ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
(AN AUTONOMOUS INSTITUTION)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Regulations: **R17** Programme Code: **G2**

IV B.Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
7G271	Power Semiconductor Drives	3	1	--	3
7G373	Digital Signal processing	3	1	--	3
7G576	Management Science	3	1	--	3
	Open Elective	3	1	--	3
	Professional Elective -I	3	1	--	3
	Massive open online course	--	--	3	3
7G276	Power System Lab-II	--	--	3	2
7G277	Microprocessors & Microcontrollers lab	--	--	3	2
7G278	**Project lab**	--	--	3	2
7G279	Comprehensive Electrical & Electronics Engineering	--	--	2	1
	Total	**15**	**5**	**14**	**25**

Professional Elective -I (PE-I):

1. Instrumentation (7G272)
2. Distribution of Electric Power (7G273)
3. Embedded Systems (7G274)

LIST OF OPEN ELECTIVES SUBJECTS		Subject Code	Offered By Department of
LIST OF OPEN ELECTIVES SUBJECTS	Disaster Management	7G674	CE
	System Modelling and Simulation	7G275	EEE
	Total Quality Management	7G575	ME
	Integrated Product Development	7G576	ME
	Industrial Electronics	7G376	ECE
	Medical Instrumentation	7G377	ECE
	Cyber Laws	7G178	CSE
	Principles of Programming Language	7G179	CSE
	Intellectual Property Rights	7GA72	MBA
	Human Resource Management	7GA73	MBA

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	L	T	P
IV B. Tech., I Semester	3	1	-

7G271-POWER SEMICONDUCTOR DRIVES

Course Objective:

This course is an extension of Power Electronics applications to AC and DC drives. Control of DC motor drives with single phase and three phase converters and choppers are given in detail. The control of AC motor drives with variable frequency converters and variable voltage are also emphasized.

Unit I

Control Of Dc Motors By Line Commutated Converters: Introduction to Thyristor controlled Drives, Single Phase semi and fully controlled converters connected to DC separately excited and DC series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed DC motors-Three phase semi and fully controlled converters connected to DC separately excited and DC series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

Unit II

Four quadrant operations of dc drives: Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

Unit III

CONTROL OF DC MOTORS BY CHOPPERS: Single quadrant, Two – quadrant and four quadrant chopper fed dc separately excited and series motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed d.c Motors – Closed Loop operation (Block Diagram Only)

Unit IV

CONTROL OF INDUCTION MOTOR: Variable voltage characteristics: Control of Induction Motor by AC Voltage Controllers – Waveforms – speed torque characteristics.

Variable frequency characteristics: Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converter- PWM control – Comparison of VSI, CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages - applications – problems

Unit V

CONTROL OF SYNCHRONOUS MOTORS: Separate control &self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical Problems – Closed Loop control of synchronous motor drives (Block Diagram Only).

TEXT BOOKS:

1. G K Dubey, *Fundamentals of Electric Drives.* Narosa Publications,2nd Edition,2016.
2. M.H.Rashid, *Power Electronic Circuits, Devices and applications,* PHI, 4th Edition,2013.

REFERENCE BOOKS:

1. MD Singh and K B Khanchandani, *Power Electronics.*Tata McGraw-Hill Publishing Company, 1998
2. B.K.Bose, *Modern Power Electronics and AC Drives.* PHI.
3. Vedam Subramanyam, *Thyristor Control of Electric Drives.* Tata McGraw Hill Publications.
4. S K Pillai, *Analysis of Thyristor Power – conditioned motors.* Universities press, 1st Edition.

Course Outcomes: At the end of the course the student will be able to

1. Analyze the control of DC motors by line commutated converters.
2. Analyze the Four quadrant operation of converters.
3. Analyze the control of DC motors by choppers.
4. Analyze the control of AC motors by single phase AC voltage control
5. Analyze the control of AC motors by Inverters

COs-POs-PSOs Mapping Table

Course Outcomes	Program Outcomes												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	-	-	-	-	-	3	3	3	-	3	3
2	1	1	1	-	-	-	-	-	1	1	1	-	3	3
3	3	3	3	-	-	-	-	-	3	3	3	-	3	3
4	3	3	3	-	-	-	-	-	3	3	3	-	3	3
5	3	3	3	-	-	-	-	-	3	3	3	-	3	3

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IV B. Tech., I Semester

7G373-DIGITAL SIGNAL PROCESSING

L	T	P
3	1	-

Course objectives:

The course aims to provide the student with the ability

- To understand application of Discrete Fourier series and Transforms
- To learn design techniques and applications of Digital signal processing

Unit I

INTRODUCTION AND DISCRETE FOURIER SERIES: Discrete time signals, LTI systems, stability and causality, Solution of linear constant coefficient difference equations. 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, Basics of Z-Transforms.

Unit II

FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT)-Radix2 decimation in time and decimation in frequency FFT algorithms, inverse FFT and FFT for composite N.

Unit III

IIR DIGITAL FILTERS Analog filter approximations-Butterworth and chebyshev, design of digital filters from analog filters, design examples: analog-digital transformations, IIR Structures- Direct form –I , Direct form- II, Transposed Structure, Cascade form.

Unit IV

FIR DIGITAL FILTERS Characteristics of FIR digital filters, frequency response. Design of FIR digital filters using window techniques, frequency sampling technique, comparison of IIR and FIR filters.

Unit V

APPLICATIONS OF DIGITAL SIGNAL PROCESSING: Spectral analysis of non stationary Signals, Musical Sound processing, signal Compression, Oversampling A/D Converter, Oversampling D/A Converter.

TEXT BOOKS:

1. Digital signal processing, principles, Algorithms and applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 4th ed., 2007.
2. Digital signal processing , A computer base approach- Sanjit K Mitra, Tata Mcgraw Hill, 3rd edition, 2009.

REFERENCE BOOKS:

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. Discrete Time Signal Processing-A.V. Oppenheim and R.W. Schaffer, 2nd ed., PHI.
3. Digital Signal Processing- P.Ramesh Babu, 4th Ed. Scitech Publications.

COURSE OUTCOMES:

At the end of the course the student will be able to

1. Understand the types of discrete time signals & systems and analyze using Fourier series and Fourier transforms.
2. Know the basics of digital filters and design using different techniques.
3. Know the applications in Real life

COs-POs-PSOs Mapping Table

Course Outcomes	Program Outcomes												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	-	-	-	-	-	3	3	3	-	3	3
2	1	1	1	-	-	-	-	-	1	1	1	-	3	3
3	3	3	3	-	-	-	-	-	3	3	3	-	3	3

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IV B. Tech., I Semester

L	T	P
3	1	-

7G576-MANAGEMENT SCIENCE

Course Objectives:

- The objective of this course is to get basic knowledge of management and organization.
- To understand the concepts of plant location plant layouts its types& types of productions.
- To get the concepts of work study & method study.
- Learn about the materials management and inventory classification techniques.
- To know the concepts of PERT & CPM.
- To understand the concepts of inspection, quality control techniques, job description, merit rating, product life cycle.

Unit I

MANAGEMENT AND ORGANISATION STRUCTURE: Meaning, Nature, Importance Elements Of Management;. Planning, Organizing, Staffing, Directing, Coordinating, Reporting, Budgeting.-Systems Approach To Management. Evolution Of Scientific Management, Modern Management. Principles Need Of Organization Structure -Types Of Organization Structure Line, Line And Staff, Functional And Matrix Organizations

Unit II

OPERATIONS MANAGEMENT: Plant Location And Layout - Methods Of Production (Job, Batch And Mass Production) Objectives Of Inventory Management- Need For Inventory Control- Method Of Inventory Management : EOQ, ABC Analysis.

MARKETING MANAGEMENT - Core Concepts Of Marketing. Need, Want, Demand, Product, Value, Satisfaction, Marketing Mix- Product, Price, Place, Promotion, Product Levels -Product Life Cycle, – Channels Of Distribution.

Unit III

HUMAN RESOURCES MANAGEMENT (HRM): Significance Of HRM, Basic Functions of hr manager. Hr planning, Job evaluation. Recruitment, and Selection. Placement And Induction. Training. Performance Appraisal. Compensation. Industrial Relations.

Unit IV

FINANCIAL MANAGEMENT: Objectives, Scope, Techniques Of Investment Analysis, Pay Back Period, Accounting Rate Of Return, Working Capital, Cost Of Capital, Sources Of Financing.

PROJECT MANAGEMENT (PERT/CPM): Network Drawing - Programme Evaluation And Review Technique (PERT) - Critical Path Method (CPM) - Probability Of Completing The Project Within Given Time – Project Crashing (Simple Problems).

Unit V

ADVANCES IN MANAGEMENT PRACTICES: Basic Concepts And Overview Of Management Information System (MIS), Enterprise Resource Planning (ERP), Value Analysis, Just –In-Time (JIT), Total Quality Management (TQM) And Supply Chain Management.

Overview Of Ethics-Nature And Objectives Of Ethics - Relationship Between Ethics And An Organization.

TEXT BOOKS:

1. L.M.Prasad, Priciples and Practice of Management, S.Chand & Sons.
2. Shridhara Bhat, Production and operation management, HPH.

REFERENCE BOOKS:

1. Harnold Koontz, Cyril 'O' Donnell, Essentials of Management, TataMcGraw Hill, New Delhi, 1979.
2. Human Resource Management, Dessler Gary, 10th Edition, Pearson/PrenticeHall of India 2006.
3. Marketing Management, V.S. Ramaswamy and S. Namakumari, 4/e McMillan, 2010.
4. Production, Planning and Control Text and Cases, S K Mukhopadhyay, PHI, New Delhi. 2009

Course Outcomes:

By the end of the course the students will be able to

1. An ability to demonstrate basic knowledge in mathematics, science and engineering.
2. An ability to design and conduct experiments, interprets, analyze and report results
3. An ability to identify, formulate and solve mechanical engineering problems.
4. An ability to understand of their professional and ethical responsibilities.
5. An ability to communicate effectively in both verbal and written forms.
6. Confidence to apply engineering solutions in global and societal contexts.
7. Broad scene education and will have an understanding of the impact of engineering on society and

8. Demonstrate awareness of contemporary issues.
9. An ability to function on multi-disciplinary teams.

COs-POs-PSOs Mapping Table

Course Outcomes	Program Outcomes												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	3	3	3	3	3	3	3	-	1	3
2	3	3	3	3	3	3	3	3	3	3	1	-	3	3
3	3	3	3	3	3	3	3	3	3	3	3	-	3	3
4	3	3	3	3	3	3	3	3	3	3	3	-	3	3
5	3	3	3	3	3	3	3	3	3	3	3	-	1	3
6	3	3	3	3	3	3	3	3	3	3	3	-	3	1
7	3	3	3	3	3	3	3	3	3	3	3	-	3	3
8	3	3	3	3	3	3	3	3	3	3	3	-	3	3
9	3	3	3	3	3	3	3	3	3	3	3	-		3

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IV Year B. Tech. I Semester

7G674 – DISASTER MANAGEMENT
(OPEN ELECTIVE)

L	T	P
3	1	0

Course Objectives:

- The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

Unit I

INTRODUCTION- Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation).

Unit II

DISASTERS- Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

Unit III

DISASTER IMPACTS- Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate-change and urban disasters.

Unit IV

DISASTER RISK REDUCTION (DRR)- Disaster management cycle–its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Unit V

Disasters, Environment and Development- Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental-friendly recovery; reconstruction and development methods.

TEXT BOOKS/REFERENCE BOOKS:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority).
2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
4. Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.
5. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Course Outcomes:

1. The students will learn basic concepts of various disasters.
2. The students must learn various classification of disasters hazard and vulnerability profile of India.
3. The students will learn impacts, global and national disaster trends.
4. The students will learn disaster management cycle and its phases and DRR programmes in India and activities of national disaster management academy.
5. The students should be able to analyze factors affecting vulnerability of developmental projects and environmental modifications for sustainable development.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	-	-	-	-	2	1	-	2	2	2	-	-
2	1	-	-	-	-	-	-	2	3	3	-	2
3	1	-	-	-	-	3	-	3	2	2	-	-
4		-	-	-	-	-	-	3	3	3	-	2
5	1	-	-	-	-	-	2	3	-	-	-	3

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IV Year B. Tech. I Semester

7G275 – SYSTEM MODELLING & SIMULATION
(OPEN ELECTIVE)

L	T	P
3	1	0

Course Objectives: The course aims to provide the student with the ability

- To understand the basic system concepts and definitions of system.
- Techniques to model and to simulate various systems.
- To analyze a system and to make use of the information to improve the performance

Unit I

Basic Simulation Modeling, Systems, Models and Simulation, Discrete Event Simulation, Simulation of Single Server Queuing System, Simulation of Inventory System, Alternative approach to Modeling and Simulation.

Unit II

SIMULATION SOFTWARE: Comparison of Simulation Packages with Programming Languages, Classification of Software, Desirable Software Features, General Purpose Simulation Packages – Arena, Extend and Others, Object Oriented Simulation, Examples of Application Oriented Simulation Packages.

Unit III

BUILDING SIMULATION MODELS: Guidelines for Determining Levels of Model Detail, Techniques for Increasing Model Validity and Credibility, **Modeling Time Driven Systems:** Modeling Input Signals, Delays, System Integration, Linear Systems, Motion Control Models, Numerical Experimentation.

Unit IV

EXOGENOUS SIGNALS AND EVENTS: Disturbance Signals, State Machines, Petri Nets & Analysis, System Encapsulation,

MARKOV Process: Probabilistic Systems, Discrete Time Markov Processes, Random Walks, Poisson Processes, the Exponential Distribution, Simulating a Poison Process, Continuous-Time Markov Processes.

Unit V

EVENT DRIVEN MODELS AND SYSTEM OPTIMIZATION: Simulation Diagrams, Queuing Theory, Simulating Queuing Systems, Types of Queues, Multiple Servers, System Identification, Searches, Alpha/Beta Trackers, Multidimensional Optimization, Modeling and Simulation Mythology.

TEXT BOOKS:

1. System Modeling & Simulation, an Introduction – Frank L. Severance, John Wiley & Sons, 2001.
2. Simulation Modeling and Analysis – Averill M. Law, W. David Kelton, TMH, 3rdEdition, 2003.

REFERENCE BOOK:

1. Systems Simulation – Geoffrey Gordon, PHI, 1978.

Course Outcomes:

1. Define basic concepts in Modeling and Simulation.
2. Understand the fundamental logic, structure, components and management of simulation modeling& demonstrate knowledge of how to use arena
3. Classify various simulation models and give practical examples for each category
4. Generate and test random number variates and apply them to develop simulation models
5. Analyze output data produced by a model and test validity of the model.
6. Perform statistical analysis of output from terminating simulation.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	3	3	3	3	3	3	3	-
2	3	3	3	3	3	3	3	3	3	3	1	-
3	3	3	3	3	3	3	3	3	3	3	3	-
4	3	3	3	3	3	3	3	3	3	3	3	-
5	3	3	3	3	3	3	3	3	3	3	3	-
6	3	3	3	3	3	2	-	2	2	2	2	2

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IV Year B. Tech. I Semester

7G575 – TOTAL QUALITY MANAGEMENT
(OPEN ELECTIVE)

L	T	P
3	1	0

Course Objectives: The course aims to provide the student with the ability

- To demonstrate knowledge of quality management principles, techniques and philosophies.
- To apply statistical process control techniques to improve the quality.
- To demonstrate knowledge of TQM tools for industries.
- To apply appropriate techniques for reliability assessment.
- To demonstrate knowledge of advanced techniques for reliability engineering.

Unit I

INTRODUCTION : Definition of Quality, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Strategic Planning, Deming Philosophy, Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen

Unit II

STATISTICAL PROCESS CONTROL (SPC) :The seven tools of quality, Statistical Fundamentals, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

Unit III

TQM TOOLS AND QUALITY SYSTEMS :Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Quality Auditing

Unit IV

INTRODUCTION TO RELIABILITY :Importance of reliability, performanc cost and reliability, quality and safety, system configuration with exampl stochastic processes, bathtub concept, MTBF, MTTR, hazard rate, failure ra probability and sampling, cumulative probability distribution function, data a distributions.

Unit V

RELIABILITY IN DESIGN AND LIFE CYCLE COSTING :Survival rate, bath-tub curve analysis of characteristics of failure regimes, design synthesis, reliability effort function, safety margin, allocation of reliabilities by AGREE, ARINC, proportional distribution of unreliability, heuristic method, mean and median methods.

TEXT BOOKS :

1. Joel E. Rose, *Total Quality Management*, 3rd Edition, Kogan Page Ltd., USA 1999
2. Srinath, L. S., *Reliability Engineering*, Affiliated East West Press, New Delhi 2005

REFERENCE BOOKS :

1. James R.Evans& William M.Lidsay, "The Management and Control of Quality", (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum.A.V. "Total Quality Management", McGraw Hill, 1991.
3. Zeiri. "Total Quality Management for Engineers", Wood Head Publishers, 1991.
4. E. E. Lewis, "Introduction to Reliability Engineering", John Wiley and Sons.

Course Outcomes:

1. Understand the concept of quality management principles, techniques and philosophies.
2. Understand how to apply statistical process control techniques to improve the quality
3. Can able to demonstrate knowledge of TQM tools for industries.
4. Able to apply appropriate techniques for reliability assessment.
5. Understand the concept of advanced techniques for reliability engineering.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	-	-	-	-	-	-	3	-	-	3	3
2	3	3	-	-	-	-	-	3	-	-	3	3
3	3	3	-	-	-	-	-	3	-	-	3	3
4	3	3	-	-	-	-	-	3	-	-	3	3
5	3	-	-	-	-	-	-	3	-	-	3	3

UNIT V

DESIGN FOR MANUFACTURING AND PRODUCT DEVELOPMENT: Definition - Estimation of Manufacturing cost- Component costs, Assembly cost, Overhead cost, Transportation costs – Component costs reduction methods - Reducing the component assembly costs – Reducing the costs of supporting production - Assessing the impact of DFM decisions on other factors.

PROTOTYPING: Principles of prototyping - Prototyping technologies – Steps involved in prototyping.

TEXT BOOK:

1. Product Design and Development, Karl T.Ulrich and Steven D.Eppinger, McGraw –Hill International Edns.1999

REFERENCES:

1. Concurrent Engg./Integrated Product Development. Kemnneth Crow, DRM Associates, 6/3,ViaOlivera, Palos Verdes, CA 90274(310) 377-569,Workshop Book
2. Effective Product Design and Development, Stephen Rosenthal, Business One Orwin, Homewood, 1992,ISBN, 1-55623-603-4
3. Tool Design – Integrated Methods for successful Product Engineering, Stuart Pugh, Addison Wesley Publishing,Neyourk,NY,1991, ISBN 0-202-41639-5
4. www.me.mit/2.7444 PD7202 P

Course outcomes:

On completion of the course the student will be able to

1. Understand the overall processes involved in developing the new product.
2. Understand the integration of customer requirements in product design.
3. Apply structural approach to concept generation, selection and testing.
4. Understand various aspects of design such as industrial design.
5. Understand the concepts of design for manufacture, and prototype development.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	-	-	3	-	-	2	-	3
2	3	-	-	-	-	3	3	-	-	2	-	3
3	3	3	3	3		3	3	-	-	-	-	3
4	3	3	3	3	-	3	3	-	-	-	-	3
5	3	3	3	3	-	-	-	-	-	-	-	3

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IV Year B. Tech. I Semester

7G376 - INDUSTRIAL ELECTRONICS
(OPEN ELECTIVE)

L	T
3	1

Course Objectives:

- To get an overview of different types of power semi-conductor devices a their switching characteristics.
- To understand the operation, characteristics and performance parameter of controlled rectifiers.
- To study the characteristics of DC and AC drives
- To learn the different modulation techniques of pulse width modulate inverters and to understand the harmonic reduction methods.

Unit I

POWER DEVICES: Power diode – Power transistor – Power MOSFET – SCR – TRIAC – GTO – IGBT – MCT – Protection of power devices.

Unit II

CONVERTERS: Introduction to half wave, full wave and bridge rectifiers – Single phase and three phase – Half controlled and fully controlled converters – Dual converters – Introduction to cyclo converters and ac controllers.

Unit III

INVERTER AND HOPPER: Voltage, current and load commutation – Voltage Source Inverter (VSI) – Series and Parallel inverter – Bridge inverters – Single and three phase – Voltage control using PWM – Current Source Inverter (CSI) – Choppers – Step up and step down choppers – Chopper classification – Class A, B, C, D, E – AC choppers.

Unit IV

DC AND AC DRIVES : Steady state characteristic of dc motors – Control of DC motor using converters and choppers – Regenerative and dynamic braking – Closed loop control scheme – Speed-torque characteristic of induction motor – Static stator voltage control – V/f control – Static rotor resistance control – Slip power recovery scheme – Self-control of synchronous motor.

Unit V

OTHER APPLICATIONS: Electronic timers – Digital counters – Voltage regulators – Online and offline ups – Switched mode power supply – Principle and application of induction and dielectric heating.

TEXT BOOK:

1. G. K. Mithal, "Industrial Electronics", Khanna Publishers, Delhi, 2000.

REFERENCE BOOKS:

1. M. H. Rashid, "power Electronics Circuits, Devices and Application", PHI, 3rd edition, 2004.
2. G. M. Chute and R. D. Chute, "Electronics in Industry", McGraw Hill Ltd, Tokyo, 1995.
3. F. D. Petruzulla, "Industrial Electronics", McGraw Hill, Singapore, 1996.

Course Outcomes: The students are able to acquire

1. Knowledge on different power devices and inverters
2. Understand the concepts of DC and AC drives.
3. Knowledge on different applications of Industrial electronics

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	2	2	3	3	2	-	-	-	-	-	-	-
2	2	2	2	-	2	-	-	-	-	-	-	-
3	2	-	2	-	2	-	-	-	-	2	-	-

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IV Year B. Tech. I Semester

7G377 – MEDICAL INSTRUMENTATION
(OPEN ELECTIVE)

L	T
3	1

Course Objectives: The course aims to provide the student with the ability

- To learn the fundamentals of Electro neurogram and Blood Pressure.
- To understand the applications of Blood flow measurement and Puls Oximeter.

Unit I

GENERAL INTRODUCTION: The cell, body fluids, Musculoskeletal system respiratory system, gastrointestinal system, Nervous system, endocrine system and circulatory system. Origin of Bio potentials: electrical activity of Excitable cells: the resting state, The active state, Volume conductor fields, Functional organization of the peripheral nervous system: Reflex are & Junctional transmission.

Unit II

THE ELECTRONEUROGRAM (ENG): The H-Reflex, The Electromyogram (EMG), The Electrocardiogram (ECG), heart and the circulatory system, Electro conduction system of the heart and heart problems, ECG waveform and Physical significance of its wave features, Electrical behavior of cardiac cells, The standard lead system, The ECG preamplifier, DC ECG Amplier, Defibrillator protection circuit, Electro surgery Unit filtering, Functional blocks of ECG system, Multichannel physiological monitoring system, Common problems encountered and remedial techniques.

Unit III

BLOOD PRESSURE: indirect measurement of blood pressure, korotkoff sounds, auscultatory method using sphygmo manometer, Oscillometric and ultrasonic non invasive pressure measurement, Direct measurement of blood pressure H2O manometers, electronic manometry, Pressure transducers,. Pressure amplifier designs, Systolic, diastolic mean detector circuits

Unit IV

BLOOD FLOW AND VOLUME MEASUREMENT: indicator dilution methods, Transit time flow meter, DC flow meter, Electromagnetic flow meter AC electromagnetic flow meter, Quadrature suppression flow meter, Ultrasonic flow meter, Continuous-wave Doppler flow meter, Electric impedance plethysmography, Photo plethysmography.

Unit V

PULSE OXIMETR: Principles of Operation, Absorption Spectrum, Sensor design, Pulse oximeter, Therapeutic and Prosthetic Devices. Cardiac Pacemakers: Lead wires and electrodes, Synchronous Pacemakers, rate responsive pacemaking, Defibrillators, cardioverters, Electrosurgical-unit, Therapeutic applications of laser, Lithotripsy Haemodialysis.

TEXT BOOKS:

1. John G Webster, Medical Instrumentation: Application and Design , John Wiley,3rd Ed. 2012.
2. Joseph J. Carr& John M. Brown , Introduction to biomedical Equipment Technology, 4th Ed., Prentice Hall India, 2001.

Course Outcomes:

Upon completion of the course, students can

1. Learn the basics of Human being Bio potentials.
2. Know the fundamentals of Blood flow and volume measurement.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	2	2	2	2	3	2	-	-	-	-	-	2
2	2	2	2	2	3	2	-	-	-	-	-	2

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IV Year B. Tech. I Semester

7G178 – CYBER LAWS
(OPEN ELECTIVE)

L	T	P
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Course Objectives:

- To explain the basic information on cyber security.
- To understand the issues those are specific to amendment rights.
- To have knowledge on copy right issues of software's.
- To understand ethical laws of computer for different countries.
- To understand legal aspects of Cyber security.

Unit I

FUNDAMENTALS OF CYBER SECURITY Introduction-Cyber Security and its Problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

Unit II

ISSUES IN CYBER SECURITY Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

Unit III

INTELLECTUAL PROPERTY RIGHTS Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

Unit IV

PROCEDURAL ISSUES Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

Unit V

LEGAL ASPECTS OF CYBER SECURITY Ethics, Legal Developments, Late 1990 to 2000, Cyber security in Society, Security in cyber laws case. studies, General law and Cyber Law-a Swift Analysis.

REFERENCE BOOKS:

1. Jonathan Rosenoer,"Cyber Law: The law of the Internet", Springer-Verlag, 1997.
2. Mark F Grady, Fransesco Parisi, "The Law and Economics of CyberSecurity", Cambridge University Press, 2006.

Course Outcomes: At the end of the course, students should be able to:

1. Critically evaluate ongoing developments in law relating to information technologies
2. Display an understanding of how these developments relate to one another.
3. Examine areas of doctrinal and political debate surrounding rules and theories;
4. Evaluate those rules and theories in terms of internal coherence and practical outcomes;
5. Draw on the analysis and evaluation contained in primary and secondary sources.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	-	2	3	2	-	-	-	3	-	3	-	1
2	-	2	3	2	-	-	-	3	-	3	-	1
3	-	2	3	2	-	-	-	3	-	3	-	1
4	-	2	3	2	-	-	-	3	-	3	-	1
5	-	2	3	2	-	-	-	3	-	3	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: RAJAMPET
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IV B. Tech I Semester

7G179 - PRINCIPLES OF PROGRAMMING LANGUAGES (OPEN ELECTIVE)

L	T	P
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Course Objectives

- To understand the types of programming languages, syntax and semantics.
- To demonstrate the principles of data types and expressions.
- To define compound statements and fundamentals of sub programs.
- To analyze data abstraction and Exception Handling in Ada, C++, Java.
- To explain basics & applications of functional and logic programming.

Unit I

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories.

Programming Paradigms: Imperative, Object Oriented, functional Programming, Logic Programming, Programming Language Implementation-compilation and virtual machines, Programming environments.

Syntax and Semantics: General Problem of describing Syntax and Semantics, formal methods of describing syntax, BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, Denotational semantics and axiomatic semantics for common programming language features.

Unit II

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types, Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Expressions: Arithmetic, relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements.

Unit III

Control Structures: Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-

programs, generic sub-programs, parameters that are sub-program names, design issues for functions, user defined overloaded operators, co routines.

Unit IV

Abstract Data types: Abstractions and Encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT,

Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

Unit V

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

TEXT BOOKS:

1. Concepts of Programming Languages Robert W. Sebesta, Pearson Education, Eighth Edition 2008.
2. Programming Languages-Louden,second edition, Thomson.

REFERENCES:

1. Programming Languages-Ghezzi, 3/e,John Wiley.
2. Programming Languages Design and implementation-Pratt and Zelkowitz, Fourth Edition PHI/Pearson Education.
3. Programming Languages-Watt,WileyDreamtech.
4. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
5. Programming in PROLOG Clocksin, Springer.

Course Outcomes: After completion of this course, the student will be:

1. Able to select the required programming language for their application.
2. Able to summarize the principles of data types and expressions.
3. Able to make use of control structures and sub programs.
4. Able to apply Abstract data types and Exception Handling.
5. Able to compare different types of programming languages.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	-	-	3	3	-	-	-	-	3	-	-	3
2	-	-	3	3	-	-	-	-	-	-	-	3
3	-	3	-	3	-	-	-	-	3	-	-	3
4	-	3	3	-	-	-	-	-	3	-	-	-
5	-	3	3	3	1	-	-	-	3	-	-	3

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IV Year B. Tech. I Semester

7GA72 – INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE)

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Course Objectives:

- This course is aimed at familiarizing students with the nuances of Intellectual Property Rights (IPR).
- This course is to help them integrate the IPR process in their academic, research (project) activities and to facilitate the students to explore career options in IPR.
- To make the technological students familiar with basics of IPR and their implications in research, development and commercialization.

Unit I

CONCEPT OF PROPERTY: Meaning of Property, Kinds of property: Movable and Immovable property; Tangible and Intangible property; Intellectual property; Private and Public property. Possession and ownership.

Unit II

INTELLECTUALPROPERTYRIGHTS: Introduction and the need for Intellectual Property Rights(IPR), IPR in India –Genesis and Development, Forms of Intellectual Property Copyright, Trademarks, Patents, Designs, Geographical Indicators, Merchandise, Franchise and Forms of Unfair Competition. Competing rationales of the legal regimes for the protection of Intellectual Property.

Unit III

COPYRIGHTS & TRADEMARKS: Copy Right: Meaning of Copyright, Copyright in literary, dramatic, musical work and cinematograp hfilms Ownership, Assignment, Author's special rights, Importation and infringement, Fair us provisions. **Trademarks:** Definition; conception of trademarks, Registration, Distinction between trademark and propertymark, Standards of proof in passing off action.

Unit IV

PATENTS, DESIGNS &GEOGRAPHICALINDICATORS: Conception of Patent, Patentable Inventions, Process of obtaining a Patent: application, examination, opposition and sealing of patents; Rights and obligations of a Patentee, International Patents, Transfer of technology, know-how and problems of self-reliant development. Basic provisions related to Designs, Geographical Indicators.

Unit V

INTERNATIONAL INSTRUMENTS CONCERNING INTELLECTUAL PROPERTYRIGHTS: The Berne Convention, Universal Copyright Convention, The Paris Union, The World Intellectual Property Rights Organization (WIPO),UNESCO, TRIPS, TRIMS, and WTO.

Reference Books:

1. Intellectual Property Rights: Basic Concepts, MMS Karki, Atlantic, 2009.
2. Intellectual Property Rights, Pandey, Neeraj, Dharani, Khushdeep.
3. Intellectual Property Rights in India: General Issues and Implications, Dr.Prankrishna Pal, Regal Series.
4. Intellectual Property, W.R.Cornish, Sweet & Maxwell,London,2012.
5. Principles of Intellectual Property, N.S.Gopala krishnan & T.G.Agitha, Eastern Book Company, Lucknow, 2009.

Course Outcomes:

Upon successful completion, students will have the knowledge and skills to,

1. have an understanding of the fundamental legal principles relating to confidential information, copyright, patents, designs, trademarks and unfair competition;
2. The students will able to understand the issues related to intellectual properties.
3. They get awareness of acquiring the patent and copyright for their innovative works.
4. Demonstrate knowledge and understanding of the justifications and rationales for protecting intellectual property
5. Demonstrate knowledge and understanding of the core doctrines of intellectual property law
6. be able to identify, apply and assess principles of law relating to each of these areas of intellectual property;
7. understand the legal and practical steps needed to ensure that intellectual property rights remain valid and enforceable;
8. understand current and emerging issues relating to the intellectual property protection, including those relating to indigenous knowledge or culture, information technology especially the distribution of material on the internet, biotechnology and international trade;

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IV Year B. Tech. I Semester

7GA73 – HUMAN RESOURCE MANAGEMENT
(OPEN ELECTIVE)

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Course Objectives:

- To understand the functioning of human resource management and HR concepts in an organizational setting.
- To conduct a job analysis and produce a job description from the job analysis.
- To providing a basic legal and conceptual framework for managers and evaluate the procedures and practices used for recruiting and selecting suitable employees.
- To have knowledge on practices and techniques for evaluating performance, career planning, training and mentoring people at complex workplace.
- To be aware of manpower planning, compensation and employee relations.

Unit I

INTRODUCTION TO HUMAN RESOURCE MANAGEMENT: Definition, Introduction, Nature of HRM, Scope of HRM, Functions of HRM-Managerial Functions, Operative Functions, Role of HRM. Personnel Management and HRM, Competitive Challenges influencing HRM, Ethical Aspects of HRM.

Unit II

HUMANRESOURCE PLANNING: Introduction to Human Resource Planning(HRP), Nature of HRP, Need and Importance of HRP in Organizations, Factors Affecting HRP, HRP Process, Barriers to Human HRP. Human Resource Information System. **Job Analysis and Job Design**–Definition, Steps in Job Analysis, Methods for Collecting Job Analysis Data, Job Description, Job Specification, Job Design- Methods of Job Design.

Unit III

PROCUREMENT OF MAN POWER: Recruitment-Meaning and Definition, Process of Recruitment, Factor Affecting Recruitment, Sources of Recruitment, Methods of Recruitment. **Selection**–Introduction, Selection Procedure, Selection Decision Outcomes. Placement and Orientation.

Unit IV

DEVELOPMENT OF MAN POWER: Employee Training–Concept, Need for Employee Training, Process of Employee Training, Methods of Employee Training, Advantages and disadvantages. **Executive Development**– Objectives,

Importance, Factors Influencing Executive Development, Process, Methods of Executive Development, Career Planning and Development.

Unit V

COMPENSATING, MAINTAINING AND EVALUATING THE MAN POWER: Compensation- Objectives, components of paystructurein India, Wage Policy in India -Minimum Wage, Fair WageandLivingWage. **Discipline and Grievance Procedures-** Disciplinary Procedure, Grievance Handling Procedure, importance and approaches of Industrial Relations. Collective Bargaining Process. **Performance Appraisal -** Definition, Purpose of appraisal, Procedures and Techniques including 360degree Performance Appraisal, Job Evaluation.

REFERENCE BOOKS:

1. Noe A.Raymond John Hollenbeck, Barry Gerhart and Patrick Wright-Human Resource Management,(Tata Mc Graw Hill.).
2. Ian Beard well & Len Holden-Human Resource Management,(Macmillan India Ltd.).
3. Aswathappa K-Human Resource and Personnel Management (TataMcGrawHill,5thEd.).
4. RaoVSP –Human Resource Management, Text and Cases (Excel Books, 2nd Ed.).
5. Ivansevich–Human Resource Management(TataMcGrawHill,10thEd.).
6. Dessler–Human Resource Management(PrenticeHall,10thEd.).
7. Bernardi–Human Resource Management(TataMcGrawHill,4thEd.).
8. Human Resource Management, T.NChhabra, Dhanpat Rai & Sons Pvt Ltd.

Course Outcomes:

1. Student will be able to list out the basic HR concepts
2. Student will be familiarized with the ethical standards of the organization.
3. Student will be able to interrelate the different processes of recruitment, selection, performance appraisal and compensation.
4. Students can easily evaluate the development of man power and have better career planning.
5. Student will be able to utilize the manpower effectively after entering the organization.

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IV B. Tech., I Semester

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7G272-INSTRUMENTATION
(PROFESSIONAL ELECTIVE-I)

Course Objective:

- To study about methods of data transmission and data acquisition system
- To provide basic knowledge about transducers and their working principles
- To study about measurement of non electrical quantities such as displacement ,velocity , acceleration, force, torque etc
- Describe the architecture details of PLC,SCADA and DCS

Unit I

DATA TRANSMISSION AND TELEMETRY: Methods of Data Transmission – General Telemetry System – Land line Telemetry System – Voltage, Current and position. Land line with feedback system. Frequency Modulation System (FM), Pulse Modulation (PM), Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM) Telemetry. Comparison of FM, PM, PAM and PCM.

Unit II

DATA ACQUISITION SYSTEM (DAS) AND SIGNAL ANALYZERS: Analog and Digital Acquisition systems – Components of Analog DAS – Types of Multiplexing Systems: Time division and Frequency division multiplexing – Digital DAS – Block Diagram – Use of Recorders in Digital DAS – Complete data logging System - Block diagram and its working – Modern Digital DAS (Block Diagram),Wave Analyzers, spectrum analyzers.

Unit III

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

Unit IV

MEASUREMENT OF NON-ELECTRICAL QUANTITIES: Measurement of strain, Displacement, Velocity, Angular Velocity (DC Tachometer generator, Photoelectric tachometer), acceleration (LVDT), Force (Strainguage, load cells and LVDT), Torque (Magneto-Strictive), Temperature (Thermocouples and Thermistor), Pressure (Resitive,Inductive, LVDT and

capacitive),Flow(electromagnetic flow meter, hot wire anemometer), Liquid level (ultrasonic level gauging, resistive and inductive methods).

Unit V

REAL TIME SYSTEMS: PLC's: Programmable logic controllers- Organisation- Hardware details- I/O- Power supply- CPU- Standards.

SACADA: Introduction, SCADA Architecture, Different Communication Protocols, Common System Components, Supervision and Control.

DCS: Introduction, DCS Architecture, Local Control (LCU) architecture, Configuration of DCS, displays, redundancy concept.

TEXT BOOKS:

1. D.V.S Murthy, *Transducers and Instrumentation.* Prentice Hall of India.
2. A.K. Sawhney, *A course in Electrical and Electronic Measurements and Instrumentation.* DhanpatRaii& Co.
3. R.G. Jamkar, *Industrial Automation using PLC, SCADA & DCS*, Global education Ltd.

REFERENCE BOOKS:

1. D O Doeblin, *Measurements Systems, Applications and Design.* McGraw Hill Edition.
2. A.S Morris, *Principles of Measurement and Instrumentation.* Pearson /Prentice Hall of India.
3. H.S.Kalsi, *Electronic Instrumentation.* Tata McGraw-Hill Edition, 3/e.
4. A.D Helfrick and W.D.Cooper, *Modern Electronic Instrumentation and Measurement techniques.* Pearson/Prentice Hall of India.
5. T. R. Padmanabhan, *Industrial Instrumentation – Principles and Design.* Springer.

Course Outcomes: By the end of this course, students will be able to

1. Understand basic principles involved in the meters for measuring voltage, current, resistance, frequency and so on.
2. Understand principles of data transmission system and data acquisition system
3. Get complete knowledge regarding working of advanced instruments such as logic analyzers and spectrum analyzers.
4. understand the principles of transducers and signal conditioning circuits used in Process control industry, manufacturing industry and Automation plants
5. Get complete knowledge regarding working of non electrical quantities

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IV B. Tech., I Semester

7G273-DISTRIBUTION OF ELECTRICAL POWER
(PROFESSIONAL ELECTIVE-I)

Pre-requisites: Generation of Electrical Power &Transmission of Electrical Power

Course Objectives:

1. To learn the basics of Distribution system, different types of loads and their characteristics and to understand the concept of DC distribution of power in terms of voltage drop and power loss.
2. To understand the concepts of AC distribution of power in terms of load voltage drop and power loss, need of protection of Distribution systems and protecting devices.
3. To know the fundamental components of Substation and bus bar arrangements.
4. To understand the need of Power Factor and Voltage Control in Distribution systems.
5. To understand the concept of Distribution System Planning and different planning techniques

Unit I

GENERAL CONCEPTS & DC DISTRIBUTION SYSTEMS: Introduction to distribution systems, Coincidence factor, Contribution factor and Loss factor. Relationship between Load factor and Loss factor Classification of loads and their characteristics. Load modeling and characteristics. Design consideration in distribution system, Factors affecting distribution system losses, Methods of reducing the distribution system losses, Classification of Distribution Systems, Requirements and Design features of Distribution Systems, DC Distributor fed at one end and both ends with equal and unequal voltages for both concentrated and uniform loading, Numerical Problems.

Unit II

A.C. DISTRIBUTION SYSTEMS – PROTECTION & COORDINATION: Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading. Voltage Drop Calculations in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages, Numerical Problems. Secondary Distribution System, Objectives of Distribution System Protection, Types of Common Faults and Procedure for Fault Calculations. Protective

Devices: Principle of operations, Coordination of Protective Devices, General coordination procedure.

Unit III

SUBSTATIONS AND BUS BAR ARRANGEMENTS: Introduction, Factors governing the selection of site, Classification of substations, Rating of distribution substation, service area with 'n' primary feeders. Optimal location of substations- Merits and demerits of Indoor and Outdoor Substation- Substation equipment

Different types of Bus bar arrangements in the Sub-Stations: Single bus bar system, Single bus bar with sectionalization, Double bus bar with one circuit breaker, Double bus bar with two circuit breakers, Breaker and a half with two main buses, Main and transfer bus bar, Double bus bar with bypass isolator and Ring bus with relevant diagrams

Unit IV

POWER FACTOR AND VOLTAGE CONTROL: Introduction to power factor, Causes of low power factor, Effect of low power factor, Advantages of improving power factor -Methods of Improving power factor– Static shunt and series capacitors, Synchronous Condensers, Phase advancers and generation of reactive power using static Capacitors-Most economical power factor for constant KW load and constant KVA type loads, Numerical Problems. Power factor correction- Economic justification - Procedure to determine the best capacitor location - Dependency of Voltage on Reactive Power flow.

Introduction, Necessity of Voltage Control, Methods of Voltage Control: Excitation control, Shunt Capacitors and reactors, Series Capacitors, Tap changing and Booster Transformers, Synchronous Condensers.

Unit V

DISTRIBUTION SYSTEM PLANNING: Distribution System Planning-Factors Affecting System Planning-Load forecasting- classification of Load forecasting-substation expansion, Distribution System Planning Models, Present Distribution System Planning Techniques.

TEXT BOOKS:

1. Turan Gonen. *Electric Power Distribution System Engineering*. McGraw-Hill Book Company, 1986.
2. A.S.Pabla, *Electric Power Distribution*, 4th edition, Tata Mc Graw-Hill Publishing Company, 1997.
3. James Northcoto Green, Robert Wilson, *"Control and Automation of Electrical Power Distribution Systems"* CRC Press, Taylor and Francis.

REFERENCE BOOKS:

1. V.Kamaraju. *Electrical Power Distribution Systems*. Right Publishers, 2001.
2. S. Sivanagaraju, *Electrical Power Distribution & Automation*, Educational & Technical Publishers.

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IV B. Tech., I Semester

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7G274-EMBEDDED SYSTEMS
(PROFESSIONAL ELECTIVE-I)

Course Objectives: The course aims to provide the student with the ability

- To understand concepts of embedded systems.
- To apply the knowledge acquired on the design considerations

Unit I

MICROCONTROLLER & INTERFACING 8051: Introduction, Architecture, Register Organization, Internal and External Memory, Pin diagram, I/O port structure, Addressing modes, Instruction Set, simple programs. On-Chip Peripherals-8051 Interrupt Structure, Timer/Counter features, modes and programming. MSP 430 Low power Micro Controller (A Quantitative study only).Applications- Interfacing with switches, display – LED, seven segment display, LCD. Keyboard interfacing, D/A and A/D interfacing, Stepper motor interfacing, Handling External Interrupts.

Unit II

INTRODUCTION TO EMBEDDED SYSTEMS: Embedded System – Definition, Application Areas, and Categories. Overview of embedded system architecture, specialties: reliability, performance, power consumption cost, size, user interface, software up gradation capability, recent trends: processor, power, memory, operating system, communication interface, programming languages, development tools, programmable hardware

Unit III

ARCHITECTURE OF EMBEDDED SYSTEMS: Hardware Architecture – CPU, Memory, Clock Circuitry, Watch dog Timer/Reset Circuitry, chip select, I/O devices, Debug Port, Communication Interfaces, Power supply Unit. Software Architecture – Services provided by an operating System, Architecture and categories of Embedded Operating Systems, Application Software, Communication software, Process of generating Executable image, Development/Testing tools.

Unit IV

COMMUNICATION INTERFACES: Need for Communication interface, RS232/UART, RS 422/RS 485, USB, Infrared, IEEE 1394 fire wire, IEEE 802.11, Blue tooth, I2C and CAN Bus.

Unit V

REAL TIME OPERATING SYSTEM: Architecture of Kernel, Tasks and Task Scheduler, Interrupt Service Routines, Inter process Communication– Semaphores, mutex, message queues, mailboxes, pipes, signals, event registers and timers. Priority Inversion Problem. Off the Shelf Operating Systems, Embedded Operating Systems, Real Time Operating Systems, And Handheld Operating Systems.

TEXT BOOKS:

1. Embedded/ Real Time Systems, K.V.K.K. Prasad, Dreamtech press.
2. The 8051 Microcontroller, Kenneth J Ayala, 3rd edition, Thomson Press.

REFERENCE BOOKS:

1. Computers and Components, Wyene Wolf, Elsevier.
2. Embedded Systems, Raj Kamal, TMH.2nd edition.2008.

Course Outcomes: By the end of this course, students will be able to

1. Understand basic concepts to design embedded applications.
2. Understand different programming models and their suitable application areas.
3. Analyze the operation of I/O ports and different communication protocols.
4. Design different embedded applications.

COs-POs-PSOs Mapping Table

Course Outcomes	Program Outcomes												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	3	3	3	3	3	3	3	-	1	3
2	3	3	3	3	3	3	3	3	3	3	1	-	3	3
3	3	3	3	3	3	3	3	3	3	3	3	-	3	3
4	3	3	3	3	3	3	3	3	3	3	3	-	3	3

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IV B. Tech., I Semester

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7G276- POWER SYSTEMS LAB-II

Any **Ten** of the following experiments are to be conducted

1. Formation of Y_{bus} without off-nominal ratios of transformer of a power system network
2. Formation of Y_{bus} with off-nominal ratios of transformer of a power system network
3. Formation of Z_{bus}
4. Load flow analysis using Gauss-Seidel method
5. Load flow analysis using Newton Raphson method
6. Short Circuit Analysis For SLG and LL Faults
7. Short Circuit Analysis For DLG Faults
8. Short Circuit Analysis For 3-ϕ Faults
9. Performance of Short/Medium Transmission Line
10. Modeling of Long Transmission Line
11. Transient Stability Analysis of single machine System using Equal Area Criteria
12. Transient Stability Analysis of single machine System using Swing equation by R-K method
13. Modeling of Single Area Load Frequency Control system
14. Modeling of Two Area Load Frequency Control system
15. Transfer function of a given model from input mode to state space model and vice versa

Note: Any Software related to Electrical Engineering can be used

Course Outcomes: At the end of the Course the student will be able to

1. Understand the formation of Y_{BUS} and Z_{BUS} matrices
2. Analyze load flow analysis of transmission system
3. Evaluate symmetrical and unsymmetrical faults
4. Analyze the efficiency, regulation and stability of transmission system
5. Develop simulation model of load frequency control

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IV B. Tech., I Semester

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7G277-MICRO PROCESSORS AND MICROCONTROLLERS LAB

Any **Ten** of the following experiments are to be conducted

Microprocessor 8086

1. Unsigned Arithmetic operations (Addition, subtraction, multiplication, division)
2. Signed Arithmetic operations (Addition, subtraction, multiplication, division)
3. ASCII – arithmetic operation.
4. Logical Operations
   a) Code conversion – BCD to ASCII.
   b) Number of 1's and 0's in a given word.
   c) Packed BCD to unpacked BCD Conversion.
5. String Operations
   a) Relocate a string of N words/bytes.
   b) Reverse String.
   c) String Insertion
   d) String Deletion
6. Ascending and descending order of numbers using Near Procedure, Factorial of a given number.
7. Interfacing with 8255 PPI
   a. DAC Interfacing: Square wave generation in BSR mode, I/O mode.
   b. Triangular, sinusoidal and Stair wave generation in I/O mode.
8. Stepper Motor Interfacing: Rotation in Clock wise and Anti-clock wise direction.

Microcontroller 8051:

9. Arithmetic operations – Addition, Subtraction, Multiplication and Division.
10. Reading and writing a port.
11. Serial communication implementation.
12. Square wave generation using Timer.
13 Switch and LED Interfacing.
14 LCD Interfacing.
15 Serial Transmission.
16 Serial Reception.