilities of job prospects
5. Communicate confidently in formal and informal contexts
6. Develop interpersonal communication skills

Syllabus

The following course activities will be conducted as part of the Advanced English Communication Skills (AECS) Lab:

UNIT-I:

Inter-personal Communication and Building Vocabulary – Starting a Conversation Responding Appropriately and Relevantly – Using Appropriate Body Language – Role Play in Different Situations – Synonyms and Antonyms, One-word Substitutes, Prefixes and Suffixes, Idioms and Phrases and Collocations.

UNIT-II:

Reading Skills and Group Discussion–General Vs Local Comprehension, Reading for Facts, Guessing Meanings from Context, Skimming, Scanning, Inferring Meaning and practice with different texts.

UNIT-III:

Writing Skills – Structure and Presentation of Different Types of Writing – Letter writing / Resume Writing/ e-correspondence/statement of purpose/ Technical Report Writing/Styles-Types-Report in Manuscript format.

UNIT-IV :

Group Discussion and Presentation Skills- Group Discussions-Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas and Rubrics of Evaluation- Concept and Process **Presentation Skills** – Oral Presentations (individual or group) through JAM Sessions/Seminars/PPTs and Written Presentations through Posters/Projects/Reports/ emails/Assignment.

UNIT-V:

Interview Skills – Pre-interview Planning, Opening Strategies, Answering Strategies, and Interview through Tele-conference & Video-conference and Mock Interviews.

MinimumHardwareRequirement:

Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab: Spacious room with appropriate acoustics Eight round tables with five movable chairs for each table. Audio-visual aids LCD Projector Public Address system Computer with suitable configuration

Suggested Software: The software consisting of the prescribed topics elaborated above should be procured and used. Oxford AdvancedLearner'sCompass,8th Edition DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice

REFERENCE BOOKS:

1. Rizvi, M Ashraf. Effective Technical Communication. McGraw – Hill
2. Kumar, Sanjay and PushpLata. English for Effective Communication, OUP,2015
3. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt Ltd,2011.
4. Shiv Khera, You can Win, Macmillan Books, New York, 2003.
5. Jeff Butterfield, Soft Skills for Everyone, Cengage Learning, 2015

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

POWER SYSTEMS-II –B26PC1

B.Tech. VI Semester **L/T/P/C**
3/0/0/3

PRE-REQUISITE: Mathematics and Electrical Circuit Analysis.

COURSE OBJECTIVES:

1. To compute inductance/capacitance of transmission lines and to understand the
2. Concepts of GMD/GMR.
3. To study the short and medium length transmission lines, their models and Performance.
4. To study the performance and modeling of long transmission lines.
5. To study the effect of travelling waves on transmission lines.
6. To study the factors affecting the performance of transmission lines and power factor Improvement methods.
7. To discuss sag and tension computation of transmission lines as well as to study the
8. Performance of overhead insulators.

COURSE OUTCOMES: After completion of this course, the students will be able to

1. Understand parameters of various types of transmission lines during different Operating conditions.
2. Understand the performance of short and medium transmission lines.
3. Understand travelling waves on transmission lines.
4. Understand various factors related to charged transmission lines.
5. Understand sag/tension of transmission lines and performance of line Insulators.

UNIT–I:

Transmission Line Parameters: Conductor materials - Types of conductors – Calculation of resistance for solid conductors –Calculation of inductance for single phase and three phase– Single and double circuit lines–Concept of GMR and GMD–Symmetrical and asymmetrical conductor configuration with and without transposition–Bundled conductors-Numerical Problems–Calculation of capacitance for 2 wire and 3 wire systems – Effect of ground on

capacitance – Capacitance calculations for symmetrical and asymmetrical single and three phase–Single and double circuit lines- Bundled conductors–Numerical Problems.

UNIT–II:

Performance of Short and Medium Length Transmission Lines: Classification of Transmission Lines – Short, medium, long line and their model representations –Nominal-T– Nominal-Pie and A, B, C, D Constants for symmetrical and Asymmetrical Networks– Numerical Problems– Mathematical Solutions to estimate regulation and efficiency of all types of lines – Numerical Problems.

UNIT–III:

Performance of Long Transmission Lines: Long Transmission Line–Rigorous Solution – Evaluation of A,B,C,D Constants–Interpretation of the Long Line Equations, regulation and efficiency—Surge Impedance and SIL of Long Lines–Wave Length and Velocity of Propagation Of Waves – Representation of Long Lines – Equivalent-T and Equivalent Pie network models (Numerical Problems).

UNIT – IV:

Travelling Wave Phenomenon: Incident, Reflected and Refracted Waves

Power System Transients: Types of System Transients – Travelling or Propagation of Surges – Attenuation–Distortion–Reflection and Refraction Coefficients – Termination of lines with different types of conditions – Open Circuited Line–Short Circuited Line – T-Junction– Lumped Reactive Junctions.

Various Factors governing the Performance of Transmission line: Skin and Proximity effects – Description and effect on Resistance of Solid Conductors –Ferranti effect – Charging Current –Shunt Compensation –Corona – Description of the phenomenon–Factors affecting corona–Critical voltages and power loss – Radio Interference.

UNIT–V:

Sag and Tension Calculations and Overhead Line Insulators: Sag and Tension calculations with equal and unequal heights of towers–Effect of Wind and Ice on weight of Conductor– Numerical Problems – Stringing chart and sag template and its applications–Types of Insulators – String efficiency and Methods for improvement–Numerical Problems – Voltage distribution– Calculation of string efficiency– Guard ring, Capacitance grading and Static Shielding.

TEXT BOOKS:

1. Electrical power systems – by C.L.Wadhwa, New Age International (P) Limited, Publishers, 1998.
2. Modern Power System Analysis by I.J.Nagarath and D.P.Kothari, Tata McGraw Hill, 2ndEdition

REFERENCE BOOKS:

1. Power system Analysis–by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
3.A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta,U.S.BhatnagarA.Chakrabarthy, DhanpatRai& Co Pvt. Ltd.
4. Electrical Power Systems by P.S.R. Murthy, B.S.Publications.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION –B26PC2

B.Tech. VI Semester **L/T/P/C**

3/0/0/3

PRE-REQUISITE: Basic Electrical Engineering, Electrical Circuit Analysis& Electromagnetic fields.

COURSE OBJECTIVES:

1. To introduce the basic principles of all measuring instruments
2. To deal with the measurement of voltage, current, Power factor, power, energy and magnetic measurements.

COURSE OUTCOMES: After completion of this course, the student will be able to

1. Understand different types of measuring instruments, their construction, operation and characteristics.
2. Identify the instruments suitable for typical measurements.
3. Analyze the measuring instruments for power and energy.
4. Design DC & AC bridges.
5. Apply the knowledge about transducers to use them effectively.

UNIT- I:

Introduction to Measuring Instruments: Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

UNIT– II:

Potentiometers & Instrument transformers: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors.

UNIT –III:

Measurement of Power & Energy: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers –

Measurement of active and reactive powers in balanced and unbalanced systems. Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximum demand meters.

UNIT – IV:

DC & AC bridges: Method of measuring low, medium and high resistance – sensitivity of Wheat-stone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method. Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge - Owen's bridge.Measurement of capacitance and loss angle –Desaunty's Bridge - Wien's bridge – Schering Bridge.

UNIT-V:

Transducers: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes.

Measurement of Non-Electrical Quantities: Measurement of strain, Gauge sensitivity, Displacement, Velocity, Angular Velocity, Acceleration, Force, Torque, Temperature, Pressure, Vacuum, Flow and Liquid level.

TEXT BOOKS:

1. "G. K. Banerjee", "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2 nd Edition, 2016
2. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements", BS Publications, 2012.

REFERENCE BOOKS:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", DhanpatRai& Co. Publications, 2005.
2. R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
3. Buckingham and Price, "Electrical Measurements", Prentice – Hall, 1988.
4. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
5. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", 5th Edition, Wheeler Publishing, 2011.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

POWER SYSTEM ANALYSIS –B26PC3

B.Tech. VI Semester **L/T/P/C**

3/0/0/3

PRE-REQUISITE: Power Systems, Electrical Circuit Analysis

COURSE OBJECTIVES:

1. To develop the impedance diagram (p.u) and formation of Y bus.
2. To study the different load flow methods.
3. To study about fault analysis.
4. To study about power system stability.

COURSE OUTCOMES: After completion of this course, the student will be able to

1. Understand different methods of load flow solutions of power system.
2. Analyze different fault studies of power system.
3. Understand and evaluate stability studies of power systems.

UNIT I:

Introduction: Need for system planning and operational studies – basic components of a power system.-Introduction to restructuring - Single line diagram – per phase and per unit analysis – Generator - transformer – transmission line and load representation for different power system studies.- Primitive network - construction of Y-bus using inspection and singular transformation methods –formation of z-bus.

UNIT II:

Power Flow Analysis

Importance of power flow analysis in planning and operation of power systems - statement of power flow problem - classification of buses - development of power flow model in complex variables form - iterative solution using Gauss-Seidel method - Q-limit check for voltage controlled buses – power flow model in polar form - iterative solution using Newton-Raphson method . Problems on 3–bus system only.

UNIT III:

Fault Analysis – Balanced and Unbalanced Faults

Introduction to symmetrical components – sequence impedances – sequence circuits of synchronous machine, transformer and transmission lines - sequence networks analysis of all types of faults using Thevenin's theorem and Z-bus matrix.

UNIT IV:

Power System Steady State Stability Analysis

Elementary concepts of Steady State, concept of stability, Dynamic and Transient Stabilities. Description of: Steady State Stability Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

UNIT V:

Power System Transient State Stability Analysis

Importance of stability analysis in power system planning and operation - classification of power system stability - angle and voltage stability – Single Machine Infinite Bus (SMIB) system: Development of swing equation - equal area criterion - determination of critical clearing angle and time – Numerical solution of swing equation by modified Euler method and Runge-Kutta fourth order method, Point-by-Point method.

TEXT BOOKS

1. Nagrath I.J. and Kothari D.P., 'Modern Power System Analysis', Tata McGraw-Hill, Fourth Edition, 2011.

2. John J. Grainger and W.D. Stevenson Jr., 'Power System Analysis', Tata McGraw-Hill, Sixth reprint t, 2010.

3. Electrical power systems – by C.L.Wadhwa, New Age International (P) Limited, Publishers, 1998.

REFERENCES BOOKS

1. HadiSaadat, 'Power System Analysis', Tata McGraw Hill Education Pvt. Ltd., New Delhi, 21st reprint, 2010. www.rejinpaul.com 55

2. Kundur P., 'Power System Stability and Control, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 10th reprint, 2010.

3. Pai M A, 'Computer Techniques in Power System Analysis', Tata McGraw-Hill Publishing Company Ltd., New Delhi, Second Edition, 2007.

4. J. Duncan Glover, Mulukutla S. Sarma, Thomas J. Overbye, ' Power System Analysis & Design', Cengage Learning, Fifth Edition, 2012.

5. Olle. I. Elgerd, ‘Electric Energy Systems Theory – An Introduction’, Tata McGraw Hill Publishing Company Limited, New Delhi, Second Edition, 2012. 6. C.A.Gross, “Power System Analysis,” Wiley India, 2011.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

SIGNALS AND SYSTEMS –B26PC4

B.Tech. VI Semester **L/T/P/C**

3/0/0/3

COURSE OBJECTIVES:

1. To introduce the terminology of signals and systems.
2. To introduce Fourier tools through the analogy between vectors and signals.
3. To introduce the concept of sampling and reconstruction of signals.
4. To analyze the linear systems in time and frequency domains.
5. To study z-transform as mathematical tool to analyze discrete-time signals and systems.

COURSE OUTCOMES: After completion of this course, the student will be able to

1. Understand the introduction of signals and systems.
2. Understand the concepts of continuous time and discrete time systems.
3. Analyse systems in complex frequency domain with Fourier Transforms.
4. Analyse systems in complex frequency domain with Laplace and Z Transforms.
5. Understand sampling theorem and its implications.

UNIT-I:

Introduction to Signals and Systems

Signals and systems as seen in everyday life, and in various branches of engineering and science. Signal properties: periodicity, absolute integrability, determinism and stochastic character. Some special signals of importance: the unit step, the unit impulse, the sinusoid, the complex exponential, some special time-limited signals; continuous and discrete time signals, continuous and discrete amplitude signals. System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, reliability. Examples.

UNIT-II:

Behavior of continuous and discrete-time LTI systems

Impulse response and step response, convolution, input-output behavior with aperiodic convergent inputs, cascade interconnections. Characterization of causality and stability of LTI systems.System representation through differential equations and difference equations.State-space Representation of systems.State-Space Analysis, Multi-input, multi-output representation.State Transition Matrix and its Role. Periodic inputs to an LTI system, the notion of a frequency response and its relation to the impulse response.

UNIT-III:

Fourier Transforms

Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients. Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem.

UNIT-IV:

Laplace and z- Transforms

Review of the Laplace Transform for continuous time signals and systems, system functions, poles and zeros of system functions and signals, Laplace domain analysis, solution to differential equations and system behavior. The z-Transform for discrete time signals and systems, system functions, poles and zeros of systems and sequences, z-domain analysis.

UNIT-V:

Sampling and Reconstruction

The Sampling Theorem and its implications.Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold. Aliasing and its effects.Relation between continuous and discrete time systems. Introduction to the applications of signal and system theory: modulation for communication, filtering, feedback control systems.

TEXT BOOKS

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, “Signals and systems”, Prentice Hall India, 1997.

2. J. G. Proakis and D. G. Manolakis, “Digital Signal Processing: Principles, Algorithms, and Applications”, Pearson, 2006.

REFERENCE BOOKS

1. H. P. Hsu, “Signals and systems”, Schaum’s series, McGraw Hill Education, 2010.

2. S. Haykin and B. V. Veen, “Signals and Systems”, John Wiley and Sons, 2007.

3. A. V. Oppenheim and R. W. Schafer, “Discrete-Time Signal Processing”, Prentice Hall, 2009.

4. M. J. Robert “Fundamentals of Signals and Systems”, McGraw Hill Education, 2007.

5. B. P. Lathi, “Linear Systems and Signals”, Oxford University Press, 2009

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

ELECTRICAL ENERGY CONSERVATION AND AUDITING (Professional Elective II)–B26PE5

B.Tech. VI Semester **L/T/P/C**
3/0/0/3

COURSE OBJECTIVE:

1. To explain Energy resources and pricing
2. To illustrate energy auditing and management
3. To Study energy efficiency in industrial systems

COURSE OUTCOMES: After completion of this course, the student will be able to

1. Understand the current energy scenario and importance of energy conservation.
2. Understand the concepts of energy management.
3. Understand the methods of improving energy efficiency in different electrical systems.
4. Understand the concepts of different energy efficient devices.

UNIT-I:

Energy Scenario

Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change. Energy Conservation Act-2001 and its features.

UNIT-II:

Basics of Energy and its various forms

Electricity tariff, load management and maximum demand control, power factor improvement, selection & location of capacitors, Thermal Basics-fuels, thermal energy contents of fuel, temperature & pressure, heat capacity, sensible and latent heat, evaporation, condensation, steam, moist air and humidity & heat transfer, units and conversion.

UNIT-III:

Energy Management & Audit

Definition, energy audit, need, types of energy audit. Energy management (audit) approach-

understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel & energy substitution, energy audit instruments. Material and Energy balance: Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

UNIT-IV:

Energy Efficiency in Electrical Systems

Electrical system: Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses. Electric motors: Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors.

UNIT -V:

Energy Efficiency in Industrial Systems

Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacity assessment, leakage test, factors affecting the performance and savings opportunities in HVAC, Fans and blowers: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pumps and Pumping System: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Energy Efficient Technologies in Electrical Systems Maximum demand controllers, automatic power factor controllers, energy efficient motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, occupancy sensors, energy efficient lighting controls, energy saving potential of each technology.

TEXT/REFERENCE BOOKS

1. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online)
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-3, Electrical Utilities (available online)
3. S.C.Tripathy,“UtilizationofElectricalEnergyandConservation”,McGrawHill,1991.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

COMPUTER ARCHITECTURE (Professional Elective II)–B26PE5

B.Tech. VI Semester **L/T/P/C**

3/0/0/3

COURSE OBJECTIVES:

1. To introduce the concept of computer organization
2. To study the concept of memory organization
3. To study the concept of Input Output organization
4. To know the concept of 16 and 32 microprocessors
5. To know the concept of Pipelining and Different Architectures

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

1. Understand the concepts of microprocessors, their principles and practices.
2. Write efficient programs in assembly language of the 8086 family of microprocessors.
3. Organize a modern computer system and be able to relate it to real examples.
4. Develop the programs in assembly language for 80286, 80386 and MIPS processors in real and protected modes.
5. Implement embedded applications using ATOM processor.

UNIT-I:

Introduction to computer organization

Architecture and function of general computer system, CISC Vs RISC, Data types, Integer Arithmetic - Multiplication, Division, Fixed and Floating point representation and arithmetic, Control unit operation, Hardware implementation of CPU with Micro instruction, microprogramming, System buses, Multi-bus organization.

UNIT-II:

Memory organization

System memory, Cache memory - types and organization, Virtual memory and its Implementation, Memory management unit, Magnetic Hard disks, Optical Disks.

UNIT-III:

Input – output Organization

Accessing I/O devices, Direct Memory Access and DMA controller, Interrupts and Interrupt Controllers, Arbitration, Multilevel Bus Architecture, Interface circuits - Parallel and serial port. Features of PCI and PCI Express bus.

UNIT-IV:

16 and 32 microprocessors

80x86 Architecture, IA – 32 and IA – 64, Programming model, Concurrent operation of EU and BIU, Real mode addressing, Segmentation, Addressing modes of 80x86, Instruction set of 80x86, I/O addressing in 80x86

UNIT-V:

Pipelining

Introduction to pipelining, Instruction level pipelining (ILP), compiler techniques for ILP, Data hazards, Dynamic scheduling, Dependability, Branch cost, Branch Prediction, Influence on instruction set.

Different Architectures

VLIW Architecture, DSP Architecture, SoC architecture, MIPS Processor and programming.

TEXT/REFENCE BOOKS

1. V. Carl, G. Zvonko and S. G. Zaky, **"**Computer organization**"**, McGraw Hill, 1978.
2. B. Brey and C. R. Sarma, **"**The Intel microprocessors**"**, Pearson Education, 2000.
3. J. L. Hennessy and D. A. Patterson, **"**Computer Architecture A Quantitative Approach**"**, Morgan Kauffman, 2011.
4. W. Stallings, **"**Computer organization**"**, PHI, 1987.
5. P. Barry and P. Crowley, **"**Modern Embedded Computing**"**, Morgan Kaufmann, 2012.
6. N. Mathivanan, **"**Microprocessors, PC Hardware and Interfacing**"**, Prentice Hall, 2004.
7. Y. C. Lieu and G. A. Gibson, **"**Microcomputer Systems: The 8086/8088 Family**"**, Prentice Hall India, 1986.
8. J. Uffenbeck, **"**The 8086/8088 Design, Programming, Interfacing**"**, Prentice Hall, 1987.
9. B. Govindarajalu, **"**IBM PC and Clones**"**, Tata McGraw Hill, 1991.
10. P. Able, **"**8086 Assembly Language Programming**"**, Prentice Hall India.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

LINE-COMMUTATED AND ACTIVE RECTIFIERS (Professional Elective II)–B26PE5

B.Tech. VI Semester **L/T/P/C 3/0/0/3**

PRE-REQUISITE: Power Electronics

COURSE OBJECTIVES:

1. Explain different rectifiers suing diodes and Thyristors
2. Study Multi-Pulse converters for HVDC applications
3. Analyze different DC-DC converters

COURSE OUTCOMES: After completion of this course, the student will be able to

1. Analyse controlled rectifier circuits.
2. Understand the operation of line-commutated rectifiers – 6 pulse and multi-pulse configurations.
3. Understand the operation of PWM rectifiers – operation in rectification and regeneration modes and lagging, leading and unity power factor mode.

UNIT-I:

Diode rectifiers with passive filtering

Half-wave diode rectifier with R L and RC loads; 1-phase full-wave diode rectifier with L, C and LC filter; 3-phase diode rectifier with L, C and LC filter; continuous and discontinuous conduction, input current wave shape, effect of source inductance; commutation overlap.

UNIT-II:

Thyristor rectifiers with passive filtering

Half-wave thyristor rectifier with R L and RC loads; 1-phase thyristor rectifier with L and LC filter; 3-phase thyristor rectifier with L and LC filter; continuous and discontinuous conduction ,input current wave shape.

UNIT-III:

Multi-Pulse converter

Review of transformer phase shifting, generation of 6-phase ac voltage from 3-phase ac,6-pulse converter and 12-pulse converters with inductive loads, steady state analysis, commutation overlap, notches during commutation.

UNIT-IV:

Single-phase ac-dc single-switch boost converter

Review of dc-dc boost converter, power circuit of single-switch ac-dc converter, steady state analysis, unity power factor operation, closed-loop control structure.

Isolated single-phase ac-dc fly back converter

Dc-dc fly back converter, output voltage as a function of duty ratio and transformer turns ratio. Power circuit of ac-dc fly back converter, steady state analysis, unity power factor operation, closed loop control structure.

UNIT-V:

AC-DC bidirectional boost converter

Review of 1-phase inverter and 3-phase inverter, power circuits of 1-phase and 3-phase ac-dc boost converter, steady state analysis, operation at leading, lagging and unity power factors. Rectification and regenerating modes. Phasor diagrams, closed-loop control structure.

TEXT BOOKS

1. G.De,"Principles of ThyristorisedConverters",Oxford&IBH PublishingCo,1988.
2. J.G. Kassakian,M. F. SchlechtandG.C. Verghese,"Principles of Power Electronics", Addison-Wesley,1991.
3. M. H. Rashid, "Power electronics: circuits, devices, and applications", Pearson Education India,2009.

REFERENCE BOOKS

1. L.Umanand,"Power Electronics: Essentials and Applications",WileyIndia,2009.
2. N.MohanandT.M.Undeland,"PowerElectronics:Converters,ApplicationsandDesign", John Wiley&Sons,2007.
3. R.W.Ericksonand D.Maksimovic, Fundamentals of Power Electronics", Springer Science&Business Media,2001.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

ELECTRICAL SYSTEMS SIMULATION LAB–B26PC7

B.Tech. VI Semester **L/T/P/C**
0/0/3/1.5

PREREQUISITE: Electrical circuits, Power System Analysis & Power Electronics

COURSE OBJECTIVES:

1. To Simulate and analyse electrical and electronic systems**.**
2. To evaluate the performance of transmission lines.
3. To Analyze various Faults in power systems
4. To Model, simulate and analyze the performance of DC Machines and Induction Motors.
5. To Analyze performance of feedback and load frequency control of the systems

COURSE OUTCOMES: After completion of this course, the student will be able to

1. Design and Analyze electrical systems in time and frequency domain
2. Analyze various transmission lines and perform fault analysis
3. Model Load frequency control of Power Systems
4. Design various Power Electronic Converters and Drives.

Any 10 of the following experiments are required to be conducted using suitable software

1. Design of first and second order circuits in time and frequency domain
2. Performance evaluation of long transmission lines
3. Symmetrical component analysis
4. Transmission Line Fault Analysis
5. Fault analysis of single machine connected to bus bar through transformer.
6. Short Circuit studies of Power system models
7. Speed Control of DC Motor
8. Speed Control of Induction motor
9. Design and analysis of feedback control system
10. Transient analysis of open ended line and short circuited line

11. Load frequency control of single area and two area power system
12. Economic Dispatch of Thermal Units
13. Design of Single Phase and Three Phase Inverters
14. Design of Single Phase and Three Phase Full Converters
15. Solution of first order differential equation using RK 4th order method.
16. Single phase Cycloconverter for 1/3 and ¼ frequencies.

REFERENCE BOOKS

1. C.L. Wadhwa: Electrical Power Systems –Third Edition, New Age InternationalPub. Co.,2001.
2. Hadi Sadat: Power System Analysis –Tata McGraw Hill Pub. Co.2002.
3. "I. J. Nagrath& M. Gopal", Control Systems Engineering, New Age International Pub. Co., 5th Edition2009.
4. A.E. Clayton & C.I. Hancock Performance and Design of DC Machines,CBS Publisher, 1st Edition2000.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous)

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

ELECTRICAL MESEARUEMENTS AND INSTRUMENTATION LAB–B26PC8

B.Tech. VI Semester **L/T/P/C**
0/0/3/1.5

COURSE OBJECTIVES:

1. To calibrate LPF Watt Meter, energy meter, P. F Meter using electro dynamo meter type instrument as the standard instrument
2. To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges & A. C Bridges
3. To determine three phase active & reactive powers using single wattmeter method practically
4. To determine the ratio and phase angle errors of current transformer and potential transformer.

COURSE OUTCOMES: After completion of this course, the students will be able to

1. Design and validate DC and AC bridges.
2. Analyze the dynamic response and the calibration of few instruments.
3. Learn about various measurement devices, their characteristics, their operation and their limitations.
4. Understand statistical data analysis.
5. Understand computerized data acquisition.

Any 10 of the following experiments are required to be conducted

1. Calibration and Testing of single phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Kelvin’s double Bridge – Measurement of resistance – Determination of Tolerance.
5. Dielectric oil testing using H.T. testing Kit.

6. Schering bridge& Anderson bridge.
7. Measurement of 3 – Phase reactive power with single-phase wattmeter.
8. Measurement of displacement with the help of LVDT. In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted
9. Calibration LPF wattmeter – by Phantom testing.
10. Measurement of 3-phase power with single watt meter and two CTs.
11. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given CT by Null method.
12. PT testing by comparison – V. G. as Null detector – Measurement of % ratio error and phase angle of the given PT
13. Resistance strain gauge – strain measurements and Calibration.
14. Transformer turns ratio measurement using AC bridges.
15. Measurement of % ratio error and phase angle of given CT by comparison.

TEXT BOOKS

1. "G. K. Banerjee", "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2 nd Edition, 2016
2. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements", BS Publications, 2012.

REFERENCE BOOKS

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", DhanpatRai& Co. Publications, 2005.
2. R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
3. Buckingham and Price, "Electrical Measurements", Prentice – Hall, 1988.
4. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
5. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments", 5th Edition, Wheeler Publishing, 2011.

T K R COLLEGE OF ENGINEERING &TECHNOLOGY

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B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING -R18

ELECTRICAL WORKSHOP –B26PC9

B.Tech. VI Semester **L/T/P/C**

0/0/3/1.5

PREREQUISITE: Basics of Electrical Engineering

COURSE OBJECTIVES:

1. To enhance practical knowledge related to different subjects
2. To develop hardware skills such as soldering, winding etc.
3. To develop debugging skills.
4. To increase ability for analysis and testing of circuits.
5. To give an exposure to market survey for available components
6. To develop an ability for proper documentation of experimentation.
7. To enhance employability of a student.
8. To prepare students for working on different hardware projects.

COURSE OUTCOMES: After completion of this course, the students will be able to

1. Get practical knowledge related to electrical
2. Fabricate basic electrical circuit elements/networks
3. Trouble shoot the electrical circuits
4. Design filter circuit for application
5. Get hardware skills such as soldering, winding etc.
6. Get debugging skills.

Group A:

1. Design and fabrication of reactor/ electromagnet for different inductance values.

2. Design and fabrication of single phase Induction/three phase motor stator.

3. Start delta starter wiring for automatic and manual operation.

4. Wiring of distribution box with MCB, ELCB, RCCB and MCCB.

5. Wiring of 40 W tube, T-5, LED, Metal Halide lamps and available latest luminaries.

6. Assembly of various types of contactors with wiring.

7. Assembly of DOL and 3 point starter with NVC connections and overload operation.

Group B: This group consists of electronic circuits which must be assembled and tested on general purpose PCB or bread boards.

1. Design and development of 5 V regulated power supply.

2. Design and development of precision rectifier.

3. Design and development of first order/ second order low pass/high pass filters with an application.

4. Microcontroller Interface circuit for temperature/level/speed/current/voltage measurement.

5. Peak detector using op-amplifiers.

6. Zero crossing detector using op-amplifiers

7. Power quality comparison of CFL, LED, and Incandescent and fluorescent lamps.