PROGRAM STRUCTURE
AND
DETAILED SYLLABUS (VOLUME – II)

ELECTRICAL AND ELECTRONICS ENGINEERING

FOR
CBCS BASED B.TECH – FOUR YEAR PROGRAM
(Applicable for the batches admitted from AY 2016-17)

Geethanjali College of Engineering and Technology
(Autonomous)
Cheeryal(V), Keesara(M), Medchal(Dist.), Telangama-501 301

Geethanjali College of Engineering And Technology (Autonomous)
Cheeryal (V), Keesara (M), Medchal Dist., Telengana-501301

B. TECH. ELECTRICAL AND ELECTRONICS ENGINEERING

Academic Regulations: AR-16 **Academic Year 2016-17**

PROGRAMME STRUCTURE

FIRST YEAR SEMESTER-I

S. No.	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Total	C
1	16EN1101	English-I	HS	2	-	-	30	70	100	2
2	16PH1101	Engineering Physics	BS	3	1	-	30	70	100	3
3	16MA1101	Mathematics -I	BS	4	1	-	30	70	100	4
4	16CH1101	Engineering Chemistry	BS	3	-	-	30	70	100	3
5	16CS1101	Computer Programming-I	ES	3	-	-	30	70	100	3
6	16ME1101	Engineering Drawing	ES	2	-	3	30	70	100	4
7	16EN11L1	English-I Lab	HS	-	-	2	30	70	100	1
8	16CH11L1	Engineering Chemistry Lab	BS	-	-	3	30	70	100	2
9	16CS11L1	Computer Programming-I Lab	ES	-	-	3	30	70	100	2
Total				**17**	**2**	**11**	**270**	**630**	**900**	**24**
Total Periods Per Week				**30**						

Abbreviation	Description
HS	Humanities and Social Sciences
BS	Basic Sciences
ES	Engineering Sciences
PC	Professional Core
SC	Soft Core
CC	Core Course
PE	Professional Elective
OE	Open Elective

Abbreviation	Description
L	Lecture
T	Tutorial
P	Practical
D	Drawing
CIE	Continuous Internal Evaluation
SEE	Semester End Examination
Tot	Total
C	Number of Credits

FIRST YEAR SEMESTER-II

S. No.	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SE	Total	C
1	16EN1201	English - II	HS	2	-	-	30	70	100	2
2	16PH1202	Semiconductor Physics	BS	4	1	-	30	70	100	4
3	16MA1201	Mathematics -II	BS	3	1	-	30	70	100	3
4	16MA1202	Mathematics -III	BS	3	-	-	30	70	100	3
5	16CS1201	Computer Programming-II	ES	3	-	-	30	70	100	3
6	16EN12L1	English-II Lab	HS	-	-	2	30	70	100	1
7	16PH12L2	Semiconductor Physics Lab	BS	-	-	3	30	70	100	2
8	16MA12L1	Computational Mathematics Lab	BS	-	-	3	30	70	100	2
9	16CS12L1	Computer Programming-II Lab	ES	-	-	3	30	70	100	2
10	16WS12L1	Information Technology Workshop/Engineering Workshop*	ES	-	-	3	30	70	100	2
Total				**15**	**2**	**14**	**300**	**700**	**1000**	**24**
Total Periods Per Week				**31**						

*CSE BoS specified the syllabus for ITWS while ME BoS Specified the syllabus for EWS

SECOND YEAR SEMESTER-I

S. No	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16MA2103	Complex Variables	BS	3	1	-	30	70	100	3
2	16ME2104	Fluid Mechanics and Hydraulic Machinery	ES	4	-	-	30	70	100	4
3	16EC2103	Switching Theory and Logic Design	ES	3	1	-	30	70	100	3
4	16EE2101	Electromagnetic Field Theory	ES	4	1	-	30	70	100	4
5	16EE2102	Electrical Circuits	PC	4	1	-	30	70	100	4
6	16ME21L3	Fluid Mechanics and Hydraulic Machinery Lab	ES	-	-	3	30	70	100	2
7	16EE21L1	Field Theory and Circuits Lab	PC	-	-	3	30	70	100	2
8	16EN21L1	Advanced English Communication Skills Lab	HS	-	-	3	30	70	100	2
		Total		**18**	**4**	**9**	**240**	**560**	**800**	**24**
		Total Periods Per Week		**31**						

SECOND YEAR SEMESTER-II

S. No	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Total	C
1	16EE2201	Power Electronics	PC	4	1	-	30	70	100	4
2	16EE2202	Electrical Machines-I	PC	3	1	-	30	70	100	3
3	16EE2203	Power Systems-I	PC	3	-	-	30	70	100	3
4	16EE2204	Signals and Systems	PC	3	1	-	30	70	100	3
5	16CH2201	Environmental Studies	HS	3	-	-	30	70	100	3
6	16EE22L1	Power Electronics and Simulation Lab	PC	-	-	3	30	70	100	2
7	16EE22L2	Electrical Machines-I Lab	PC	-	-	3	30	70	100	2
8	16EE22L3	Signals and systems simulation Lab	PC	-	-	3	30	70	100	2
9	16HS22L1	Gender Sensitization	HS	-	-	3	30	70	100	2
		Total		**16**	**3**	**12**	**270**	**630**	**900**	**24**
		Total Periods Per Week		**31**						

THIRD YEAR SEMESTER-I

S. No	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16EE3101	Control Systems	PC	4	1	-	30	70	100	4
2	16EE3102	Power systems –II	PC	4	1	-	30	70	100	4
3	16EE3103	Electrical Machines-II	PC	3	1	-	30	70	100	3
4	16EC3102	Microprocessors and Microcontrollers	PC	3	1	-	30	70	100	3
5	**Open Elective I**									
	16MB3121	Intellectual Property	OE	3	-	-	30	70	100	3
	16CS3123	JAVA Programming								
	16EC3124	Electronic Measuring								
	16ME3125	Nano Materials and Technology								
	16CE3126	Global Warming and Climate Change								
6	16EE31L1	Control systems and simulation Lab	PC	-	-	3	30	70	100	2
7	16EE31L2	Electrical Machines-II Lab	PC	-	-	3	30	70	100	2
8	16EC31L1	Microprocessors and Microcontrollers Lab	PC	-	-	3	30	70	100	2
9	16MA31P1	Logical Reasoning	BS	-	-	2	30	70	100	1
			Total	**17**	**4**	**11**	**270**	**630**	**900**	**24**
		Total Periods Per Week		**32**						

THIRD YEAR SEMESTER-II

S. No	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16EE3201	Computer Methods in Power Systems	PC	3	1	-	30	70	100	3
2	16EE3202	Electric Drives	PC	3	1	-	30	70	100	3
3	16EE3203	Instrumentation and Measurement Techniques	PC	3	1	-	30	70	100	3
4	**Professional Elective I**									
	16EE3204	Renewable Energy (Wind and Solar)	PE	3	1	-	30	70	100	3
	16EE3205	Special Machines								
	16EE3206	Utilization of Electrical Energy								
	16EE3207	Linear System Analysis								
5	**Professional Elective II**									
	16EE3208	Energy Auditing	PE	3	1	-	30	70	100	3
	16EE3209	Switched Mode Power								
	16EE3210	Power Quality								
	16EC3201	Digital Signal Processing								
6	**Open Elective II**									
	16MB3231	Supply Chain Management	OE	3	-	-	30	70	100	3
	16CS3232	Knowledge Management								
	16EC3234	Basics of Communication Systems								
	16ME3235	Manufacturing Processes								
	16CE3236	Building Technology								
7	16EE32L1	Computer Methods in Power systems lab	PC	-	-	3	30	70	100	2
8	16EE32L2	Instrumentation and Measurement Techniques Lab	PC	-	-	3	30	70	100	2
9	16MB32P1	Human Values and Professional Ethics	HS	-	-	3	30	70	100	2
Total				**18**	**5**	**9**	**270**	**630**	**900**	**24**
Total Periods Per Week				**32**						

FOURTH YEAR SEMESTER-I

S. No	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16EE4101	Switch Gear and Protection	PC	3	1	-	30	70	100	3
2	16EE4102	Power Systems Operation and Control	PC	3	1	-	30	70	100	3
3	16MB4101	Management Science	HS	3	-	-	30	70	100	3
4	**Professional Elective III**									
	16EE4103	Flexible AC Transmission Systems	PE	3	-	-	30	70	100	3
	16EE4104	Smart Grid/Micro Grid								
	16EE4105	High Voltage Engineering								
	16EE4106	Hybrid Electric Vehicles								
5	**Open Elective –III**									
	16MB4141	Banking and Insurance	OE	3	-	-	30	70	100	3
	16CS4142	Database Systems								
	16EC4144	Principles of Wireless Communication Systems								
	16ME4145	Aspects of Heat Transfer in Electronically Controlled Units								
	16CE4146	Green Buildings								
	16EN4147	Foreign Language -French								
	16EN4148	Foreign Language - Spanish								
	16EN4149	Foreign Language - German								
6	**Soft Core - I**									
	16EC4106	Embedded Systems	SC	3	1	-	30	70	100	3
	16EC4107	Digital Signal Processing								
7	**Soft Core – I Lab**									
	16EC41L2	Embedded Systems Lab	SC	-	-	3	30	70	100	2
	16EC41L3	Digital Signal Processing Lab								
8	16EE41L2	Power Systems Simulation and Drives Lab	PC	-	-	3	30	70	100	2
9	16EE4108	Industry Oriented Mini-project	CC	-	-	-	-	100	100	1
10	16EE4109	Major Project Seminar	CC	-	-	2	100	-	100	1
		Total		**18**	**3**	**8**	**340**	**660**	**1000**	**24**
		Total Periods Per Week		**29**						

FOURTH YEAR SEMESTER - II

S. No	Course Code	Course	Category	No. of Periods Per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16MB4201	Financial Analysis and Project Management	HS	4	-	-	30	70	100	4
2	**Professional Elective IV**									
	16EE4201	Reliability	PE	3	-	-	30	70	100	3
	16EE4202	HVDC Transmission								
	16EE4203	Robotics								
	16EC4206	VLSI Technology								
3	**Open Elective – IV**									
	16MB4251	Entrepreneurship	OE	3	-	-	30	70	100	3
	16CS4252	Web Development								
	16EC4254	Biomedical Instrumentation								
	16ME4255	Materials Handling								
	16CE4256	Disaster Mitigation and Management								
	16MA4257	Actuarial Statistics								
4	16EE4204	Major Project	CC	-	-	15	30	70	100	10
5	16EE4205	Technical Seminar	CC	-	-	2	100	-	100	1
6	16EE4206	Comprehensive Viva	CC	-	-	-	-	100	100	3
Total				**10**	**0**	**17**	**220**	**380**	**600**	**24**
Total Periods Per Week				**27**						

B.Tech (EEE)
IV Year I Sem
Detailed Syllabus

16EE4101 – SWITHGEAR AND PROTECTION

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16EE2203 Power Systems – I
16EE3102 Power Systems – II
16EE3203 Instrumentation and Measurement Techniques

Course Objectives: Develop ability to

1. Understand basic operation of Circuit Breakers
2. Understand basic operation of different Relays and its applications
3. Understand the methods used for protection of Generators, Transformers
4. Understand the methods used for protection of feeders and bus bars
5. Understand concept of Neutral grounding and Earthing.
6. Understand the protection techniques against over voltages and other hazards.

Course Outcomes: At the end of the course, student would be able to get thorough knowledge on

CO 1. Various types of protective devices and their coordination
CO 2. Protection of generators, transformers, feeders, bus bars through different types of protective devices.
CO 3. Over voltage protection and lightening
CO 4. Earthing and Grounding
CO 5: Application of above conceptual things to real world electrical and electronics problems.

UNIT -1

Circuit Breakers: Introduction – elementary principles of arc interruption, Recovery, Re-striking Voltage and Recovery voltages Re-striking Phenomenon, Average and Max. RRRV, Numerical problems – Current Chopping and Resistance Switching – CB ratings and Specifications, Types and Numerical Problems – Auto re-closures.

Description and Operation of types of circuit breakers: Minimum Oil Circuit Breaker, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT – II

Electromagnetic and Static Relays: Principle of Operation and Construction of Attracted armature, Balanced Beam, Induction Disc and Induction Cup Relays

Relays classification: Instantaneous, DMT and IDMT types.

Application of Relays: Over-current/Under voltage relays, Direction relays, Differential Relays and Percentage Differential Relays. Universal torque equation.

Distance Relays: Impedance, Reactance and Mho and Off-set Mho relays, Characteristics of Distance Relays and Comparison.

Static Relays: Static Relays verses Electromagnetic Relays. Introduction of Numerical Relays.

UNIT – III

Protection of generators: against Stator faults, Rotor faults, and Abnormal Conditions, Restricted Earth fault and inter-turn fault protection. Numerical Problems on % winding unprotected.

Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CTs Ratio, Buchholz relay Protection, Harmonic restraint relay and types of protection for power transformers.

UNIT – IV

Feeder and Bus - Bar Protection: Protection of Lines – Over Current, Carrier Current and Three – zone distance relay protection using impedance relays. Tanslay Relay. Protection of bus bars – Differential Protection**.**

Power System Earthing: Introduction, definitions, soil resistivity, grounding resistance, potential gradient and earthing mat. Size of earthing conductor, measurement of earth resistance and soil resistivity.

Neutral Grounding: Grounded and Ungrounded Neutral Systems. Effects of Ungrounded Neutral on system performance. Methods of Neutral grounding: Solid, Resistance, Reactance, Resonant – Arcing Grounds, harmonic suppressors, and grounding Practices.

UNIT – V

Protection against over voltages due to lightening: Introduction, internal and external causes of overvoltage's, mechanism of lighting and wave shape of lighting strokes, protection against lighting-Expulsion, valve and gapless metal – Oxide Lighting Arresters – Insulation Coordination – BIL, Impulse Ratio, Standard impulse Test Wave, Volt- Time Characteristics.

TEXTBOOKS:

1. Switchgear and Protection – by Sunil S Rao, Khanna Publishers
2. Power System Protection and Switchgear by Badari Ram, D. N. Viswakarma, TMH Publications

REFERENCE BOOKS:

1. Fundamentals of Power System Protection by Paithankar and S. R. Bhide, PHI, 2003.
2. Art & Science of Protective Relaying – by C R Mason, Wiley Eastren Ltd.
3. Electrical Power Systems – by C. L. Wadhawa, New Age International (P) Limited, Publishers, 3rd edition.
4. A Text book on Power System Engineering by B. L. Soni, Gupta, Bhatnagar, Chkarabarthy, Dhanpat Rai & Co.
5. A Course in Power Systems by J. B. Gupta S. K. Kataria& Sons.

16EE4102 – POWER SYSTEM OPERATION AND CONTROL

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16EE2203 Power Systems - I
16EE3201Computer Methods in Power Systems

Course Objectives: Develop ability to

1. Understand Economic operation and control of power system.
2. Model power frequency dynamics.
3. Design power frequency controller.
4. Model reactive power – voltage interactions.
5. Determine the error in power system state estimation.

Course Outcomes (COs): At the end of the course, student would be able to

CO1. Identify different operating states of power system.
CO2. Operate generators economically
CO3. Obtain solution to unit commitment problems.
CO4. Control the power flow, frequency and voltage.
CO5. Perform system state estimation and explore its importance

UNITI

Control Center Operation Of Power Systems: Power system control and operating states, control center, digital computer configuration, automatic generation control, area control error, operation without central computers, expression for tie-line flow and frequency deviation, parallel operation of generators, area lumped dynamic model..

UNIT II

Automatic Voltage Regulator: Basic generator control loops, Cross-coupling between control loops, Exciter types, Exciter modeling, Generator modeling, Static performance of AVR loop.

Automatic Load Frequency Control: Automatic Load frequency control of single area systems, Speed governing system, Hydraulic valve actuator, Turbine generator response, Static performance of speed governor, Closing of ALFC loop, Concept of control area, Static response of primary ALFC loop, Integral control, ALFC of multi-control area systems (POOL operation),The Two-Area system, Modeling the Tie-Line, Block Diagram representation of Two-Area system, Static response of Two-Area system and Tie-Line Bias control

UNIT III

Control Of Voltage And Reactive Power: Introduction, generation and absorption of reactive power, relation between voltage, power and reactive power at a node, single machine infinite bus systems, methods of voltage control, sub synchronous resonance, voltage stability, voltage collapse.

UNIT – IV

Optimal System Operation And Unit Commitment: Introduction , Optimal operation of generators on a bus bar, Statement of the Unit Commitment problem, need and importance of unit commitment, Constraint in Unit Commitment, Unit Commitment solution methods-Priority lists method, Forward Dynamic Programming method (excluding problem), Spinning reserve.

UNIT – V

System Monitoring And Control: Introduction , Energy management system, the basis of power system state estimation(PSSE), mathematical description of PSSE process, minimization technique for PSSE, Least Square estimation, Error and detection in PSSE, System security and emergency control.

TEXT BOOKS:

1. Power generation, operation and control- Allen J Wood & Woollenberg. John Wiley and Sons, Second Edition, 2009.
2. Power System Analysis, Operation and Control, Abhijit Chakrabarti and Sunita Halder, PHI, Second Edition, 2009

REFERENCE BOOKS:

1. Power System Operation and Control, Dr. K. Uma Rao, Wiley India Pvt. Ltd.
2. Modern Power System Analysis- I J Nagarath and D P Kothari, TMH, 3rd Edition, 2003
3. Electrical Energy Systems Theory, O.J Elgerd, TMH,2008.
4. Electric Power Systems- B.M.Weedy and B.J. Cory, Wiley student edition, 1999
5. Computer Aided Power System Operation and Analysis- R.N. Dhar, Tata McGraw-Hill, 1987.
6. Computer Aided Power System Analysis**,** G.L.Kusic, PHI,2010.

16MB4101- MANAGEMENT SCIENCE

IV Year. B.Tech. EEE - I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop ability to

1. Recognize the functions and functional areas in management.
2. Understand production operations and grab the concepts of marketing management. Understand the relation between production, operations and marketing management.
3. Integrate HRM function for better function of the organization.
4. Discuss the key elements in strategic management.
5. Enhance value through world class quality of product or service .

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

CO1 Infer the importance of management its functions and its role in motivating and leading the organization.
CO2 Summarize production functions and marketing functions. Specify their inter relationship.
CO3 Plan and control the HR function better.
CO4 Formulate different strategies for different businesses or service organizations.
CO5 Ensure value in offer through quality in delivery.

UNIT - I

Introduction to Management and Organization: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory- Fayol's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management, Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types and Evaluation of mechanistic and organic structures of organization and suitability.

UNIT - II

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production (Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling.

Marketing management: Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III

Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT - IV

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

UNIT - V

Contemporary Strategic Issues: Bench Marking and Balanced Score Card , TQM, Six Sigma, Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management.

TEXT BOOKS:

1. Management, Stoner, Freeman, Gilbert, 6th Ed, Pearson Education, New Delhi, 2004.
2. Management, P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Marketing Management, Philip Kotler and Keller Kevin Lane, Pearson, 2012.
2. Essentials of Management, Koontz and Weihrich, McGraw Hill, 2012.
3. Management - Principles and Guidelines, Thomas N. Duening and John M. Ivancevich, Biztantra, 2012.

16EE4103 – FLEXIBLE AC TRANSMISSION SYSTEMS (FACTS)

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16EE2201 Power Electronics
16EE3102 Power Systems - II

Course Objectives: Develop ability to

1. Understand the fundamentals of FACTS Controllers, Importance of controllable parameters
2. Understand operation of different FACTS controllers & their benefits.
3. Recall the objectives of Shunt and Series compensation.
4. Explain control of STATCOM and SVC and their comparison and the regulation of STATCOM.
5. Analyze the functioning and control of GCSC, TSSC and TCSC.

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

CO1. Choose proper controller for the specific application based on system requirements.
CO2. Understand various systems thoroughly and their requirements.
CO3. Identify the necessity of shunt and series compensation.
CO4. Interpret the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. transient stability Enhancement, voltage instability prevention and power oscillation damping.
CO5. Detect the Power and control circuits of Series Controllers GCSC, TSSC and TCSC.

UNIT – I

FACTS Concepts: Transmission interconnections power flow in an AC system, loading capability limits, Dynamic stability considerations, importance of controllable parameters basic types of FACTS controllers, benefits from FACTS controllers.

UNIT – II

Voltage Source Converters: Single phase and three phase full wave bridge converters transformer connections for 12 pulse and 24 pulse operation. Three level voltage source converter, pulse width modulation converter, basic concept of current source Converters, and comparison of current source converters with voltage source converters.

UNIT – III

Static Shunt Compensation: Objectives of shunt compensation, mid-point voltage regulation voltage instability prevention, improvement of transient stability, Power oscillation damping, Methods of controllable VAR generation, variable impedance type static VAR generators switching converter type VAR generators hybrid VAR generators.

UNIT – IV

SVC and STATCOM: The regulation and slope transfer function and dynamic performance, transient stability enhancement and power oscillation damping operating point control and summary of compensator control.

UNIT - V

Static Series Compensators: Concept of series capacitive compensation, improvement of transient stability, power oscillation damping, and functional requirements of GTO thyristor controlled series capacitor (GSC), thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor(TCSC), Control schemes for GSC TSSC and TCSC.

TEXT BOOKS:

1. "Understanding FACTS-Concepts and Technology of Flexible AC Transmission Systems", Hingorani H G and Gyugyi. L New York, IEEE Press, 2000.
2. "FACTS Controllers in Power Transmission and Distribution", Padiyar.K.R, New Age Int.Publishers, 2007

REFERENCE BOOKS:

1. "Flexible AC Transmission Systems: Modeling and Control", Zhang, Xiao-Ping, Rehtanz, Christian, Pal, Bikash Springer, 2012
2. "Flexible AC Transmission Systems", Yong-Hua Song, Allan Johns, IET, 1999.

16EE4104- SMART GRID \ MICRO GRID

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16EE2203 Power Systems – I
16EE3102 Power systems –II

Course Objectives: Develop ability to

1. Understand the basic concepts of Smart grid
2. Communicate effectively through Smart meters.
3. Integrate renewable energy generation to smart grids.
4. Understand the concept of Micro Grid.
5. Understand the Power Quality associated with Micro Grids.

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

CO1: Do Power Flow calculations and explain functions of smart grid components
CO2: Use Smart meters for effective power network communication
CO3: Integrate Renewable energy generation with smart grids.
CO4: Operate, communicate and control Micro grids.
CO5: Analyze the stability of micro grids under different power quality events.

UNIT I

Introduction to Smart Grid: Smart Grid - definition, Applications, Government and Industry - Standardization, Functions of Smart Grid Components, Wholesale energy market in smart grid, smart vehicles in smart Grid.

UNIT II

Smart Grid Communications and Measurement Technology: Communication and Measurement – Monitoring Phasor Measurement Unit (PMU), Smart Meters, Wide area monitoring systems (WAMS), Advanced metering infrastructure – GIS and Google Mapping Tools, IP – based systems, Network Architectures.

UNIT III

Renewable Energy and Storage: Renewable Energy Resources – Sustainable Energy Options for the Smart Grid – Penetration and Variability Issues associated with sustainable energy technology – Demand response issues – Electric Vehicles and Plug in Hybrids – PHEV Technology – Environmental Implications – Storage Technologies – Grid integration issues of renewable energy sources.

UNIT IV

Micro grids: Concept and definition of micro grid, micro grid drives and benefits, review of sources of micro grids, power electronics interfaces in DC and AC micro grids, Communication infrastructure.

Modes of operation and control of micro grid: Grid connected and islanded mode, Active and reactive power control, protection issues, anti-islanding schemes: passive, active and communication based techniques.

UNIT V

Power Quality Issues in Micro Grids: Power quality issues in micro grids: Modeling and stability analysis of micro grid, regulatory standards, micro grid economics, introduction to smart micro grids.

TEXT BOOKS:

1."Smart Grid: Fundamentals of design and analysis", James Momoh, John Wiley & Sons Inc, IEEE press 2012.
2. "Smart grid: Technology and applications", Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, John Wiley U sons inc, 2012

REFERENCE BOOKS:

1. "Smart Grid: Integrating Renewable, Distributed & Efficient Energy", Fereidoon P Sioshansi, Academic press, 2012.
2. "The Smart grid: Enabling energy efficiency and demand response", Clark W Gellings, Fairmont press inc, 2009.

16EE4105 – HIGH VOLTAGE ENGINEERING

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16PH1101 Engineering Physics
16EE3102 Power Systems II

Course Objectives: Develop ability to

1. Provide introduction to high voltage technology and its applications.
2. Study breakdown in solid, liquids and gaseous dielectrics.
3. Study generation and measurement of high voltage and current.
4. Learn overvoltage phenomenon and insulation coordination.
5. Study testing of materials and electrical apparatus.

Course outcomes: At the end of the course, student would be able to

CO1. Get an introduction to different high voltage terminology.
CO2. Learn about Gases and Liquid as insulating media, collision process, Ionization process, breakdown in pure and commercial liquids and breakdown of solid dielectrics in practice.
CO3. Learn how high voltages and currents are generated, Learn measurement of direct and alternating voltages and Measurement of High Currents-direct, alternating and Impulse.
CO4. Learn about natural causes for over voltages.
CO5. Measure of D.C Resistivity, Dielectric Constant and loss factor, Partial discharge
CO6. Test high voltages.

UNIT I

Introduction to High Voltage Technology and Applications: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT II

Break Down in Dielectrics Materials: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, and Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT III

Generation and Measurement of High Voltages and Currents: Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

Measurement of High Direct Current voltages, Measurement of High alternating Voltages and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT IV

Over Voltages and Insulation Co-Ordination: Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

UNIT V

Testing of Materials and Electrical Apparatus: Measurement of D.C Resistivity, measurement of Dielectric Constant and loss factor, Partial discharge measurements. Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, and Radio Interference measurements.

TEXT BOOKS:

1. High Voltage Engineering, Naidu and V. Kamaraju, TMH Publications.
2. High Voltage Engineering, C.L.Wadhwa, New Age Internationals (P) Limited

REFERENCE BOOKS:

1. High Voltage Engineering: Fundamentals, E.Kuffel, W.S.Zaengl, J.Kuffel by Elsevier, Newnes, 2000
2. High Voltage Insulation Engineering, Ravindra Arora, Wolfgang Mosch, New Age International (P)Limited

16EE4106– HYBRID ELECTRIC VEHICLES

IV Year. B.Tech. EEE – I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16EE2202 Electrical Machines-I
16EE3103 Electrical Machines-II
16EE2201 Power Electronics

Course Objectives: Develop ability to

1. Understand the concepts and drive train configurations of electric drive vehicles
2. Build different electric propulsion systems
3. Fabricate energy storage devices
4. Design and control hybrid electric vehicles
5. Propose advanced battery charger topologies for plug in hybrid electric vehicles

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

CO1. Know the concepts and drive train configurations of electric drive vehicles
CO2. Interpret different electric propulsion systems
CO3. Be familiar with different energy storage devices
CO4. Infer the technology, design methodologies and control strategy of hybrid electric vehicles
CO5. Identify battery charger topologies for plug in hybrid electric vehicles

UNIT I

Introduction to Electric Vehicles: Sustainable Transportation - EV System - EV Advantages - Vehicle Mechanics - Performance of EVs - Electric Vehicle drivetrain - EV Transmission Configurations and components-Tractive Effort in Normal Driving - Energy Consumption - EV Market - Types of Electric Vehicle in Use Today - Electric Vehicles for the Future.

UNIT II

Electric Vehicle Modelling - Consideration of Rolling Resistance - Transmission Efficiency - Consideration of Vehicle Mass - Tractive Effort - Modelling Vehicle Acceleration - Modelling Electric Vehicle Range - Aerodynamic Considerations - Ideal Gearbox Steady State Model - EV Motor Sizing - General Issues in Design.

UNIT III

Introduction to electric vehicle batteries - electric vehicle battery efficiency - electric vehicle battery capacity - electric vehicle battery charging - electric vehicle battery fast charging - electric vehicle battery discharging - electric vehicle battery performance – testing.

UNIT IV

Hybrid Electric Vehicles - HEV Fundamentals -Architectures of HEVs- Interdisciplinary Nature of HEVs - State of the Art of HEVs - Advantages and Disadvantages - Challenges and Key Technology of HEVs - Concept of Hybridization of the Automobile-Plug-in Hybrid Electric Vehicles - Design and Control Principles of Plug-In Hybrid Electric Vehicles - Fuel Cell Hybrid Electric Drive Train Design - HEV Applications for Military Vehicles.

UNIT V

Advanced topics - Battery Charger Topologies, Charging Power Levels, and Infrastructure for Plug- In Electric and Hybrid Vehicles - The Impact of Plug-in Hybrid Electric Vehicles on Distribution Networks – Sizing Ultra capacitors for Hybrid Electric Vehicles.

TEXT BOOKS:

1. Modern Electric, Hybrid Electric and Fuel Cell Vehicles – Fundamentals, Theory and Design– Mehrdad Ehsani, Uimin Gao and Ali Emadi - Second Edition - CRC Press, 2010.
2. Electric & Hybrid Vehicles – Design Fundamentals - Iqbal Hussain, Second Edition, CRC Press, 2011.

REFERENCE BOOKS:

1. Hybrid electric Vehicles Principles and applications With practical perspectives -Chris Mi, Dearborn - M. Abul Masrur, David Wenzhong Gao - A John Wiley & Sons, Ltd., -2011.
2. Electric Vehicle Technology Explained - James Larminie, John Lowry - John Wiley & Sons Ltd, - 2003.
3. Electric Vehicle Battery Systems – Sandeep Dhameja – Newnes - New Delhi – 2002.
4. The Impact of Plug-in Hybrid Electric Vehicles on Distribution Networks: a Review and Outlook - Robert C. Green II, Lingfeng Wang and Mansoor Alam - 2010 IEEE.
5. Sizing Ultracapacitors for Hybrid Electric Vehicles - H. Douglas P Pillay -2005 IEEE.
6. Review of Battery Charger Topologies, Charging Power Levels, and Infrastructure for Plug-In Electric and Hybrid Vehicles - Murat Yilmaz, and Philip T. Krein, - IEEE transactions on power electronics, vol. 28, no. 5, May 2013.

16MB4141-BANKING AND INSURANCE

IV Year. B.Tech. EEE - I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop the ability to

1. Learn the importance of banking business and its functions.
2. Understand the banking sector services.
3. Examine the importance of RBI and its significance.
4. Understand the insurance sector.
5. Identify regulatory framework of insurance sector.

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

CO1: Acquire the knowledge of banking system.
CO2: Acknowledge banking services and types of banks.
CO3: Absorb regulation pattern on banking sector.
CO4: Identify the need of insurance sector and its significance.
CO5: Acknowledge IRDA and other insurances pattern in India.

UNIT I

Introduction to banking business: Concept and history of banking system in India, banking structure – types of accounts, advances and deposit system in India - cheque process and clearing system.

UNIT II

Card System and classification of banks: Types of cards and its importance (Debit, credit, smart-card) net banking, mobile banking , KYC system, Nationalization of banks- commercial, private, public and foreign banks- regional rural banks and local bankers- money lenders and pawn brokers.

UNIT III

Reserve Bank of India Act 1934: Establishment of RBI Act and Banking Regulation Act 1949-features-functions- Mint (coin printing) -money control, deficiencies in Indian banking system- problem and challenges, Non-Performing Assets (NPA's).

UNIT IV

Introduction to Insurance sector: concept and nature of insurance- principles of insurance- new insurance products, bank assurance. Types of plans pricing and underwriting documentation. Channels of distribution-policy servicing and settlement of clients.

UNIT V

Insurance Regulatory Development Authority 1999: History –features- importance of IRDA- general insurance Act 1972- feature and functions– LIC Act 1956, features and functions. Non life insurance and its kinds – difference between general insurance and life insurance.

TEXT BOOKS:

1. Introduction to banking, Vijayragavan Iyengar, Excel publications.
2. Risk Management and Insurance, S.Arjunatesan and T.R. Vishwanthan, Macmillan
3. " Capital Adequacy beyond banking securities and Insurance", Hals Scott, Oxford press

REFERENCE BOOKS:

1. Insurance principle and practice, Mishra, M.N., Sultan Chand &sons, New Delhi
2. Banking law and Practice, VarshneyP.N., Sultan Chand &sons, New Delhi
3. Banking and Insurance, Reddy K.S and Rao R N, Paramount Publisher, 2013
4. "Principles of Risk Management and Insurance", George E Rejda, 9e, Pearson Education

16CS4142 – DATABASE SYSTEMS

IV Year. B.Tech. EEE - I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop ability to

1. Learn and practice data modeling using entity-relationship and develop database design.
2. Understand the features of database management systems and Relational database.
3. Understand Structured Query Language (SQL) and learn SQL syntax.
4. Understand normalization process of a logical data model and correct any anomalies.
5. Understand needs of database processing and learn techniques for controlling the consequences of concurrent data access.

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

CO1. Design and describe data models and schemas in DBMS.
CO2. Use SQL - the standard language of relational databases, for database processing.
CO3. Implement Transaction and Query processing techniques for data storage and retrieval.
CO4. Use backup and recovery techniques for handling the databases.
CO5. Use PL/SQL for database administration and performance optimization.

UNIT I

Introduction- Data base System Applications, Purpose of Database Systems, View of Data – Data Abstraction , Instances and Schemas , Data Models ,Introduction to Data base design , ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets , Relationships and Relationship sets , Additional features of ER Model , Conceptual Design with the ER Model , Conceptual Design for Large enterprises, database Access for applications Programs ,Data Storage and Querying,– data base Users and Administrator ,data base System Structure ,History of Data base Systems. Database Languages – DDL, DML, DCL.

UNIT II

Relational Model: Introduction to the Relational Model - Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data, Logical data base Design, Introduction to Views – Destroying /altering Tables and Views.

UNIT III

Form of Basic SQL Query – Examples of Basic SQL Queries , Introduction to Nested Queries, Correlated Nested Queries Set – Comparison Operators – Aggregative Operators , NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs ,Outer Joins , Disallowing NULL values.

UNIT IV

Transaction Management- Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability - Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control - Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

Recovery system – Failure Classification- Storage Structure- Recovery – Atomicity – Log – Based Recovery- Recovery with Concurrent Transactions – Buffer Management – Failure with loss of non-volatile storage - Advance Recovery systems- Remote Backup systems.

UNIT V

PL/SQL and Database Administration

Fundamentals, Defining variables and data types, using SQL in PL/SQL, Program Structures to Control Execution Flow, Using Cursors and Parameters, Using Composite Data Types, Exception Handling, Using and Managing: Procedures, Functions, Packages and Triggers, Improving PL/SQL performance, Recognizing and Managing Dependencies, Using the PL/SQL Compiler.

TEXT BOOKS:

1. Fundamentals of Database Systems, Elmasri, Navathe, 7th Edition, Pearson Education, 2016.
2. Oracle PL/SQL Programming, Steven Feuerstein, Bill Pribyl, O'Reilly, 5th Edition, 2009.

REFERENCE BOOKS:

1. Data base System Concepts, Silberschatz, Korth, McGraw hill, VI edition.
2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
4. Introduction to Database Systems, C.J.Date Pearson Education

16EC4144 – PRINCIPLES OF WIRELESS COMMUNICATION SYSTEMS

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop ability to

1. Discuss the fundamentals of cellular mobile wireless networks.
2. Provide an overview of various approaches to communication networks.
3. Study the numerous different-generation technologies with their individual pros and cons.
4. Discuss about the principles of operation of the different access technologies like FDMA, TDMA, SDMA and CDMA and their pros and cons.

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

CO1. Explain different generations of Cell phone technology
CO2. Explain different cellular, communication networks and different access techniques
CO3. Distinguish between different personal communication services
CO4. Explain the development of Wireless technologies beyond 2 G
CO5. Explain mobile data services and short range networks

UNIT I

Cell phone Generations: 1G, 2G, 2.5G, 3G & 4G.

Transmission Fundamentals: Time domain & Frequency domain concepts, Radio, Analog Vs Digital, channel capacity, transmission media, carrier-based signaling, spread-spectrum signaling.

UNIT II

Network Concepts:

Communication Networks: LANs, MANs, WANs, circuit switching, packet switching, ATM.

Cellular Networks: Cells, duplexing, multiplexing, voice coding.

Multiple Access Techniques: FDMA, TDMA, SDMA, CDMA, spectral efficiency.

UNIT III

Personal Communication Services: GSM, HSCSD, GPRS, D-AMPS, CDMA One, CDMA Two, Packet Data Systems.

UNIT IV

3G & Beyond: IMT-2000, W-CDMA, CDMA 2000, EDGE, Wi-Fi, WiMAX, OFDM.

UNIT V

Mobile Data Services & Short-Range Networks: Messaging, wireless web, WAP, site design Unlicensed spectrum, WLANs, cordless telephony, IrDA, Bluetooth

Smart Phones: Future phones, mobile OSs, smart phone applications.

TEXT BOOKS:

1. "The essential guide to wireless communications applications: from cellular systems to Wi-Fi", Andy Dornan, 2nd Edition, Prentice Hall, 2002.
2. "Wireless Communications and Networks: 3G & Beyond", Misra, Tata McGraw-Hill, 2009.

REFERENCE BOOKS:

1. "Wireless Communications: Principles and Practice", Theodore S. Rappaport, 2nd Edition, Pearson Education, 2009.
2. "Wireless communications and networking", William Stallings, Prentice Hall,2002.

16ME4145 – ASPECTS OF HEAT TRANSFER IN ELECTRONICALLY CONTROLLED UNITS

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop ability to

1. Apply the Energy conservation principles to electronic devices.
2. Apply the conduction, convection and radiation principles to electronic devices.
3. Apply the Refrigeration and Air conditioning concepts to industrial applications.
4. Perform the heat dissipation analysis on electronic devices.

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

CO1. Analyze conduction, convection and radiation heat transfer modesin electronically controlled units.
CO2. Analyze heat generation in electronically controlled units.
CO3. Analyze conduction and dissipation in electronically controlled units.
CO4. Analyze the cooling load capacity in electronically controlled units.

UNIT I

Conduction Heat transfer: Modes of heat transfer, Fourier's law of steady state heat conduction (one dimensional conduction), thermal conductivity and its unit, conduction through slab or plane wall, hollow cylinders and spheres conduction through composite walls and hollow cylinders and spheres with multi-layers, Convective heat transfer, Newton's law of cooling, electrical analogy and overall heat transfer coefficient, numerical problems

UNIT II

Convective and radiation Heat transfer:

Dimensional analysis as a tool for experimental investigation, Buckingham pi theorem and method, radiation and radiation properties of surfaces, black body, emissive power, Stefan Boltzmann's law, emissivity, monochromatic emissive power and monochromatic emissivity, grey body, Kirchhoff's law, Wien's displacement law, numerical problems.

UNIT III

Cooling of Electronic equipment:

Introduction and history, manufacturing of electronic equipment, cooling load of electronic equipment, thermal environment, electronics cooling in different applications, conduction cooling, air cooling: natural convection and radiation, air cooling: forced convection, liquid cooling, immersion cooling, heat pipes, cooling of chips, PCBs, computers, logic chips etc.

UNIT IV

Refrigeration and Air conditioning: Introduction to refrigeration, necessity and applications, unit of refrigeration and cop, Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

UNIT V

Heat pipes: structure – operation - construction - thermal resistance- performance characteristics - effects of working fluid and operating temperature, wick - selection of material - pore size, applications.

TEXT BOOKS:

1. Heat Transfer- A practical approach by Yunus A. Cengel,Tata Mc Graw-Hill Edition
2. Heat Transfer – A conceptual approach – P.K.Sarma&K.Rama Krishna/New age
3. A course in Refrigeration and Air conditioning – SC Arora and &Domkundwar / Dhanpatrai

REFERENCE BOOKS:

1. Fundamentals of Engineering, Heat and mass transfer – R.C. Sachdeva/New Age
2. Heat & mass Transfer – D.S.Kumar/S.K.Kataria & sons

16CE4146–GREEN BUILDINGS

IV Year. B.Tech. EEE– I Semester.

L	T	P/D	C
3	-	-/-	3

Pre Requisites: **None.**

Course Objectives: Develop ability to

1. Impart knowledge on the sustainable construction strategies.
2. Understand the concepts of green buildings.
3. Know emerging building materials.
4. Understand LEED building assessment and certification process.

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

CO 1: Describe the need of green buildings for environmental sustainability.
CO 2: Select suitable sustainable planning and construction strategies.
CO 3: Determine the building rating systems and the process and implementation of green buildings.
CO 4: Describe emerging materials in the field of Civil Engineering construction.
CO 5: Explain the future scope of Green building technology in India.

UNIT – I

Sustainable Construction and Green Building Requirements: Ethics and sustainability – Increased CO_2 trade – Sustainable construction – Major environmental and resource concerns – Green building movement and obstacles – Green building requirements – Perceived use of green building – Relationship between comfort level and performance ability.

UNIT – II

Green Building Process and Assessment: Conventional versus green building delivery systems – Execution of green building process – Integrated design process – Ecological design – Merits and demerits – Historical perspective – Contemporary and future ecological designs – LEED building assessment standard – LEED certification process – International building assessment standards – Building rating system and its future – Case study of a green building.

UNIT – III

Sustainable landscaping, Energy and Atmosphere: Land and landscape approaches for green buildings – Sustainable landscapes – Enhancing ecosystems – Storm water management – Heat island mitigation – Building energy issues – Building energy design strategies – Building envelope – Active mechanical systems – Electrical power systems – Innovative energy optimization strategies – Smart buildings and energy management systems – Ozone depleting chemicals in HVAC & R and fire suppression.

UNIT – IV

Building Hydrologic System and Material Loops: Energy policy act of 1992 – High performance building hydrologic strategy - High performance building water supply strategy - High performance building wastewater strategy – Landscaping water efficiency – Green building materials issues and priorities –

Difference between green building buildings and green building materials – LCA of building materials and products – Emerging construction materials and products – Design for deconstruction and disassembly – Closing material loops in practice.

UNIT – V

Green Building Implementation: Site protection planning – Health and safety planning – Construction and demolition – Waste management – Reducing the footprint of construction operations – Essentials of building commissioning – Costs and benefits of building commissioning – Case study for high performance green buildings – The economics of green buildings – Quantifying green building costs – Future directions in green buildings.

TEXT BOOKS:

1. Sustainable Construction: Green Building Design and Delivery, Charles.J.Kibert, John Wiley & Sons, New Jersey, 2008.
2. Green Building: Guidebook for Sustainable Architecture, M.Bauer, P. Mosle and M. Schwarz, Springer, Verlag Berlin Heidelberg, 2010.

REFERENCE BOOKS:

1. Marketing Green Building Services: Strategies for success, Jerry Yudelson, Elsevier, 2008.
2. Marketing Green Buildings: Guide for Engineering, Construction and Architecture, Jerry Yudelson, The Fairmont Press INc., 2006.
3. Green by Design: Creating a Home for Sustainable Living, Angela M. Dean, Gibbs Smith Publication, 2003.
4. Indian Green Building Council Website: https://igbc.in/igbc/
5. http://cpwd.gov.in/Publication/Guideleines_Sustainable_Habitat.pdf
6. For case studies: http://www.nmsarchitects.com/

16EN4147 – FRENCH

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop ability to

1. Recognize and pronounce French alphabet.
2. Apply grammatical concepts in both oral and written communication.
3. Appreciate the culture of Francophone countries.
4. Read authentic texts

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

CO1. Demonstrate competency in basic vocabulary and grammar
CO2. Understand the culture of Francophone countries
CO3. Read with accurate pronunciation
CO4. Understand short &simple oral and written messages

UNIT–I

Functional Aspects: Greetings, introductions, asking/giving information, pronunciation and Spellings of Francophonic names, family relations, professions, days of the week and months, nationalities, languages, cardinal numbers and ordinal numbers, descriptions.

Grammatical Aspects: Definite and Indefinite articles, numbers, adjectives, interrogation, negation, conjugation of the verbs in the present tense.

UNIT–II

Functional Aspects: Intonation, vowels, orals and nasals, Inviting and responding to invitations, describing people.

Grammatical Aspects: Past Tense- verbs used

UNIT–III

Functional Aspects: Polite expressions-expressing opinions, making suggestions, expressing ideas and dislikes, agreeing and disagreeing.

Describing places, professions, dress and monuments of Paris and other public places.

Grammatical Aspects: Regular and irregular verbs, conjugations, writing simple sentences using the verbs in present and past tense.

UNIT–IV

Functional Aspects: Semi-vowels, consonant sounds, Invitations, accepting and refusing invitations, fixing appointments, Inviting through telephone and e-mail.

Grammatical Aspects: Partitif articles, adjectives, demonstrative and possessive, prepositions and adverbs of quantity and quality.

UNIT–V

Functional Aspects: Asking for information in a restaurant, Ordering food in a restaurant, appreciating, describing leisure of Francophone cultures.

Grammatical Aspects: Future Tense-Verbs used

TEXT BOOK:

1. Dominique, Philippe, et al. 1999. Le Nouveau sans Frontières -I (Including Exercise Book). Paris: Clé, International (Indian Edition).

REFERENCE BOOKS:

1. Alter Ego I & II. Published by Hachette
2. Connexion I & II. Published by Didier
3. Echo I & II. Clé International publishers
4. Latitude I & II. Published by Didier

16EN4148 – SPANISH

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop ability to:

1. Identify Spanish sounds and participate in social interactions
2. Read authentic texts in Spanish
3. Write small and simple messages in Spanish
4. Understand the nuances of Hispanic culture

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

CO1: Apply basic vocabulary and grammatical structures in Spanish.

CO 2: Demonstrate competency in functional and grammatical structures of the language.

CO 3: Read with accurate pronunciation

CO 4: Participate in simple conversations based on everyday situations

UNIT–I

Functional Aspects: Greetings, introductions, asking/giving information, pronunciation and Spellings - Hispanic names, family relations, professions, days of the week and months, nationalities, languages.

Grammatical Aspects: Basic structure of spelling and pronunciation; present indicative of the regular verbs (‘ar/er/ir) and ‘querer’; subject pronouns; interrogative sentences with ‘Porque’, and ‘quien’; causal phrase with ‘porque’; ‘ser’ and ‘estar’; negative sentences; adjectives of nationality.

UNIT–II

Functional Aspects: Ordinal and cardinal numbers, quantities, shopping, describing things(material, colour, size etc.) and people (food habits, dress etc.)

Grammatical Aspects: Gender and number of nouns and adjectives; the verb ‘tener’; interrogativeSentences; demonstrative and qualitative adjectives.

UNIT–III

Functional Aspects: Polite expressions- expressing opinions, making suggestions, expressing ideas and dislikes, agreeing and disagreeing.

Grammatical Aspects: Qualitative adjectives, forms and usage, gradations, superlative adjectives, exclamatory sentences; the verb ‘gustar’, forms and syntax; personal Pronouns; definite and indefinite pronouns, direct object pronouns, Prepositions; verbs like ‘parecer’ and ‘encontrar and preferir, their form and syntax, interrogative pronouns.

UNIT–IV

Functional Aspects: Invitations; accepting and refusing invitations; fixing an appointment;Inviting through telephone and or e-mail.

Grammatical Aspects: Present indicative of irregular verbes, expressions with ‘tener’ and ‘estar’; Prepositional pronouns; interrogative sentences.

UNIT–V

Functional Aspects: Expression of time; Making comparisons- Indian and Hispanic. Describing events - festivals - Indian and Hispanic

Grammatical Aspects: Time with 'ser', expression s relating to festivals.

TEXT BOOK:

1.NOUVEAU ELE INICIAL 1

REFERENCE BOOKS:

1. Espanol sin Fronteras, A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997
2. Entre Nosotros A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997

16EN4149 – GERMAN

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives: Develop ability to:

1. Understand and participate in social interactions in everyday situations
2. Write simple messages in German on topics related to personal interest and everyday life.
3. Read authentic texts in German.
4. Demonstrate insight into significant cultural products and historical events in German

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

CO 1: Converse in day to day situations
CO 2: Demonstrate proficiency in writing
CO 3: Read with accurate pronunciation
CO 4: Display greater insight of German culture

UNIT–I

Functional Aspects: Greetings, introductions, asking/giving information, pronunciation and Spellings – German names, family relations, professions, days of the week and months, nationalities, languages.

Grammatical Aspects: Definite and Indefinite articles(including negation), Noun: Gender and Plural forms, cases (nominative, accusative, dative & genitive)

UNIT–II

Functional Aspects: Ordinal and cardinal numbers, quantities, shopping, describing things (material, colour, size etc.) and people (food habits, dress etc.)

Grammatical Aspects: Verb: Strong and Weak verbs, Verbs with separable and inseparable prefixes, modal verbs, position of verb in the main and subordinate clauses, auxiliary verbs, reflexive verbs in accusative and dative cases, imperative constructions

UNIT–III

Functional Aspects: Polite expressions- expressing opinions, making suggestions, expressing ideas and dislikes, agreeing and disagreeing.

Grammatical Aspects: Pronouns: personal, possessive, reflexive, interrogative and demonstrative, Prepositions: with the accusative, dative and with both these cases

UNIT–IV

Functional Aspects: Invitations; accepting and refusing invitations; fixing an appointment; Inviting through telephone and or e-mail.

Grammatical Aspects: Adjective:declension with the Indefinite article, Definite article, without article, with the indefinite pronoun, Degrees of comparison (also adverbs), ordinal numbers, adjectives as nouns
Conjunctions: subordinating and coordinating with respect to the position of the verb.

UNIT–V

Functional Aspects: Expression of time; Making Comparison - Indian and Germanic. Describing events - festivals - Indian and Germanic.

Grammatical Aspects: Negation: of a sentence and words therein. .Sentence structure: general principles observed in German Language.

TEXT BOOK:

1. Hermann Funk, Christina Kuhn, Oliver Bayerlein., Studio d A 1.2005 Comelsen Verlag, Berlin.

REFERENCE BOOKS

1. Rosa –Marie Dallapiazza, Eduard von Jan, Till Schonherr,unter Mitarbeit von Jutta Orth-Chambah.
2. Tangram aktuell 1 –Lektion 1-4, Lektion 5 - 8 Max Hueber Verlag. Munchen. 2009
3. Max Hueber Verlag. Munchen. 2009

16EC4106 – EMBEDDED SYSTEMS

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16EC3102 – Microprocessors and Microcontrollers
16EC3208 - Computer Architecture and Organization

Course Objectives: Develop ability to:

1. Understand design principles of an Embedded System.
2. Understand the operation of ARM Processors and Networked Embedded systems.
3. Understand the functions and applications of Arduino and Raspberry Pi boards.
4. Understand the functions of RTOS.
5. Understand various Task communication methods.

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

CO1. Explain the hardware requirements of an Embedded System Design for various applications.
CO2. Explain the functions and features of ARM7 and Networked Embedded systems, and develop simple programs.
CO3. Explain the operation of Arduino and Raspberry Pi Embedded system development boards.
CO4. Justify the role of Real Time Operating System and its special features in Embedded Systems.
CO5. Explain various methods of Task communication.

UNIT – I

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, Major Application Areas, Purpose of Embedded Systems. Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer.

UNIT – II

ARM processor and Networked Embedded systems: ARM Processor and memory organization, data operations, ARM programming model, flow of control and Simple Programs. Networked Embedded Systems: Bus protocols, I2C bus and CAN bus.

UNIT – III

Introduction to Advanced embedded system development boards: Ardino and Raspberry Pi board description, operation, Pin functional details, programming and applications. Introduction to Embedded C and Python.

UNIT – IV

RTOS Based Embedded System Design: Real time Operating System Basics, Types of Real time Operating Systems, Selection of RTOS, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT – V

Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers.

TEXT BOOKS:

1. "Introduction to Embedded Systems", Shibu K.V, McGraw Hill Education (India) Private Limited, 2009.
2. "Computers as components", Wayne Wolf , Morgan Kaufmann Publishers, 2006.
3. Arduino programming, Sams, Pearson India Education services, 2015.
4. "Getting started with Raspberry Pi", Matt Richardson and Shawn Wallace, 1st Edition, O' Reilly, 2012.

REFERENCE BOOKS:

1. "Embedded Systems –Architecture, Programming and Design", Raj Kamal, Tata McGraw Hill, 2008.
2. "Embedded System Design -A Unified Hardware / Software Introduction" Frank Vahid, Tony Givargis, 3rd Edition, John Wiley & Sons, 2002.
3. "Embedded Systems – An Integrated Approach", Lyla B. Das, Pearson Education, 2013.
4. "An Embedded Software Primer", David E. Simon, Pearson Education 1999.

16EC4107 – DIGITAL SIGNAL PROCESSING

IV Year B.Tech. EEE I Semester

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): 16EE2204 – Signals and Systems

Course Objectives: Develop ability to:

1. Provide background and fundamental concepts for analysis and processing of digital signals.
2. Familiarize the relationships between continuous-time and discrete-time signals and systems.
3. Study fundamentals of time, frequency and Z-plane analysis and discuss the inter-relationships of these analytic methods.
4. Study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.
5. Introduce a few real-world signal processing applications.
6. Acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

Course Outcomes (COs): At the end of the course, student would be able to:

CO 1. Perform time, frequency and Z-plane analysis on signals and systems.
CO 2. Identify the inter-relationship between DFT and various Transforms.
CO 3. Compare various filter structures and effects of round off errors.
CO 4. Design a digital filter for a given specification.
CO 5. Understand the fast computation of DFT and appreciate the FFT processing.
CO 6. Understand the tradeoffs between normal and multi rate DSP techniques and finite word length effects.

UNIT-I:

Introduction to Digital Signal Processing: Review on 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, Applications of DSP., Review on Z-transforms, Solutions of difference equations of digital filters.

Discrete Fourier Series: DFS representation of periodic sequences and its properties, Relation between Z-transform and DFS.

UNIT II

Discrete Fourier Transforms: Introduction to DTFT , frequency domain sampling ,DFT and its Properties, Relationship of DFT to DTFS and Z-Transforms, linear convolution of sequences using DFT, Computation of DFT and IDFT.

Fast Fourier Transforms: Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, Radix-N FFT algorithm.

UNIT III

IIR DIGITAL FILTERS: Realization of IIR Filters- Direct, Canonic, Cascade, Parallel, Lattice forms.

Design of IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR digital filters from Analog filters, Step and Impulse Invariant techniques, Bilinear transformation method, Spectral transformations

UNIT IV

FIR DIGITAL FILTERS: Realization of FIR Filters: Direct form, cascade realization and Linear phase Realization. Characteristics of linear phase FIR filters and its frequency response. Comparison of IIR and FIR filters.

Design of FIR filters: Fourier Method, Frequency Sampling method and windowing methods: Rectangular window, Hanning window, Hamming window, Bartlett window and Kaiser window.

UNIT V

Multirate digital signal processing: sampling rate conversion, Decimation, interpolation, , Implementation of sampling rate conversion, Applications of Multirate Signal Processing.

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, Measurement of Coefficient quantization effects through pole-zero movement, Dead band effects.

Introduction to DSP processors: Introduction to programmable DSPs: Multiplier and Multiplier Accumulator(MAC),Modified Bus Structures and Memory Access schemes in DSPs multiple access memory, multiport memory.

TEXT BOOKS:

1. Digital Signal Processing: Principles, Algorithms and Applications – John G.Proakis,D.G.Manolakis, 4th Edition, Perason/PHI, 2009.
2. Digital Signal Processing – A Pratical Approach – Emmanuel C.Ifeacher, Barrie. W.Jervis, 2nd Edition, Pearson Education, 2009.

REFERENCE BOOKS:

1. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI, 2009
2. Digital Signal Processing- Fundamentals and Applications – Li Tan, Elsevier, 2008.
3. Fundamentals of Digital signal Processing using MatLab- Robert J.Schilling, Sandra

16EC41L2 – EMBEDDED SYSTEMS LAB

IV Year B.Tech. EEE I Semester

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16EC31L1 – Microprocessors and Microcontrollers Lab

Course Objectives: Develop ability to

1. Use ARM Controller (LPC2148) Kit for conducting various operations.
2. Program LPC2148 for various applications.
3. Interface LPC2148 with displays and ADC/DACs.
4. Interface Arduino and Raspberry Pi modules with motors.

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

CO1: Write programs for different types of operations using LPC2148.
CO2: Interface LPC2148 with displays and ADC/DACs.
CO3: Use software namely, Keil µvision and Flash Magic.
CO4: Write programs for Interfacing Motors with Arduino and Raspberry Pi boards.

List of Experiments: (A minimum of 10 experiments are to be conducted and Experiments 11 and 12 are mandatory)

1. Programs for arithmetic and logical operations for LPC2148
2. Program for finding largest number in an array for LPC2148.
3. Program for finding LCM of two numbers for LPC2148.
4. Program to generate Fibonacci Series using LPC2148.
5. Program to generate Multiplication Table of a number using LPC2148.
6. LED Blinking using LPC2148.
7. Buzzer Interfacing with LPC2148.
8. LCD interfacing with LPC2148.
9. Interfacing ADC/DAC to LPC2148.
10. Interfacing of temperature sensor with LPC2148.
11. Servo motor interfacing with Arduino.
12. DC motor interfacing with Raspberry Pi.

Software Required:

1. Keil µvision-3
2. Flash Magic

Hardware required:

1. Computer Systems
2. LPC 2148 trainer kits (along with sensors and actuators)
3. Arduino Kits
4. Raspberry Pi kits
5. Servo motor
6. DC motor

16EC41L3 – DIGITAL SIGNAL PROCESSING LAB

IV Year B.Tech. EEE I Semester

L	T	P/D	C
-	-	3/-	2

Prerequisite(s): 16EC31L1 – MPMC Lab

Course Objectives: Employing MATLAB/SCILAB/OCTAVE/CC-Studio**,** develop ability to

1. **A**nalyze and display signals in the frequency-domain.
2. Perform spectral analysis using the DTFT, DFT FFT.
3. Write programs and use DSP hardware for various signal processing applications
4. Design FIR and IIR Filters for given specifications
5. Implement decimation, interpolation and sampling rate conversion

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

CO1. Develop and Implement DSP algorithms in software using floating point Processor.
CO2. Develop various DSP Algorithms using MATLAB/SCILAB/OCTAVE/CC-Studio Software.
CO3. Analyze Magnitude and phase characteristics of digital IIR and FIR filters.
CO4. Estimate power spectral densities of a discrete time sequence.
CO5. Estimate and remove noise using a variety of signal processing algorithms

Minimum 12 Experiments are to be conducted

The programs shall be implemented employing MATLAB/SCILAB/OCTAVE/CC-Studio or Equivalent in software and DSP processors kits in hardware.

1. Generation of Sinusoidal waveform / signal based on recursive difference equations.
2. To find DFT / IDFT of given DT signal.
3. To find frequency response of a given system given in (Transfer Function/ Differential equation form).
4. Implementation of FFT of given sequence.
5. Determination of Power Spectrum of a given signal(s).
6. Design and Implementation of LP FIR filters for given specifications.
7. Design and Implementation of HP FIR filters for given specifications.
8. Design and Implementation of LP IIR filters for given specifications.
9. Design and Implementation of HP IIR filters for given specifications.
10. Time frequency analysis of a given non-stationary signal.
11. Design a FIR Filter using the following windows and compare their finite word length effects.
    a. Rectangular window
    b. Hamming window
    c. Hanning window
    d. Kaiser window
12. Implementation of Decimation Process.
13. Implementation of Interpolation Process.
14. Implementation of I/D sampling rate converters.
15. Noise removal: Add white noise to a signal and study their spectral characteristics and then remove the noise.
16. Impulse response of first order and second order systems.

16EE41L2 – POWER SYSTEMS SIMULATION AND DRIVES LAB

IV Year. B.Tech. EEE I Semester

L	T	P/D	C
-	-	3/-	2

Prerequisite(S): 16EE22L1-Power Electronics and Simulation Lab
16EE32L1-Computer Methods in Power Systems Lab

Course Objectives: Develop ability to

1. Apply iterative techniques to typical power systems
2. Understand reactor power compensation techniques
3. Understand the behavior of DC distribution systems
4. Know the speed control strategies for AC and DC drives
5. Perform the open loop and closed loop speed control analysis

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

CO1. Apply iterative techniques to typical power systems
CO2. apply reactor power compensation techniques
CO3. Understand the behavior of DC distribution systems
CO4. Apply the speed control strategies for AC and DC drives
CO5. Understand and apply open loop and closed loop speed control techniques for AC and DC drives

Part A: Power Systems Simulation Experiments (Any five from the following to be conducted)

1. Solution of power flow using gauss siedel method
2. ABCD constants for long lines and voltage profile observation for open circuit line with and without shunt reactor compensation
3. To study the operation of definite time over current relay
4. To study the performance of typical dc distribution system
5. Simulation of automatic voltage regulator using both stabilizer and pid controller
6. Simulation of steady state stability for small disturbances with & without change in power input

Part B: Electric Drives Experiments (Any five from the following to be conducted)

1. IGBT used single 4 quadrant chopper drive for PMDC motor with speed measurement and closed loop control measurement.
2. Thyristorised drive for 1Hp DC motor with closed loop control
3. 3-Phase input, thyristorised drive, 3 Hp DC motor with closed loop control
4. 3-Phase input IGBT, 4 quadrant chopper drive for DC motor with closed loop control
5. Speed control of 3 phase wound rotor Induction motor.
6. Cyclo-converter based single phase AC Induction motor control equipment.

B.Tech (EEE)
IV Year II Sem
Detailed Syllabus

16MB4201- FINANCIAL ANALYSIS AND PROJECT MANAGEMENT

IV Year. B. Tech. EEE - II Semester

L	T	P/D	C
4	-	-/-	4

Pre requisites: None

Course Objectives: Develop ability to:

1. Familiarize and acquaint the student with accounting concepts and analysis.
2. Evaluate alternative techniques for analyzing project opportunities and budgeting capital.
3. Understand the various costs of capital and calculate these costs.
4. Recognize the significance of capital structure and examine its importance in decision making along with dividends and working capital.
5. Understand the concept and stages in project management.

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

CO1. Learn financial accounting concepts and analyze data.
CO2. Understand the role of capital budgeting in decision making.
CO3. Apply the concepts of capital structure in financial decision making.
CO4. Applications of Project management.
CO5. Appreciate Risk Management concepts.

UNIT-I

Introduction to Financial Accounting: Definition, branches of accounting, accounting concepts and conventions, types and principles of accounting, accounting cycle, journal, ledger and Trial Balance and final accounts (simple problems) and types of financial statement analysis.

Financial Statement Analysis: Introduction, meaning of ratio, steps in Ratio analysis, classification of Ratios. Advantages and limitation of ratio analysis,(simple problems).

UNTI-II

Introduction to Financial Management and Capital Budgeting: Concept, functional areas and objectives of financial management. Capital Budgeting- meaning – importance – process –techniques of capital budgeting. Traditional techniques – Payback Period – Accounting / Average Rate of Return, Discounted techniques – discounted Payback Period – Net Present Value – Internal Rate of Return – Profitability Index. (Simple Problems).

UNIT-III

Financing Decision: Concepts and measurement of cost of capital, computation of cost of debt, cost of equity, cost of preference shares, and cost of retained earnings; concept weighted average cost of capital and marginal cost of capital.

Capital Structure: Optimal capital structure, factors influencing the capital structure, financial leverage, operating leverage and combined leverage.

UNIT-IV

Dividend decision and Working Capital Management: Concept, types of dividends, models of dividend theories. Concepts of working capital management, types and components of working capital (cash, marketable securities, receivable management inventory management).

UNIT-V

Basics of Project Management: Introduction, need for project management, project management knowledge areas and processes, the project life cycle.

Project Risk Management: Introduction, risk, risk management, role of risk management in overall project management, steps in risk management, risk identification, risk analysis, reducing risks.

TEXT BOOKS:

1. Financial Management--Text and Problems, MY Khan and PK Jain, Tata McGraw Hill. 2009.
2. "Project Management: A Systems Approach to Planning, Scheduling and Controlling", Harold Kerzner, New Delhi, CBS Publications, 1994.

REFERENCE BOOKS:

1. "Project Planning, Analysis, Selection, Implementation and Review", Prasanna Chandra, New Delhi, Tata McGraw Hill Publications, 2000.
2. "Text book of Project Management", P. Gopalkrishnan and E. Rama Moorthy, New Delhi,McGraw Hill Publications, 2000.

16EE4201- RELIABILITY

IV Year B.Tech. EEE II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16EE2203 Power Systems-I
16MA1101 Mathematics I

Course Objectives: Develop ability to

1. To comprehend the concept of Reliability and Unreliability
2. Derive the expressions for probability of failure, Expected value and standard deviation of Binominal distribution, Poisson distribution, normal distribution and weibull distributions.
3. Formulating expressions for Reliability analysis of series-parallel and Non-series parallel Systems
4. Deriving expressions for Time dependent and Limiting State Probabilities using Markov Models.
5. Understand Reliability Model representation of Generating Station.

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

CO1: Apply fundamental knowledge of Reliability to modeling and analysis of series Parallel and Non-series parallel systems.
CO2: Solve some practical problems related with Generation, Transmission and Utilization of Electrical Energy.
CO3: Understand or become aware of various failures, causes of failures and Remedies for Failures in practical systems.
CO4: Analyze Various Processes in Reliability Engineering.
CO5: Develop Model for Generating Station.

UNIT I

Reliability: Rules for combining probabilities of events, definition of Reliability. Significance of the terms appearing in the definition. Probability distributions: Random variables, probability density and distribution functions. Mathematical expectation, Binominal distribution, Poisson distribution, normal distribution, weibull distribution.

UNIT II

Hazard rate, derivation of the reliability function in terms of the hazard rate. Failures: Causes of failures, types of failures (early failures, chance failures and wear-out failures). Bath tub curve. Preventive and corrective maintenance. Modes of failure. Measures of reliability: mean time to failure and mean time between failures.

UNIT III

Classification of engineering systems: series, parallel and series-parallel systems- Expressions for the reliability of the basic configurations. Reliability evaluation of Non-series-parallel configurations: Decomposition, Path based and cutest based methods, Deduction of the Paths and cut sets from Event tree.

UNIT IV

Discrete Markov Chains: General modelling concepts, stochastic transitional probability matrix, time dependent probability evaluation and limiting state probability evaluation of one component repairable model. Absorbing states.

Continuous Markov Processes: Modelling concepts, State space diagrams, Stochastic Transitional Probability Matrix, Evaluating time dependent and limiting state Probabilities of one component repairable model. Evaluation of Limiting state probabilities of two component repairable model.

UNIT V

Generating System Reliability Analysis – I: Generation system model – capacity outage probability tables – Recursive relation for capacitive model building – sequential addition method – unit removal – Evaluation of loss of load and energy indices – Examples.

TEXT BOOKS:

1. "Reliability evaluation of Engineering systems", Roy Billinton and Ronald N Allan, BS Publications.
2. "Reliability Engineering", Elsayed A. Elsayed, Prentice Hall Publications.

REFERENCE BOOKS:

1. "Reliability Engineering: Theory and Practice", By Alessandro Birolini, Springer Publications.
2. "An Introduction to Reliability and Maintainability Engineering", Charles Ebeling, TMH Publications.
3. "Reliability Engineering", E. Balaguruswamy, TMH Publications.

16EE4202 – HVDC TRANSMISSION

IV Year B.Tech. EEE II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16EE2201Power Electronics
16EE3102 Power Systems – II

Course Objectives: Develop ability to:

1. Familiarize the importance of HVDC transmission
2. Understand the operation of HVDC converters.
3. Familiarize the performance characteristics of 6 pulse and 12 pulse converters.
4. Deal with reactive power control of HVDC system.
5. Deal with firing angle control of HVDC system and its protection.

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

CO1: Understand the importance of transmission of power through HVDC links.
CO2: Relate the performance characteristics of 6 pulse, 12 pulse circuits and discuss firing angle control.
CO3: Analyze the control of reactive power through HVDC.
CO4: Discuss power flow analysis of HVDC.
CO5**:** Understand the importance of protection of HVDC.

UNIT I

Basic Concepts: Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC &DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.

UNIT II

Analysis of HVDC Converters: Choice of Converter configuration – analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters – Cases of two 3 phase converters in star –star mode – their performance.

Converter & HVDC System Control: Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

UNIT III

Reactive Power Control in HVDC: Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies-sources of reactive power-AC Filters – shunt capacitors-synchronous condensers.

Power Flow analysis in AC/DC Systems: Modeling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC load flow – P.U. System for DC quantities-solution of AC-DC Power flow-Simultaneous method-Sequential method.

UNIT IV

Converter Fault & Protection: Converter faults – protection against over current and over voltage in converter station – surge arresters – smoothing reactors – DC breakers –Audible noise-space charge field-corona effects on DC lines-Radio interference.

UNIT V

Harmonics: Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non-Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics.

Filters: Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar, New Age International (P) Limited, and Publishers.
2. EHVAC and HVDC Transmission Engineering and Practice – S.Rao.

REFERENCE BOOKS:

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications.

16EE4203– ROBOTICS

IV Year. B.Tech. EEE – II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s):16EE2202-Electrical Machines-I
16EE3103-Electrical Machines-II
16EE3101-Control Systems

Course Objectives: Develop ability to

1. Demonstrate knowledge about robotics.
2. Understanding the functioning of robotics.
3. Understand the functioning of electric drives for robotics.
4. Understand the concepts related to electric actuators.
5. Understand the characteristics of motors used for robotics.

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

CO1. Know the basic working of robots
CO2. Familiar with motion controlling techniques used for robots
CO3. Know the drive systems used for robots
CO4. Identify the sensors used in robots
CO5. Do any case study of robo-mechanism used in any industry / application.

UNIT I
Introduction to Robotics:
Introduction and history of Robots. their classification and components. Robot - Degrees of Freedom, Joints, Coordinates and Reference frames, programming modes, characteristics, workspace, Languages and applications.

UNIT II
Motion Control Systems:
Basic Components and terminology. Block diagrams, System Dynamics, Laplace and Inverse Laplace Transforms, Transfer Function, Block Diagram Algebra. First and Second order systems.
Controllers and compensators, Open loop Vs Closed loop applications, Multiple Input and Multiple output systems. Ttypical digital control system. An example of Non-linear control system. Microprocessor Control of Electric Motors.

UNIT III
Electric Actuators and Drive Systems
Introduction to Actuators and drive systems. Characteristics of actuating systems. Comparison of actuating systems. Electro-Mechanical System dynamics-Robot Actuation and Control. Electric Motors: Different types of servo and stepper motors for Robotic applications.

UNIT IV
Sensors and Encoders in Robots:
Sensor characteristics, Sensor Utilization, Position sensors, Velocity sensors, Acceleration sensors, Force and Pressure sensors, Torque sensors, Micro Switches, Visible Light and Infrared Sensors, Touch and Tactile Sensors, Proximity sensors, Sniff sensors, Taste Sensors, Vision Sensors, Vision systems, Voice Recognition Devices, Voice Synthesizers.

UNIT V

Case Study:

Control of the PUMA Arm. Single Joint Arm: Transfer function, Positional Controller for a single joint, performance and stability criteria.

Natraj- A case study of 6 legged robot.

TEXT BOOKS:

1. Introduction to Robotics – Analysis, Control, Applications" Saeed B. Niku. Wiley II Edition. 2014.
2. Robotics and Control. R. K. Mittal, I J Nagrath McGraw Hill Publication 2015

REFERENCE BOOKS:

1. Robotics –Control, Sensing, Vision and Intelligence. K.S. Fu, R.C. Gonzalez, C.S.G Lee McGraw Hill International Editions 1987.
2. Introduction to Robotics. John J Craig. Pearson. 4th Edition.

16EC4206– VLSI TECHNOLOGY

IV Year B.Tech. EEE II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): 16PH1202 Semiconductor Physics
16EC2103 Switching Theory and Logic Design

Course Objectives: Develop ability to:

1. Understand different steps involved in the fabrication of ICs using MOS transistors.
2. Understand electrical properties of MOS devices to analyze the behaviour of inverters designed with various loads.
3. Understand the construction of stick diagrams and design rules to implement the layout of any logic circuit.
4. Understand design concepts of building blocks of data path subsystems and array subsystems.
5. Understand different types of faults in MOS circuits and the process of testing them.

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

CO1. Explain the different steps involved in the fabrication process of integrated circuits using MOS transistors.
CO2. Analyze the behaviour of inverters with various loads using the electrical properties of MOS devices.
CO3. Explain the concepts of VLSI design flow and draw the layout of a logic circuit conforming to design rules.
CO4. Design various logic circuits for data path subsystems and explain the design aspects of different memory architectures using MOS transistors.
CO5. Explain different types of faults in a MOS circuit and apply the concepts of testability.

UNIT – I

Introduction to MOS Technology: The future of Microelectronics, The Integrated Circuit(IC) Era, MOS VLSI technology, Basic MOS transistors, Enhancement Mode Transistor Action, Depletion Mode Transistor Action, nMOS fabrication, CMOS fabrication.

UNIT – II

Basic Electrical Properties of MOS Circuits: I_{ds}-V_{ds} relationships, Aspects of MOS transistor threshold Voltage, g_m, g_{ds}, Figure of merit ω_o, Pass transistor, nMOS Inverter, Alternative forms of Pull-up, The CMOS Inverter, Latch-up in CMOS circuits.

UNIT –III

MOS Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Scaling of MOS circuits, Scaling Models, Scaling factors for device parameters, Limitations of Scaling.

UNIT –IV

Data path Subsystems: Addition/Subtraction, One/Zero Detectors, Comparators, Counters. **Array Subsystems:** SRAM, DRAM, Read-only-Memory, Serial Access Memories, Programmable Logic Arrays.

UNIT –V

Testing and Verification: Introduction, Logic Verification Principles, Manufacturing Test Principles, Design for Testability.

TEXT BOOKS:

1. Essentials of VLSI circuits and systems, Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. CMOS VLSI Design – A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, Pearson, 2006.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective, Ming-Bo Lin, CRC Press, 2011.
2. Modern VLSI Design, Wayne Wolf, Pearson Education, 3rd Edition, 1997.
3. VLSI Design, K.Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.

16MB4251- ENTREPRENEURSHIP

IV Year. B. Tech. EEE - II Semester

L	T	P/D	C
3	-	-/-	3

Pre requisites: None

Course Objectives: Develop ability to

1. Understand the mindset of the entrepreneurs.
2. Analyze the promotion and financial aspects of entrepreneurship.
3. Learn entrepreneurial activities and determine ventures for launching.
4. Identify all the legal challenges of entrepreneurship and develop an idea on the legal framework.
5. Apply strategic perspectives in entrepreneurship.

Course Outcomes (COs): At the end of the course, student would be able to:

CO1: Explore and identify the entrepreneurial traits.
CO2: Identify various funding agencies.
CO3: Imagine and identify opportunities to launch new ventures.
CO4: Address legal challenges.
CO5: Develop strategies for bringing stability and growth in business

UNIT-I

Introduction to entrepreneurship: meaning, importance, entrepreneurship characteristics, women entrepreneurs, classifications of entrepreneurs, myths of entrepreneurship, qualities of entrepreneurship, competencies, attitude function and nature of forms of entrepreneurship.

UNIT-II

Promotion and financial aspects of entrepreneurship: Idea generation- opportunities- SWOT analysis, patents and trademark, intellectual property rights, source of capital, debt capital, seed capital, venture capital-informal agencies in financing entrepreneurs. Government grants and subsidies, types of investors and private offerings.

UNIT-III

Launching entrepreneurial ventures: opportunities identification- entrepreneurial imagination and creativities – the nature of the creativity process innovation and entrepreneurial- methods to initiate venture creating new ventures-acquiring and established entrepreneurial venture, franchising hybrid-disadvantage of franchising.

UNIT-IV

Legal challenges of entrepreneurship: Intellectual property protection patents, copy rights-trademarks and trade secret. Avoiding trademarks, pitfalls-formulation of the entrepreneurial plan-the challenges of new venture startups-poor financial understanding-critical factors for new venture development, the evaluation process, feasibility criteria approach.

UNIT-V

Strategic perspectives in entrepreneurship: Strategic planning-strategic actions-strategic positioning-business stabilization-building the adoptive firms-understanding the growth stage unique managerial concern of growing ventures.

TEXT BOOKS:

1. "Entrepreneurship- A South - Asian Perspective ",D F Kuratko and T V Rao Cengage Learning, 1/e, 2012.
2. "Small Scale industries and entrepreneurship", Vasanth Desai, Himalaya Publishing 2012.

REFERENCE BOOKS:

1. "Entrepreneurship Development", B. Janakiram and M. Rizwana, Text & Cases, Excel Books, 2011.
2. Effectual Entrepreneurship, Stuart Read, Routledge, 2013.
3. Fundamentals of Entrepreneurship, Nandan H, PHI, 2013.

16CS4252 - WEB DEVELOPMENT

IV Year. B. Tech. EEE - II Semester

L	T	P/D	C
3	-	-/-	3

Pre requisites: None

Course Objectives: Develop ability to

1. Understand the basic web concepts and Internet protocols
2. Understand XML and processing of XML data
3. Understand client side scripting with Javascript and DHTML
4. Understand server side programming with PHP
5. Understand file handling and database connectivity with PHP

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

CO1. Create dynamic and interactive web sites
CO2. Write and execute client side scripts using Javascript and DHTML.
CO3. Write, parse and execute XML schemas.
CO4. Write, implement, deploy and execute server side programs and components using PHP.
CO5. Handle files, store, retrieve and process data using database connectivity with PHP.

UNIT I

HTML: Common Tags – List, Tables, images, forms, frames; Cascading Style Sheets.
Client side Scripting: Introduction to JavaScript: JavaScript language – declaring variables, Scope of variables, functions, event handlers (on click, on submit etc.), Document Object Model, Form validation.

UNIT II

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definitions, XML Schemas, Document Object Model, XHTML
Parsing XML Data – DOM and SAX Parsers in Java.

UNIT III

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Http sessions and cookies.

UNIT IV

File Handling PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT V

Connecting to Database (MYSQL as reference), executing simple queries, Storing form data into tables, handling results.

TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford University Press.
2. The Complete Reference PHP – Steven Holzner, Tata McGraw – Hill.

REFERENCE BOOKS:

1.Web Programming, building internet applications, Chirs Bates 2nd edition, Wiley Dreamtech.
2.Java Server Pages – Hans Bergsten, SPD O‟Reilly.
3.Java Script, D.Flanagan, O‟Reilly, SPD
4.Beginning Web Programming – Jon Duckett WROX.
5.Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6.Internet and world wide web – How to program, Dietel and Nieto, Pearson.

16EC4254– BIOMEDICAL INSTRUMENTATION

IV Year. B.Tech. EEE – II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives: Develop ability to:

1. Learn the basics of human physiology
2. Understand the basics of bio-medical transducers and recorders.
3. Understand the applications of measuring, recording and monitoring instruments.
4. Understand the concepts of various medical instruments and supporting systems.

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

1. Explain the functioning of different human physiological systems.
2. Explain the operations of transducers and recorders used for bio-medical applications.
3. Explain the principles of medical imaging systems.
4. Explain the principles of monitoring instruments used for bio-medical application
5. Explain the need for health supporting systems

UNIT I

Human Physiology: Introduction to generalized medical instrumentation system, components of instrumentation system, physiological system of human body, cardiovascular system. Respiratory system, Nervous system, generation of bioelectric potentials, Action potential, resting potential, Neuronal communication.

UNIT II

Bio- Potential Electrodes, Transducers and Recorders: The electrode – electrolyte interface, Polarization, Ag/Agcl Electrodes, Body surface electrodes, Internal Electrodes. Transducers in general, PressureTransducers, Temperature transducers, pulse sensors, Basic recording systems.

UNIT III

Medical Imaging Systems: Basics of medical imaging systems, block diagrams and applications of - X-ray machine, Computer Tomography, Magnetic Resonance Imaging systems, Ultrasonic Imaging systems.

UNIT IV

Monitoring Systems: Basic principles of -Stethoscope, BP measuring Instrument, Electrocardiography(ECG), Electroencephalography(EEG) and Electromyography(EMG) recorders,

UNIT V

Supporting Systems: Basic principles of Pacemaker system, Transcutaneous Electrical Nerve stimulation (TENS), surgical diathermy, Heart lung machine, Hemo Dialysis, Lithotripsy.

TEXT BOOKS:

1. "Bio-Medical Instruments and Measurements", Cromwell, Prentice Hall of India, 1990.
2. "Bio-Medical Instrumentation", Dr.Arumugam, Anuradha Agencies, 1994.

REFERENCES BOOKS:

1. "Bio-Medical Electronics & Instrumentation", Prof.Venkataram.S.K, Galgotia Publications, 2000.
2. "Introduction to Bio Medical Equipment Technology", John. Can. Brown, Pearson Education of ASIA, 2001.
3. "Hand book of Bio-Medical Instrumentation", Khandpur.R.S, Tata McGraw –Hill, 1987

16ME4255– MATERIALS HANDLING

IV Year. B.Tech. EEE – II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives: Develop ability to

1. To know the working principle of earth moving equipment
2. To study types and working principle of conveying and hoisting equipment
3. To understand the working principle of concrete producing, concrete screening and concrete mixing equipment
4. To know the principle of pneumatic equipment and tools

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

CO1 Understand the basics of material handling systems by using earth moving equipments.
CO2 Understand working principles of various conveying systems used in industries.
CO3 Understand the process of aggregating the materials with crushers and screens.
CO4 Understand the working principles of pneumatic equipments.
CO5 Apply the various methods for cost minimization along with maintenances

UNIT – I

Introduction: Material handling principles; material handling equipment and material handling systems.
Earth moving and Excavation Equipment-Shovels, Dragline, Clam shell, Cable Excavator, Bucket Wheel Excavator, Tractor, Bull - dozer, Scraper, Earth compactors.

UNIT – II

Conveying Equipment: Belt Conveyor, Screw Conveyor, Bucket Conveyor, Aerial ropeway,
Hoisting Equipment: Hoist Winch, Differential and Worm geared chain hoists. Fork lift truck, Guyed derricks, Swing and non -swing mobile crane, Whirler crane, Tower crane.

UNIT – III

Aggregate and Processing Equipment: Crushers, Jaw, Gyratory, Hammer and Roll crushers; Screens: Stationary, Revolving, Shaking and Vibrating screens. Concrete mixers, Concrete pump. .

UNIT – IV

Pneumatic Equipment: Reciprocating air-compressor. Construction of pneumatic tools: Jack hammer, Paving breaker, Concrete vibrator and miscellaneous equipments.

UNIT – V

Cost minimization & Maintenance: Cost minimization methods of material handling- Maintenance of Material Handling Equipments, Safety in material handling, Ergonomics of Material Handling equipment.

TEXT BOOKS:

1. " Construction Planning, Equipment and Methods", Peurifoy R.L, McGraw Hill 6th Edn., 2008.
2. "Building and Civil Engineering Plant", Spence G and Wood C.L, John -Wiley & Sons, 2nd Edn., 2004.
3. "Construction Equipment & its Planning & Application", Metropolitan Book Co., 3rdEdn., 2009

REFERENCES BOOKS:

1. Operations Management, PB Mahapatra, PHI. January 2010.
2. James M. Apple, Plant Layout and Material Handling, John Wiley & Sons.2013.
3. Fred E. Meyers, Plant Layout and Material Handling, Prentice Hall, 25 January 1993.

16CE4256-DISASTER MITIGATION AND MANAGEMENT

IV Year. B.Tech. EEE – II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives: Develop ability to

1. Acquire knowledge on disasters and assess their impact.
2. Comprehend the monitoring techniques of disasters
3. Understand the issues and policies involved in the disaster management.
4. Evaluate the pre-disaster risk and vulnerability reduction strategies.
5. Assess the role of NGO's, Government bodies and Public in the disaster mitigation and Management.

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

CO 1: Explain the different types of disasters.
CO 2: Evaluate the impact of disasters on the community.
CO 3: Suggest a suitable monitoring technique for disasters.
CO 4: Recommend appropriate vulnerability reduction strategy and risk reducing techniques.
CO 5: Estimate the disaster infrastructure development and role of NGO's, Government bodies and Public in the disaster mitigation and management.

UNIT–I

Introduction: Meaning and Concept of Environmental hazards, Environmental Disasters and Environmental stress. Different approaches and relation with human Ecology - Landscape Approach – Ecosystem Approach – Perception approach – Human ecology and its application in geographical researches.

UNIT–II

Types of Environmental hazards & Disasters: Natural and Man induced. Natural Hazards – Planetary Hazards/ Disasters – Extra Planetary Hazards/ disasters – Planetary Hazards – Endogenous Hazards – Exogenous Hazards.

UNIT–III

Endogeneous Hazards/ Disasters: Volcanos –Earthquakes - Landslides – Earthquake Hazards/ disasters – Causes of Earthquakes – Distribution of Earthquakes – Hazardous effects of earthquakes – Earthquake Hazards in India – Human adjustment, perception & mitigation of earthquake.

UNIT–IV

Exogenous Hazards/ Disasters: Infrequent events – Cumulative atmospheric hazards/ disasters.
Infrequent events: Cyclones – Lightning – Hailstorms.
Cyclones: Tropical cyclones & Local storms – Destruction by tropical cyclones & local storms (causes, distribution, human adjustment, perception & mitigation)
Cumulative Atmospheric Hazards/ Disasters: Floods – Droughts – Cold waves – Heat waves. **Floods**: Causes of floods – Flood hazards – Flood control measures (Human adjustment, perception & mitigation).
Droughts: Impacts of droughts – Drought hazards in India – Drought control measures.

Extra Planetary Hazards/ Disasters – Man induced Hazards/ Disasters – Physical hazards/ Disasters – Soil Erosion.

Soil Erosion: Mechanics & forms of Soil Erosion – Factors & causes of soil erosion – Conservation measures of Soil Erosion.

Chemical Hazards/ Disasters: Release of toxic chemicals, nuclear explosion – Sedimentation processes:- Global Sedimentation problems – Regional Sedimentation problems – Sedimentation & Environmental problems – Corrective measures of Erosion & Sedimentation.

Biological hazards/ disasters: Population Explosion.

UNIT–V

Emerging approaches in Disaster Management – Three Stages

1) Pre-disaster stage (preparedness)
2) Emergency Stage
3) Post Disaster stage – Rehabilitation

TEXT BOOKS:

1. Manual on National Disaster Management Plan, National Disaster Management Authority, Ministry of Home affairs, Government of India (http://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf)
2. Disaster Management, Dr.Mrinalini Pandey, Wiley India Pvt Ltd., 2014.
3. Disaster Science and Management, Tushar Bhattacharya, McGraw Hill Education, 2015.

REFERENCE BOOKS:

1. Disaster Mitigation: Experiences and Reflections, PardeepSahni, PHI Learning, 2010.
2. Natural Hazards and Disasters, Donald Hyndman and David Hyndman, Cengage Learning, 2013.
3. Disaster Management Global Challenges and Local Solutions, Rajib, S and Krishna Murthy, R.R, Universities Press Hyderabad, 2012.
4. Earth and Atmospheric Disaster Management: Nature and Manmade,NavalePandharinath& C.K. Rajan, B.S. Publications, Hyderabad, 2009.
5. Disaster Risk Reduction in South Asia, Sahni and Pardeep, PHI learning Pvt Ltd, 2003.

16MA4257-ACTUARIAL STATISTICS

IV Year. B.Tech. EEE – II Semester

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives: Develop ability to

1. Determine present and future values of investment projects, annuities and be able to compute outstanding principal (capital) as well as interest using loan schedules.
2. Provide a motivation, based on a normative theory of individual behavior in the face of uncertainty, for the study of insurance models.
3. Measure the number of deaths (in general, or due to a specific cause) in a particular population, scaled to the size of that population, per unit of time.
4. Understand benefits of life insurance, various insurance policies, payments and premiums.
5. Predict future trends and patterns in the data behavior of processes or metrics over a period of time using time series models. Fit a model and proceed to forecasting and monitoring.

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

CO1. Assess financial loss and profit of an organization or in any business, shares.
CO2. Apply an economic theory that explains the mathematical expectation of the insured loss and profit.
CO3. Organize to assess various risks involved in terms of mortality, claims which can be received, profitability analysis for organization and individuals.
CO4. Analyze Life Insurance policies, Pension plans and Health Care Plans.
CO5. Apply time series models in Economic, Sales, Weather forecasting, Budgetary and Stock market analysis, Inventory and Utility studies etc.

UNIT-I

Financial mathematics: Rate of Interest; Normal and effective rates of interest and discount; Accumulated Value; Present value of cash flows; Valuing Cash Flows; Present Value Principals of compound interest; force of interest and discount compound interest; Annuities certain; Deferred annuities, Concepts of different annuities, annuities due, Redemption of Loans, Sinking Funds and Capital redemption assurance.

UNIT-II

Utility Theory: Insurance and Utility Theory; Models for Individual Claims and their sums; Approximations for the distribution of Sums; Application to Insurance; Survival function Time until-death for a person age x; Curate future life time.

UNIT-III

Mortality: Functions and laws of mortality tables; Select ultimate and aggregate mortality tables; Functions other than yearly policy Values; Surrender values and paid up Values; Bonus Special policies; Joint life and last survivor statuses; The Mortality tables.

UNIT-IV

Life Insurance and Premiums: Insurance payable at the moment's of death and at the end of the year of death-level benefit insurance; endowment insurance; differed insurance and varying benefit insurances;

recursions; commutation functions; Single payment.Net Premiums and Net Premium Reserves of insurance policies; Insurance policies with expenses and bonuses introduced; Gross premiums and Gross premium reserves of insurance policies.

UNIT-V

Time Series Analysis and Forecasting: Basic concepts of Time Series Analysis; Components of Time Series: Moving Averages, Exponential Smoothing, Autoregressive and Partial Autoregressive Functions; Forecasting Models: Moving/Autoregressive Moving Averages (MA,AR,ARMA and ARIMA); Prediction limits, Forecast Updating and Holt-Winter's Methods; Box-Jenkins Method of modeling.

TEXT BOOKS:

1. Actuarial Mathematics society of Actuaries, Itasca, IIIinos, USA Second Edition (1997), Newton.L.Bower, JR. Hanes.U. Gerber, James .C.Hickman, Donald. A.Jones and Cecil .J.Nesbitt (1986).
2. Actuarial Statistics: An Introduction Using R (2009) by Shailaja R. Deshmukh, Universities Press; Third edition

REFERENCE BOOKS:

1. Introduction to Time Series Analysis and Forecasting, Cheryl L. Jennings, Douglas C. Montgomery, and Murat Kulahci
2. An Introduction to Actuarial Mathematics, Springer-Science+Bussiness Media Dordrecht (2002),A.K.Gupta and T.Varga.
3. Fundamentals of Actuarial Mathematics, Second Edition, S. David Promislow
4. Life Contingencies, Spurgeon E.T. (1972), Cambridge University Press
5. Time series analysis, forecasting and control Book by George E. P. Box