GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)
(Approved by AICTE, Permanently Affiliated to JNTUH, Accredited by NAAC with 'A' Grade)
Cheeryal (V), Keesara (M), Medchal Dist., Telangana - 501 301

PROGRAM STRUCTURE
AND
DETAILED SYLLABUS (Volume-II)

ELECTRONICS AND COMMUNICATION ENGINEERING

FOR

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

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)
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GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

B.Tech. ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAM 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	Tot	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**

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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	SEE	Tot	C
1.	16EN1201	English – II	HS	2	-	-	30	70	100	2
2.	16PH1201	Applied 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.	16PH12L1	Applied 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 (ITWS) / Engineering Workshop (EWS)	ES	-	-	3	30	70	100	2
TOTAL				**15**	**2**	**14**	**300**	**700**	**1000**	**24**

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

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

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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.	16EC2101	Electronic Devices and Circuits	PC	4	1	-	30	70	100	4
3.	16EC2102	Theory of Signals and Systems	PC	4	1	-	30	70	100	4
4.	16EC2103	Switching Theory and Logic Design	PC	3	1	-	30	70	100	3
5.	16EE2103	Electrical Circuits and Electrical Technology	ES	4	1	-	30	70	100	4
6.	16EC21L1	Electronic Devices and Circuits Lab	PC	-	-	3	30	70	100	2
7.	16EC21L2	Simulation lab-I	PC	-	-	3	30	70	100	2
8.	16EE21L2	Electrical Engineering Lab	ES	-	-	3	30	70	100	2
TOTAL				**18**	**5**	**9**	**240**	**560**	**800**	**24**

SECOND YEAR SEMESTER – II

S.No	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.	16EC2201	Pulse, Digital and Switching Circuits	PC	3	1	-	30	70	100	3
2.	16EC2202	Electronic Circuit Analysis	PC	3	1	-	30	70	100	3
3.	16EC2203	Electromagnetic Theory and Transmission Lines	PC	4	1	-	30	70	100	4
4.	16EC2204	Analog Communications	PC	3	1	-	30	70	100	3
5.	16CH2201	Environmental Studies	HS	3	-	-	30	70	100	3
6.	16EC22L1	Electronic Circuits and Pulse Circuits Lab	PC	-	-	3	30	70	100	2
7.	16EC22L2	Analog Communications Lab	PC	-	-	3	30	70	100	2
8.	16EC22L3	Simulation Lab-II	PC	-	-	3	30	70	100	2
9.	16HS22L1	Gender Sensitization	HS	-	-	3	30	70	100	2
TOTAL				**16**	**4**	**12**	**270**	**630**	**900**	**24**

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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.	16EC3101	Linear and Digital IC Applications	PC	4	1	-	30	70	100	4
2.	16EC3102	Microprocessors and Microcontrollers	PC	3	1	-	30	70	100	3
3.	16EC3103	Antennas and wave Propagation	PC	4	-	-	30	70	100	4
4.	16MB3101	Management Science	HS	3	-	-	30	70	100	3
5.	**Open Elective – I**		OE	3	-	-	30	70	100	3
	16MB3121	Intellectual Property Rights								
	16EE3122	Industrial Safety and Hazards								
	16CS3123	JAVA Programming								
	16ME3125	Nano Materials and Technology								
	16CE3126	Global Warming and Climate Change								
6.	16EC31L1	Microprocessors and Microcontrollers Lab	PC	-	-	3	30	70	100	2
7.	16EC31L2	IC Applications and HDL Simulation Lab	PC	-	-	3	30	70	100	2
8.	16EN31L1	Advanced English Communication Skills Lab	HS	-	-	3	30	70	100	2
9.	16MA31P1	Logical Reasoning	BS	-	-	2	30	70	100	1
TOTAL				**17**	**2**	**11**	**270**	**630**	**900**	**24**

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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.	16EC3201	Digital Signal processing	PC	3	1	-	30	70	100	3
2.	16EC3202	Digital Communications	PC	3	1	-	30	70	100	3
3.	16EC3203	Control Systems Engineering	PC	3	1	-	30	70	100	3
4.	**Professional Elective – I**		PE	3	1	-	30	70	100	3
	16EC3204	Electronic Instrumentation and Measurements								
	16EC3205	Telecommunication Switching Systems and Networks								
	16EC3206	Digital Systems Design								
5.	**Professional Elective – II**		PE	3	1	-	30	70	100	3
	16EC3207	Optical Communications								
	16EC3208	Computer Architecture and Organization								
	16CS3212	Computer Networks								
6.	**Soft Core – I**		SC	3	-	-	30	70	100	3
	16EC3209	Digital Design through Verilog HDL								
	16EC3210	VLSI Design								
7.	16EC32L1	Digital Signal Processing Lab	PC	-	-	3	30	70	100	2
8.	**Soft Core - I lab**		SC	-	-	3	30	70	100	2
	16EC32L2	Digital Design through Verilog HDL Lab								
	16EC32L3	VLSI Lab								
9.	16MB32P1	Human Values and Professional Ethics	HS	-	-	3	30	70	100	2
TOTAL				**18**	**5**	**9**	**270**	**630**	**900**	**24**

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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.	16EC4101	Microwave Engineering	PC	3	1	-	30	70	100	3
2.	16EC4102	Cellular and Mobile Communications	PC	3	1	-	30	70	100	3
3.	**Professional Elective – III**									
	16EC4103	Digital Signal processors and Architecture	PE	3	-	-	30	70	100	3
	16EC4104	Satellite Communications								
	16EC4105	Digital Image Processing								
4.	**Soft Core – II**									
	16EC4106	Embedded Systems	SC	3	-	-	30	70	100	3
	16CS4115	Android Application Development								
5.	**Open Elective – II**									
	16MB4131	Supply Chain management	OE	3	-	-	30	70	100	3
	16CS4132	Knowledge Management								
	16EE4133	Energy Conservation and Management								
	16ME4135	Manufacturing Processes								
	16CE4136	Building Technology								
6.	**Open Elective – III**									
	16MB4141	Banking and Insurance	OE	3	-	-	30	70	100	3
	16CS4142	Database Systems								
	16EE4143	Micro-Electro-Mechanical 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								
7.	16EC41L1	Microwave Engineering And Digital Communications Lab	PC	-	-	3	30	70	100	2

8.	**Soft core Lab – II**		SC	-	-	3	30	70	100	2
	16EC41L2	Embedded Systems Lab								
	16CS41L3	Android Application Development Lab								
9.	16EC4107	Industry oriented mini-project	CC	-	-	-	-	100	100	1
10.	16EC4108	Major Project Seminar	CC	-	-	2	100	-	100	1
TOTAL				**18**	**2**	**8**	**340**	**660**	**1000**	**24**

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**		PE	3	-	-	30	70	100	3
	16EC4201	Wireless Communication Networks								
	16EC4202	Radar Systems								
	16CS4208	Big Data								
3.	**Open Elective – IV**		OE	3	-	-	30	70	100	3
	16MB4251	Entrepreneurship								
	16CS4252	Web Development								
	16EE4253	Renewable Energy Sources								
	16ME4255	Materials Handling								
	16CE4256	Disaster Mitigation and Management								
	16MA4257	Actuarial Statistics								
4.	16EC4203	Major Project	CC	-	-	15	30	70	100	10
5.	16EC4204	Technical Seminar	CC	-		2	100	-	100	1
6.	16EC4205	Comprehensive Viva	CC	-	-	-	-	100	100	3
TOTAL				**10**	**0**	**17**	**220**	**380**	**600**	**24**

OPEN ELECTIVES

(Open Elective course offered by a department SHOULD NOT be taken by the students of the same department)

Open Elective I

S. No.	Course Title	Course Code
21	Intellectual Property Rights (MBA)	16MB3121/16MB3221
22	Industrial Safety and Hazards (EEE)	16EE3122/16EE3222
23	JAVA Programming (CSE)	16CS3123/16CS3223
24	Electronic Measuring Instruments (ECE)	16EC3124/16EC3224
25	Nano Materials and Technology (ME)	16ME3125/16ME3225
26	Global Warming and Climate Change (CE)	16CE3126/16CE3226

Open Elective II

S. No.	Course Title	Course Code
31	Supply Chain Management (MBA)	16MB3231/16MB4131
32	Knowledge Management (CSE)	16CS3232/16CS4132
33	Energy Conservation and Management (EEE)	16EE3233/16EE4133
34	Basics of Communication Systems(ECE)	16EC3234/16EC4134
35	Manufacturing Processes (ME)	16ME3235/16ME4135
36	Building Technology (CE)	16CE3236/16CE4136

Open Elective III

S. No.	Course Title	Course Code
41	Banking and Insurance (MBA)	16MB3241/16MB4141
42	Database Systems (CSE)	16CS3242/16CS4142
43	Micro-electro-mechanical Systems(EEE)	16EE3243/16EE4143
44	Principles of Wireless Communication Systems (ECE)	16EC3244/16EC4144
45	Aspects of Heat Transfer in Electronically Controlled Units(ME)	16ME3245/16ME4145
46	Green Buildings (CE)	16CE3246/16CE4146
47	Foreign Language – French	16EN3247/16EN4147
48	Foreign Language –Spanish	16EN3248/16EN4148
49	Foreign Language –German	16EN3249/16EN4149

Open Elective IV

S. No.	Course Title	Course Code
51	Entrepreneurship (MBA)	16MB4251
52	Web Development (CSE)	16CS4252
53	Renewable Energy Sources (EEE)	16EE4253
54	Biomedical Instrumentation (ECE)	16EC4254
55	Materials Handling (ME)	16ME4255
56	Disaster Mitigation and Management (CE)	16CE4256
57	Actuarial Statistics (S&H)	16MA4257

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16EC4101 - MICROWAVE ENGINEERING

IV Year. B.Tech. ECE- I Semester

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

Prerequisite: 16EC2203 – Electromagnetic Theory and Transmission Lines

Course Objectives: Develop ability to

1. Understand the electrical characteristics of waveguides and microstrip lines.
2. Understand the working principles of various microwave components in terms of scattering parameters.
3. Understand the generation of microwave signal using microwave tubes and solid state devices.
4. Understand the methods of measuring various characteristics of Microwave devices and components.

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

CO1: Explain the operation of rectangular waveguides, cavity resonators and micro strip lines, their mode characteristics at various frequency bands for communication systems.

CO2: Explain microwave coupling mechanisms and apply S-matrix properties to analyze the characteristics of microwave components.

CO3: Explain the operation of Reflex Klystron oscillator and Two cavity klystron amplifier and derive expressions for their output power and efficiency.

CO4: Explain the operation of Magnetron Oscillator and TWT amplifier.

CO5: Explain the operation of various microwave solid state devices and measurement of various parameters of Microwave devices and components.

UNIT – I : Wave Guides and Micro-Strip Lines

Wave Guides: Introduction, Microwave frequencies, Microwave Devices, Microwave systems. Rectangular Waveguides – solutions of wave equations in Rectangular Coordinates, TE modes in rectangular wave guides, TM modes in rectangular waveguides, Impossibility of TEM mode, Power transmission in rectangular wave guides, Power losses in rectangular wave guides.

Micro-Strip Lines: Introduction, Characteristic impedance of Micro strip lines, Losses in Micro strip lines, Quality factor of Micro strip lines.

UNIT – II : Microwave Components

Cavity Resonators: Introduction, Expression for f_0 in a Rectangular Cavity resonator, Applications of Cavity resonator, Quality factor of cavity resonators, Reentrant cavities.

Waveguide Components: Introduction, Waveguide microwave junctions and Scattering parameters: E-plane Tee, H-Plane Tee, Magic Tee, Rat Race Junction, Directional couplers. Waveguide Joints, Wave guide bends, Corners, Transitions and Twists, Waveguide Irises, Posts and tuning screws, Coupling Probes, Coupling Loop, waveguide terminations.

Ferrite Devices: Faraday Rotation in ferrites, Microwave devices which uses faraday rotation - Gyrator, Isolator and Circulator.

UNIT – III : Microwave Tubes-I

Introduction and limitations of Conventional Vacuum triodes, Tetrodes and Pentodes at Microwave frequencies (Qualitative treatment only).

Linear beam Tubes (O-Type): Klystron amplifiers - Velocity Modulation Process, Bunching Process, Output power and beam loading. Multicavity Klystron Amplifiers, Reflex Klystron - Velocity Modulation, Power Output and Efficiency, Electronic admittance.

UNIT – IV : Microwave Tubes-II

Helix TWTs – Slow wave structures, Amplification Process, Convection current, Axial electric field, Wave Modes, Gain Considerations.

Microwave Crossed – Field tubes (M-Type): Introduction, Magnetron oscillators, Cylindrical Magnetron, Linear Magnetron, Forward-Wave Crossed-Field Amplifier.

UNIT – V : Solid State Microwave Devices and Microwave Measurements

Solid State Microwave Devices: Transferred Electron Devices – Introduction, Gunn effect diodes – GaAs diode, Ridley – Watkings – Hilsum (RWH) Theory, Modes of operation, Microwave generation and amplification. Avalanche Transit Time Devices – Introduction, IMPATT, TRAPATT, BARITT diodes.

Microwave Measurements: Microwave Bench general measurement setup, Frequency measurement, Measurement of Power, Attenuation Measurement, Measurement of VSWR, Measurement of Impedance, Measurement of Q of a cavity resonator.

TEXT BOOKS:

1. Samuel Y. Liao , "Microwave Devices and Circuits", PHI, 3rd Edition, 2003.
2. M. Kulkarni, "Microwave and Radar Engineering", Umesh Publications, 1998

REFERENCES:

1. M.L. Sisodia and G.S. Raghuvanshi, "Microwave Circuits and Passive Devices", Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
2. Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, "Microwave Principles", CBS Publishers and Distributors, New Delhi, 2004.

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16EC4102 - CELLULAR AND MOBILE COMMUNICATIONS

IV Year B.Tech. ECE- I Semester

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

Prerequisite(s): 1) 16EC3103 - Antennas and Wave Propagation
2) 16EC3202 - Digital Communications

Course Objectives: Develop ability to

1. Understand basics of cellular system, their generations and characteristics of mobile communications.
2. Understand co-channel and non-cochannel interferences in mobile communications and their mitigation techniques.
3. Understand the coverage prediction models for different geographical environments (Over water, point-to-point, flat terrain and so on) and antenna requirements at cell-site and mobile to improve cell coverage.
4. Understand operational techniques and technologies used in cellular mobile Communication systems to increase traffic capacity.
5. Understand types of handoff mechanism in handling calls in cellular systems, evaluation of dropped calls and intelligent cell concepts like micro cells, MIMO and CDMA and their applications.

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

CO1. Explain the cellular system basics, their generations and characteristics of mobile communications.
CO2. Distinguish between the co-channel and non-cochannel interferences, determine the required C/I ratio and propose analytic solutions to reduce the effect of these interferences.
CO3. Evaluate various propagation path-loss models in different geographical environments (Over water, point-to-point, flat terrain and so on) and requirements for cell-site and mobile antennas to improve cell coverage.
CO4. Explain concepts of various assignment schemes and methods to increase traffic capacity.
CO5. Explain types of Handoff strategies; compute associated QoS parameters and Intelligent cell concepts.

UNIT – I : Introduction to Cellular Mobile Systems

History of mobile Cellular – AMPs System (First-Generation System), Second-Generation system, 3G systems, 4G systems, Spectrum allocation, Basic Cellular Systems – Circuit switched and Packet Switched systems, Uniqueness of Mobile Radio

Environment – Description of Mobile Radio Transmission Medium, Model of Transmission Medium, Mobile Fading Characteristics, Active Scattering Region, Standing waves statistics of fading, Delay spread and Coherence Band Width, Noise level in Cellular Frequency Band, Amplifier Noise.

Concept of Frequency Reuse Channels, Co-channel interference Reduction factor, Desired C/I from a normal case in an Omni-directional Antenna system, Handoff Mechanism, cell splitting and Diversity schemes.

UNIT – II : Co-Channel and Non-Co-channel Interference Reduction

Co-channel interference: Exploring co-channel interference areas in a system, Real-Time measurement at mobile Radio Trans receivers, Design of an Omnidirectional antenna system in the worst case, Design of Directional antenna system, Lowering Antenna Height, Reduction of co-channel interference by means of notch in tilted antenna pattern, Umbrella pattern effect and Diversity Receiver.

Non Co-channel Interference: SINAD, Adjacent Channel Interference, Near-End-Far-End Interference, Effect on Near-end mobile units and Cross talk.

UNIT – III : Cell Coverage and Antennas

General introduction, Obtaining the Mobile Point-to-Point Model (Lee Model), Propagation over water or flat open area, Foliage loss, Propagation in near-in distance, long distance propagation, Obtain path loss from a Point-to-Point Prediction Model (General approach) and its form.

Cell-site and Mobile Antennas: Antennas at cell-site, unique situations of cell-site antennas and mobile antennas.

UNIT – IV : Operational techniques and technologies

Adjusting the parameters of a system**,** Fixed Channel assignment schemes, Non Fixed Channel assignment algorithms, Coverage hole filter, Cell Splitting, and small cells (Micro cells), Narrow Beam concept.

UNIT – V : Hand-Off, Dropped Calls and Intelligent Cell Concepts

Value of Implementing Handoffs, Initiation of a Hard Handoff, Delaying a Handoff, Forced Handoffs, Queuing of Handoffs, Power difference Handoffs, MAHO and Soft Handoff, Intersystem Handoff. Introduction to Dropped call rates and formula of dropped call rates.

Intelligent Cell Concept: Intelligent cell concept, Applications of intelligent microcell systems, CDMA Cellular Radio Network and MIMO.

TEXT BOOKS:

1. William C.Y. Lee, "*Wireless and Cellular Telecommunications",* 3rd International ed., McGraw Hill, 2006.
2. Theodore S Rappaport, "*Wireless Communications Principles and Practice"*, 2nd ed., Prentice Hall PTR, 2002.

REFERENCE BOOKS:

1. William C.Y. Lee, "*Mobile Communications Design Fundamentals"*, 2nd ed., Wiley Student Edition (WSE), 2011.
2. Gordon L. Stuber, "*Principles of Mobile Communication"*, 3rd ed., Springer, 2011.

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16EC4103 – DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

(Professional Elective-III)

IV Year. B.Tech. ECE- I Semester

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

Prerequisite(s): 1) 16EC3102 - Microprocessors and Microcontrollers
2) 16EC3201 – Digital Signal Processing

Course Objectives: Develop ability to

1. Learn the architectural differences between Digital Signal Processor and General purpose processor.
2. Understand the operation of commercial DSP Processors (TMS320C54xx, AD2100 family and Blackfin).
3. Understand various basic algorithms for DSP Processors.
4. Understand method of interfacing memory and I/O peripherals with programmable DSP devices.

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

CO1. Explain the basics of the Digital Signal Processing and the architecture of programmable DSP devices.
CO2. Explain the operation of TMS320C54 processing units.
CO3. Explain the operation and the features of Analog DSP devices and the Blackfin processors.
CO4. Develop various signal processing algorithms on DSP processors.
CO5. Interface memory and I/O peripherals to programmable DSP devices.

UNIT- I : Architecture for Programmable DSP Devices

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues.

UNIT – II : Programmable Digital Signal Processors

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT – III : DSP Devices Of Other Manufacturers

Analog Devices Family of DSP Devices, ALU Block Diagram in 2100 ADSP, MAC Block Diagram for AD2100 Family of DSP, Shifter Instruction - Base Architecture of AD2100, ADSP2181 high performance Processor.

Introduction to Blackfin Processor – The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Blackfin Processor, Architecture: Hardware Processing Units and Register files, Bus Architecture and Memory, Basic Peripherals.

UNIT – IV : Implementation of Basic DSP Algorithms

The Q-notation, Overview of FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, An FFT Algorithm for DFT Computation, and Butterfly Computation. Overflow and scaling, Bit Reversed index generation, an 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT – V : Interfacing Memory and I/O Peripherals

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, "Digital Signal Processing", Cengage Learning, 2004.
2. K Padmanabhan, S Ananthi and R Vijayarajeswaran, "A Practical Approach to Digital Signal Processing", New Age International publishers, 2001/2013.
3. Woon-Seng Gan, Sen M. Kuo, "Embedded Signal Processing with the Micro Signal Architecture", John Wiley & Sons, IEEE Press, 2007.

REFERENCE BOOKS:

1. B. Venkataramani and M. Bhaskar, "Digital Signal Processors: Architecture, Programming and Applications", Tata McGraw-Hill, 2002.
2. Jonathan Stein, "Digital Signal Processing: A Computer Science Perspective", John Wiley & Sons, 2005.

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16EC4104-SATELLITE COMMUNICATIONS

(Professional Elective - III)

IV Year. B.Tech. ECE-I Semester

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

Prerequisite(s): 1) 16EC3202 - Digital Communications
2) 16EC3103 – Antennas and Wave propagation

Course Objectives: Develop ability to

1. Understand the basics of orbital mechanics, frequency bands and launch vehicles for satellite communication systems.
2. Understand the operations of various sub-systems of communication satellites.
3. Understand the basic transmission theory for design of satellite link.
4. Understand various propagation effects and multiple access techniques for satellite-earth links.
5. Understand the principles of Global Positioning System and algorithms for satellite packet communication.

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

CO1. Explain the basics of orbital mechanics, frequency bands and launch vehicles for satellite communication systems.
CO2. Explain the operations of various sub-systems of communication satellites.
CO3. Explain the basic transmission theory and design of satellite link for C, Ka and Ku bands.
CO4. Explain various propagation effects and multiple access techniques for satellite-earth links.
CO5. Explain the principles of Global Positioning System and algorithms for satellite packet communication.

UNIT – I : Elements of Satellite Communication System

Brief history of satellite communications, overview of satellite communications, Orbital mechanics, Look Angle determination, Orbital Perturbations, Launches and Launch Vehicles.

UNIT – II : Satellite Sub-Systems

Satellite Sub-Systems, Attitude and Orbit Control system, TTC &M subsystem, Attitude Control subsystem, Power systems, Communication subsystems, Satellite Antennas, Equipment Reliability and Space Qualification.

UNIT – III : Satellite Link Design

Basic transmission theory, System noise temperature and G/T ratio, Design of D-downlinks, Uplink design, Design of satellite links for a specified C/N and C/I Values in satellite links.

UNIT – IV : Propagation Effects and Multiple Access Techniques

Propagation Effects: Propagation effects that are not associated with Hydrometeors, Rain and Ice effects, Propagation Impairment Countermeasures.

Multiple Access Techniques: Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Onboard Processing, Demand Assignment Multiple Access (DAMA), Random Access, Packet Radio Systems and Protocols, Code Division Multiple Access (CDMA).

UNIT –V: Satellite Navigation and Packet Communications

Satellite Navigation: Radio and satellite navigation, GPS position location principles, GPS receivers and codes, satellite signal acquisition, GPS navigation message, GPS signal levels, Timing accuracy, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

Satellite Packet Communications: Message transmission by FDMA: MI G/i Queue, Message transmission by TDMA, PURE ALOHA-Satellite Packet switching, Slotted aloha, Packet reservation.

TEXT BOOKS

1. Timothy Pratt, Charles Bostian, Jeremy Allnutt, "Satellite Communications", 2nd Edition, 2003, John Wiley & Sons.
2. Tri T–Ha, "Digital Satellite Communications", 2nd Edition, 1990, McGraw Hill.

REFERENCE BOOKS

1. D.C. Agarwal, "Satellite Communications", Khanna Publications, 5th edition
2. Dennis Roddy, "Satellite Communications", 2nd Edition, 1996, McGraw Hill.
3. M. Richcharia, "Satellite Communications - Design Principles",2nd Ed., BSP, 2003.

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16EC4105 - DIGITAL IMAGE PROCESSING

(Professional Elective-III)

IV Year B.Tech. ECE- I Semester

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

Prerequisite: 16EC3201- Digital Signal processing

Course Objectives: Develop ability to

1. Understand fundamentals of digital image processing and image transforms.
2. Demonstrate digital image processing techniques in spatial and frequency domains.
3. Compare various image compression algorithms.
4. Understand advanced image analysis methods: image segmentation
5. Understand advanced image analysis methods: morphological image processing and image restoration.

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

CO1: Explain various methods of acquiring and representing a digital image, 2-D Fourier Transforms.
CO2: Apply various intensity based image processing techniques to enhance quality of image.
CO3: Explain various image segmentation techniques.
CO4: Explain various image compression algorithms.
CO5: Restore the image from degradations.

UNIT – I : Digital Image Fundamentals and Image Transforms

Fundamental Steps in Digital Image Processing, Image Sampling and Quantization, Relationships between Pixels.

Image Transforms: 2-D DFT, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform and their Properties, Introduction to Continuous wavelet Transform and Discrete wavelet Transform.

UNIT – II : Image Enhancement

Spatial Domain: Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operations, Histogram Manipulation, Linear and Non-Linear Gray Level Transformations, Local or Neighborhood Operation, Median Filter, Spatial Domain High-Pass Filtering.

Frequency Domain: Frequency Domain Filtering Fundamentals, Correspondence between Filtering in the Spatial and Frequency Domains. Image Smoothing Filters, Image Sharpening, Homomorphic Filtering.

UNIT – III : Image Segmentation

Fundamentals, Point, Line and Edge Detection, Global processing using Hough Transform, Thresholding, Region Based segmentation.

UNIT – IV : Image Compression

Fundamentals, Fidelity Criteria, Image Compression Models, Coding Redundancy , Basic Compression Methods, Huffman Coding, Arithmetic Coding, LZW Coding Run-Length Coding, Bit-Plane Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Block Transform Coding, JPEG .

UNIT – V : Image Restoration and Reconstruction

Image Degradation Model/Restoration process, Restoration in the Presence of Noise-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of the Degradation Function, Inverse Filtering, Minimum Mean Square Error(Wiener) Filtering, Constrained Least Squares Filtering, Iterative Method of Image Restoration.

Morphological Image Processing: Erosion and Dilation, Opening and Closing, The Hit or Miss Transformation, Some Basic Morphological Algorithms.

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", 3rd Edition, Pearson, 2008.
2. S Jayaraman, S Esakkirajan, "Digital Image Processing", TMH, 2010.

REFERENCE BOOKS

1. William K. Pratt," Digital Image Processing", 3rd Edition, John Willey, 2004.
2. Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, " Digital Image Processing using MATLAB", 2nd Edition, TMH, 2010.
3. A. K. Jain," Fundamentals of Digital Image Processing", PHI, 1989.

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16EC4106 - EMBEDDED SYSTEMS

(Soft Core-II)

IV Year. B.Tech. ECE- I Semester

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

Prerequisite(s): 1) 16EC3102 - Microprocessors and Microcontrollers
2) 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, the 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.

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16CS4115 - ANDROID APPLICATION DEVELOPMENT
(Soft Core - II)

IV Year. B.Tech. ECE – I SEMESTER

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

Prerequisite(s): None

Course Objectives: Develop ability to

1. Understand the architecture of mobile software applications and mobile development frameworks and tools.
2. Use XML and UML for mobile computing
3. Understand generic user interface development, mobile GUIs, VUIs and their applications and various technologies involved.
4. Understand the process of modelling multichannel and multimodal user interfaces using UML
5. Understand mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

Course Outcomes: After completion of the course, the student would be able to

CO1. Describe the architecture of mobile software applications and mobile development frameworks and tools.
CO2. Model various components of mobile computing using XML and UML.
CO3. Identify various technologies related to generic user interface development, mobile GUIs, VUIs and their applications
CO4. State the process of modelling multichannel and multimodal user interfaces using UML
CO5. Identify and overcome mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

UNIT-I : Introduction

Mobile computing-Introduction, added dimension of mobile computing, condition of the mobile user, architecture of mobile software applications.

Mobile Development Frameworks and Tools: Introduction, fully centralized frameworks and tools, N-tier client-server frameworks and tools, Java, BREW, Windows CE, WAP, Symbian EPOC, publishing frameworks, other tools.

UNIT-II : XML

Introduction, XML web services, key XML technologies for mobile computing, XML and UML, putting XML to work.

UML: Introduction, user view, structural view, behavioural view, implementation view: component diagrams,

UNIT-III : Generic User Interface Development

Introduction, user interface development, building generic user interfaces, using UML for modelling generic user interface components, XForms, putting it all to work.

Developing Mobile GUIs: Introduction, WAP, J2ME, BREW and Microsoft platforms for mobile GUIs.

UNIT-IV : VUIs and Mobile Applications

Introduction, qualities of speech, voice transcription, voice recognition, text-to-speech technologies: converting written language to spoken language.

Multichannel and Multimodal User Interfaces: Introduction, modelling multichannel and multimodal applications with UML, multimodal content, software and system architectures for delivering multimodality, internationalization and localization, the evolving definition of multimodality.

UNIT-V : The Mobile Development Process

Introduction, back to the dimensions of mobility, applying the wisdom methodology to mobile development, UML-based development cycle for mobile applications.

Architecture, Design and Technology Selection for Mobile Applications: Introduction, practical concerns with architectures, architectural patterns for mobile applications.

Mobile Application Development Hurdles: Introduction, voice user interface hurdles, hurdles with multimodal applications, problems with building location based applications, power use.

TEXT BOOKS

1. Reza B'Far, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University Press, 2005.

REFERENCE BOOKS

1. Wei Meng Lee, "Beginning Android Application Development", Wiley Publishing Inc, 2011.
2. Jeff McWherter, Scott Gowell, "Professional Mobile Application Development", John Wiley & Sons, Inc, 2012.

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16MB4131-SUPPLY CHAIN MANAGEMENT
(Open Elective-II)

IV Year. B.Tech. ECE – I SEMESTER

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

Pre requisites: None

Course Objectives: Develop ability to

1. Distinguish the different functional areas in businesses management; understand the cross functional integrations and map supply chains of various business sectors.
2. Identify different types of distribution/ modes of transport/ network design.
3. Analyze the operational issues in SCM.
4. Recognize the drivers of supply chain.
5. Interpret the importance of relationships with suppliers and customers.

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

CO1. Understand the role of an Engineer as well as Manager in Supply chain Management.
CO2. Appreciate the importance of logistics in integrating different functional areas.
CO3. Integrate operations with functional areas.
CO4. Visualize the role of logistics and distribution as supply chain drivers
CO5. Understand the importance of supplier and customer relationship management.

UNIT – I : Introduction to Supply Chain Management

Understanding the Supply Chain, Supply Chain Performance: Achieving Strategic Fit and Scope including: Customer and Supply Chain Uncertainty, Competitive and Supply Chain Strategies, Product development strategy, Marketing and sales strategy, Supply chain strategy, Scope of strategic fit; Supply Chain Drivers and Metrics.

UNIT – II : Logistics Management

Designing distribution networks and applications to e-Business, Network design in the Supply Chain, Designing global supply chain, network design, 3 PL, 4 PL, Transportation in supply chain management.

UNIT – III : Planning and Managing Inventories

Managing Economies of Scale in a Supply Chain: Cycle Inventory, Managing Uncertainty in a Supply Chain: Safety Inventory, Determining the Optimal Level of Product Availability. Demand Forecasting in a Supply Chain, Aggregate Planning in a Supply Chain, Sales and Operations Planning: Planning Supply and Demand in a Supply Chain, Coordination in a Supply Chain. E- Procurement, Global alliances.

UNIT - IV: Managing Cross-Functional Drivers in a Supply Chain

Importance of sourcing decisions in Supply Chain Management, Price and Revenue management, role of Information Technology in a Supply Chain, Sustainability and the Supply Chain. Customer Relationship management.

UNIT – V : Logistics and Supply Chain Relationships

Identifying logistics performance indicators- channel structure- economics of distribution- channel relationships- logistics service alliance. Managing global logistics and global supply chains: Logistics in a global economy- Views of global logistics- global operating levels interlinked global economy. Global supply chain, Supply chain management in Global environment Global strategy- Global purchasing- Global logistics- Global alliances- Issues and Challenges in global supply chain management.

TEXT BOOKS

1. Sunil Chopra, Peter Meindle, D.V Kalra, "Supply Chain Management", 6/e, Pearson.
2. Donald J. Bowersox and David J. Closs, "Logistics Management: The Integrated Supply Chain Process", TMH, 2006.
3. Sridhara Bhat, "Logistics and Supply Chain Management", EXCEL, 2009.

REFERENCE

1. Jeffrey Liker, "The Toyota Way Paperback".

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16CS4132 - KNOWLEDGE MANAGEMENT
(Open Elective - II)

IV Year. B. Tech. ECE- I Semester

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

Pre requisites: None

Course Objectives: Develop ability to

1. Understand Knowledge Management systems for access and coordination of knowledge assets.
2. Understand technologies namely, intranets, groupware, weblogs, instant messaging, content management systems and email in both individual and organizational contexts.
3. Use case studies, research methods of knowledge organization.

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

CO1. Evaluate and implement Knowledge Management Systems to facilitate individual and group work.
CO2. Develop a thorough review of Knowledge Management concepts, both historical and speculative.
CO3. Originate and distribute research on a Knowledge Management System topic.
CO4. Analyze and design KM processes and systems.

UNIT – I : Knowledge Management

KM Myths – KM Life Cycle – Understanding Knowledge – Knowledge, intelligence – Experience – Common Sense – Cognition and KM – Types of Knowledge – Expert Knowledge – Human Thinking and Learning.

UNIT – II : Knowledge Management System Life Cycle

Challenges in Building KM Systems – Conventional Vs KM System Life Cycle (KMSLS) – Knowledge Creation and Knowledge Architecture – Nonaka's Model of Knowledge Creation and Transformation. Knowledge Architecture.

UNIT – III : Capturing Knowledge

Evaluating the Expert – Developing a Relationship with Experts – Fuzzy Reasoning and the Quality of Knowledge – Knowledge Capturing Techniques, Brain Storming – Protocol Analysis – Consensus Decision Making – Repertory Grid- Concept Mapping – Black boarding.

UNIT – IV : Knowledge Codification

Modes of Knowledge Conversion – Codification Tools and Procedures – Knowledge Developer's Skill Sets – System Testing and Deployment – Knowledge Testing – Approaches to Logical Testing, User Acceptance Testing – KM System Deployment Issues – User Training – Post implementation.

UNIT – V : Knowledge Transfer and Sharing

Transfer Methods – Role of the Internet – Knowledge Transfer in e-world – KM System Tools – Neural Network – Association Rules – Classification Trees – Data Mining and Business Intelligence – Decision Making Architecture – Data Management – Knowledge Management Protocols – Managing Knowledge Workers.

TEXT BOOK

1. Elias.M. Award & Hassan M. Ghaziri – "Knowledge Management" Pearson Education.

REFERENCE BOOKS

1. Guus Schreiber, Hans Akkermans, AnjoAnjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management", Universities Press, 2001.
2. C.W. Holsapple, "Handbooks on Knowledge Management", International Handbooks on Information Systems, Vol 1 and 2, 2003.

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16EE4133–ENERGY CONSERVATION AND MANAGEMENT
(Open Elective - II)

IV Year. B.Tech. ECE – I Semester

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

Prerequisite: None

Course Objectives: Develop ability to

1. Understand different basic terms related to Indian Energy Scenario and Energy Conservation Act.
2. Understand the principles of energy conservation, audit and management.
3. Understand energy conservation in different mechanical utilities.
4. Understand efficient heat and electricity utilization, saving and recovery in different thermal and electrical systems.
5. Understand different basic terms related to Energy economy, Financial Management and to understand the role of Energy Service Companies.

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

CO1. Perform energy accounting and balancing
CO2. Prepare energy audit report for different energy conservation instances.
CO3. Suggest energy saving methodologies.
CO4. Evaluate the energy saving and conservation in different mechanical utilities.
CO5. Evaluate the energy saving and conservation in different electrical utilities.

UNIT-I: Energy Scenario, Conservation Act and related policies

Classification of Energy, Indian energy scenario, Sectorial energy consumption(domestic, and other sectors), energy needs of growing economy, energy intensity, long term energy scenario, energy pricing, energy security, energy conservation and its importance, energy strategy for the future. Energy conservation Act 2001 and its features, notifications under the Act, Schemes of Bureau of Energy Efficiency (BEE) including Designated consumers, State Designated Agencies, Electricity Act 2003, Integrated energy policy, National action plan on climate change, ECBC code for Building Construction.

UNIT-II: Energy Management and Audit

Principles of Energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting – Energy management qualities and functions, language Questionnaire – check list for top management. Definition, energy audit, need, types of energy audit. Energy management (audit) approach – understanding energy costs, Bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitution, energy audit instruments and metering.

UNIT-III: Energy Efficient Systems-I

Energy efficient motors, factors affecting efficiency, loss distribution, constructional details, characteristics – variable speed, variable duty cycle systems, RMS hp–voltage variation – voltage unbalance – over motoring – motor energy audit.

Power Factor Improvement, Lighting and Energy Instruments: Power factor – methods of improvement, location of capacitors, power factor with non-linear loads, effect of harmonics on power factor, power factor motor controllers – Good lighting system design and practice, lighting control, lighting energy audit – energy instruments – wattmeter, data loggers, thermocouples, pyrometers, lux meters, tongue testers, application of PLC's.

UNIT-IV: Energy Efficient Systems-II

Thermal utilities and systems: Boilers – types, combustion in boilers, performances evaluation, analysis of losses, feed water treatment, blow down, energy conservation opportunities. Boiler efficiency calculation, evaporation ratio and efficiency for coal, oil and gas, soot blowing and soot deposit reduction.

Heat Exchangers: Types, networking, pinch analysis, multiple effect evaporators, condensers, distillation column, etc.,

Waste Heat Recovery: Classification, advantages and applications, commercially viable waste heat recovery devices, saving potential

Cogeneration: Definition, need, application, advantages, classification, saving potentials, heat balance, steam turbine efficiency, tri-generation, micro turbine.

UNIT-V: Energy Economics

Discount rate, payback period, internal rate of return, net present value, life cycle costing, role of energy service companies (ESCOs), investment – need, appraisal and criteria, financial analysis techniques, simple payback period, return on investment, net present value, internal rate of return, cash flows, risk and sensitivity analysis; financing options, energy performance contracts.

TEXT BOOKS:

1. Energy Manager Training Manual (4 Volumes) available at www.energymanager training.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004.

REFERENCE BOOKS:

1. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management and Utilisation" Hemisphere Publ, Washington, 1988.
2. Callaghn, P.W. "Design and Management for Energy Conservation", Pergamon Press, Oxford, 1981.
3. Dryden. I.G.C., "The Efficient Use of Energy" Butterworths, London, 1982.
4. Turner. W.C., "Energy Management Hand book", Wiley, New York, 1982.
5. Murphy. W.R. and G. Mc KAY, "Energy Management", Butterworths, London 1987.
6. Energy Conservation Guidebook, Dale R Patrick, Stephen W Fardo, 2nd Edition, CRC Press
7. Handbook of Energy Audits, Albert Thumann, 6th Edition, The Fairmont Press

8. Bureau of Energy Efficiency Reference book: No.1, 2, 3 4
9. Energy Management Handbook, W.C. Turner, John Wiley and Sons, A Wiley Inter-science publication
10. Carbon Capture and Sequestration: Integrating Technology, Monitoring, and Regulation edited by E J Wilson and D Gerard, Blackwell Publishing
11. Heating and Cooling of Buildings - Design for Efficiency, J. Krieder and A. Rabl, McGraw Hill Publication, 1994.

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16ME4135 – MANUFACTURING PROCESSES
(Open Elective - II)

IV Year. B.Tech. ECE – I Semester

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

Pre-requisites: None

Course Objectives: Develop ability to

1. Understand about sand casting and metal casting techniques.
2. Impart the knowledge of various welding processes.
3. Understand about the importance rolling, forging and sheet metal operations.
4. Understand about the processing of plastics.

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

CO1. Analyze and select the suitable casting technique for making the components.
CO2. Differentiate the different types of welding processes are needed for various materials and importance of welding
CO3. Recognize and adopt the methods involved in forming processes, sheet metal operations, rolling, forging etc.,
CO4. Perform the methods involved in press work
CO5. Know the various manufacturing methods in processing of plastics.

UNIT – I : Casting

Steps involved in making a casting – Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.

Methods of Melting - Crucible melting and cupola operation – Defects in castings;

Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting, shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design.

UNIT – II : Welding

Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.

Inert Gas Welding : TIG Welding, MIG welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non- destructive testing of welds.

UNIT – III : Forming

Hot working, cold working, strain hardening, recovery, recrystallization and grain growth. Stamping, forming and other cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning. Types of presses and press tools. Forces and power requirement in the above operations.

UNIT – IV: Extrusion of Metals

Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion

UNIT – V: Forging Processes

Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers : Rotary forging – forging defects – cold forging, swaging, Forces in forging operations.

TEXT BOOK

1. P.N. Rao, "Manufacturing Technology", TMH.

REFERENCE BOOK(S)

1. R.K. Jain, "Production Technology".
2. T.V Ramana Rao, "Metal Casting", New Age.
3. Rosenthal, "Principles of Metal Castings".
4. Parmar, "Welding Process".
5. Sarma P C, "Production Technology".
6. Kalpakjin S, "Manufacturing Engineering and Technology", Pearson Edu.

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16CE4136–BUILDING TECHNOLOGY
(Open Elective – II)

IV Year. B.Tech. ECE– I Semester

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

Prerequisite: **None.**

Course Objectives: Develop ability to

1. Study the basic building materials, properties and their applications.
2. Grasp the knowledge of planning of buildings.
3. Understand the concepts of fire safety, ventilation and plumbing services provided for a building.

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

CO 1: Explain characteristics of building materials.
CO 2: Apply basic principles to develop stable and sustainable buildings.
CO 3: Explain the principles of planning of building including building bye-laws.
CO 4: Identify different materials, quality and methods of fabrication and construction.
CO 5: Adopt standard building provisions for natural ventilation and lighting.
CO 6: Explain principles of acoustics in building and plumbing.

UNIT – I : Stones, Bricks, Cement and Concrete

Stones: Uses of stones as building materials, Characteristics of good building stones. Types of stones and their significance.

Bricks: Characteristics of good building bricks. Types of bricks and their significance.

Cement and Concrete: Ingredients of cement – Types of cement, properties and uses of cement. Overview on concrete.

UNIT – II : Building and Ventilation

Building: Basic definitions, Types, components, economy and design, principles of planning of buildings and their importance, building bye-laws.

Ventilation: Definitions and importance of circulation; Lighting and ventilation; how to consider these aspects during planning of building.

UNIT – III : Repairs and Vertical Transportation in Buildings

Repairs in Buildings: Inspection, control measures and precautions for various construction defects, General principles of design of openings, and various types of fire protection measures to be considered while planning a building.

Vertical transportation in buildings: Types of vertical transportation, Stairs, different forms of stairs, planning of stair cases, other modes of vertical transportation – lifts, ramps, escalators.

UNIT – IV : Prefabrication Systems and Air Conditioning

Prefabrication systems: Prefabrication systems in residential buildings – walls, openings, cupboards, shelves, etc., planning and modules and sizes of components in prefabrication.

Air Conditioning: Process and classification of air conditioning, Dehumidification. Systems of air conditioning, ventilation, functional requirements of ventilation.

UNIT – V : Acoustics and Plumbing Services

Acoustics: Acoustics, effect of noise, properties of noise and its measurements, Principles of acoustics of building. Sound insulation – Importance and measures.

Plumbing Services: Water supply system, maintenance of building pipe line, Sanitary fittings, principles governing design of building drainage.

TEXT BOOKS:

1. P.C. Varghese, "Building Materials", Prentice Hal India Learning Pvt. Ltd., 2015.
2. B.C.Punmia, Er. Ashok Kumar Jain and Dr.Arun Kumar Jain, "Building Construction", Laxmi Publications, 2016.

REFERENCE BOOKS:

1. S.K. Duggal, "Building Materials", New Age, 2016.
2. S.S. Bhavikatti, "Building Materials", Vikas Publishers, 2016.
3. Rangwala, "Engineering Materials and Building Construction", Charotar Publishing House, 2015.
4. Arora and Bindra, "A Text book of Building Construction", Dhanpat Rai Publications, 2014.

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16MB4141 - BANKING AND INSURANCE
(Open Elective - III)

IV Year. B.Tech. ECE - I Semester

L	T	P/D	C
3	-	-	3

Prerequisite(s): None

Course Objectives: Develop 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, the 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 (NPAs).

UNIT – IV : Introduction to Insurance Sector

Concept and nature of insurance- principles of insurance- new insurance products, bancassurance. 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. Vijayragavan Iyengar, "Introduction to banking", Excel publications.
2. S.Arjunatesan and T.R. Vishwanthan, "Risk Management and Insurance", Macmillan.
3. Hals.Scott, "Capital Adequacy beyond Basel banking securities and insurance", Oxford

REFERENCE BOOKS

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

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16CS4142 – DATABASE SYSTEMS
(Open Elective - III)

IV Year. B.Tech. ECE - 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: After completion of the course, the 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 : Data Base Systems

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 : Sequential Query Language

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

REFERENCE BOOKS

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

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16EE4143–MICRO – ELECTRO – MECHANICAL SYSTEMS
(Open Elective - III)

IV Year. B.Tech. ECE - I Semester

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

Prerequisite(s): None

Course Objectives: Develop ability to

1. Understand semiconductors and solid mechanics used to fabricate MEMS devices.
2. Understand basics of Micro fabrication techniques.
3. Understand various sensors and actuators
4. Understand different materials used for MEMS
5. Understand applications of MEMS to disciplines beyond Electrical and Mechanical engineering.

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

CO1. Identify different types of semiconductor and solid mechanic materials that are used to fabricate MEMS devices.
CO2. Apply basic science, circuit theory, Electro-magnetic field theory, control theory in Micro fabrication techniques
CO3. Distinguish between different sensors and actuators
CO4. Distinguish between various processes involved in Micro machining
CO5. Apply the knowledge of MEMs to other advanced applications such as polymer and optical MEMs

UNIT-I: Basics:

Intrinsic Characteristics of MEMS, Energy Domains and Transducers, Sensors and Actuators, Introduction to Micro fabrication, Silicon based MEMS processes, New Materials, Review of Electrical and Mechanical concepts in MEMS, Semiconductor devices, Stress and strain analysis, Flexural beam bending, Torsional deflection

UNIT-II: Sensors and Actuators-I

Electrostatic sensors, Parallel plate capacitors, Applications, Inter-digitated Finger capacitor, Comb drive devices, Micro Grippers, Micro Motors, Thermal Sensing and Actuation , Thermal expansion, Thermal couples, Thermal resistors, Thermal Bimorph, Applications, Magnetic Actuators, Micro-magnetic components, Actuation using Shape Memory Alloys

UNIT-III: Sensors and Actuators-II

Piezoresistive sensors, Piezoresistive sensor materials, Stress analysis of mechanical elements, Applications to Inertia, Pressure, Tactile and Flow sensors, Piezoelectric sensors and actuators, piezoelectric effects, piezoelectric materials, Applications to Inertia , Acoustic, Tactile and Flow sensors.

UNIT –IV: Micromachining

Silicon Anisotropic Etching, Anisotrophic Wet Etching, Dry Etching of Silicon, Plasma Etching, Deep Reaction Ion Etching (DRIE), Isotropic Wet Etching, Gas Phase Etchants, Case studies, Basic surface micro machining processes, Structural and Sacrificial Materials, Acceleration of sacrificial Etch, Striction and Antistriction methods

UNIT –V: Polymer and Optical MEMS

Polymers in MEMS, Polimide, SU-8, Liquid Crystal Polymer (LCP), PDMS, PMMA, Parylene, Fluorocarbon, Application to Acceleration, Pressure, Flow and Tactile sensors, Optical MEMS, Lenses and Mirrors, Actuators for Active Optical MEMS.

TEXT BOOKS:

1. Chang Liu, "Foundations of MEMS", Pearson Education Inc., 2006.
2. Stephen D Senturia, "Microsystem Design", Springer Publication, 2000.
3. Tai Ran Hsu, "MEMS & Micro systems Design and Manufacture" Tata McGraw Hill, New Delhi, 2002.

REFERENCE BOOKS:

1. Nadim Maluf," An Introduction to Micro Electro Mechanical System Design", Artech House, 2000.
2. Mohamed Gad-el-Hak, editor, " The MEMS Handbook", CRC press Baco Raton, 2000
3. Julian w. Gardner, Vijay K. Varadan, Osama O. Awadelkarim, "Micro Sensors MEMS and Smart Devices", John Wiley & Son LTD,2002
4. James J.Allen, "Micro Electro Mechanical System Design", CRC Press Publisher, 2010
5. Thomas M.Adams and Richard A.Layton, "Introduction MEMS, Fabrication and Application," Springer 2012.

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16ME4145 – ASPECTS OF HEAT TRANSFER IN ELECTRONICALLY CONTROLLED UNITS
(Open Elective –III)

IV Year B.Tech, ECE- I Semester

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

Pre-requisites: 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, the student would be able to

CO1. Analyze conduction, convection and radiation heat transfer modes in 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, Kirchoff'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. Yunus A. Cengel, "Heat Transfer- A practical approach", Tata Mc Graw-Hill.
2. P.K.Sarma, K.Rama Krishna, "Heat Transfer – A conceptual approach", New age
3. SC Arora and Domkundwar, "A course in Refrigeration and Air conditioning", Dhanpatrai Publications.

REFERENCE BOOKS

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

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16CE4146 – GREEN BUILDINGS
(Open Elective – III)

IV Year. B.Tech. ECE– I Semester

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

Prerequisite: **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, the student would be able to

CO1. Describe the need of green buildings for environmental sustainability.
CO2. Select suitable sustainable planning and construction strategies.
CO3. Determine the building rating systems and the process and implementation of green buildings.
CO4. Describe emerging materials in the field of Civil Engineering construction.
CO5. 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. Charles.J.Kibert, "Sustainable Construction: Green Building Design and Delivery", John Wiley & Sons, New Jersey, 2008.
2. M.Bauer, P. Mosle and M. Schwarz, "Green Building: Guidebook for Sustainable Architecture", Springer, Verlag Berlin Heidelberg, 2010.

REFERENCE BOOKS

1. Jerry Yudelson, "Marketing Green Building Services: Strategies for success", Elsevier, 2008.
2. Jerry Yudelson, "Marketing Green Buildings: Guide for Engineering, Construction and Architecture", The Fairmont Press INc., 2006.
3. Angela M. Dean, "Green by Design: Creating a Home for Sustainable Living", 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/

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16EN4147 – FOREIGN LANGUAGE - FRENCH
(Open Elective - III)

IV Year B.Tech. ECE – I Semester

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

Pre-requisites: 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, the students would be able to

CO1. Demonstrate competence in basic vocabulary and grammar
CO2. Understand the culture of Francophone countries
CO3. Read with accurate pronunciation
CO4. Understand short and 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 possesive, prépositions 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(S)

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

REFERENCE BOOK(S)

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

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16EN4148 – FOREIGN LANGUAGE - SPANISH
(Open Elective - III)

IV Year. B.Tech. ECE – I Semester

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

Pre-requisites: 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, the students would be able to

CO1. Apply basic vocabulary and grammatical structures in Spanish.
CO2. Demonstrate competence in functional and grammatical structures of the language.
CO3. Read with accurate pronunciation
CO4. 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 'Por que', 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'; interrogative Sentences; 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 appointments; Inviting through telephone and e-mail or telephone

Grammatical Aspects: Present indicative of irregular verbs, 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', expressions relating to festivals.

TEXT BOOK(S)

1. NOUVEAU ELE INICIAL 1

REFERENCE BOOK(S)

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

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16EN4149 – FOREIGN LANGUAGE - GERMAN
(Open Elective - III)

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

IV Year. B.Tech. ECE – I Semester

Pre-requisites: 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, the students would be able to

CO1. Converse in day to day situations
CO2. Demonstrate proficiency in writing
CO3. Read with accurate pronunciation
CO4. 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 c

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 appointments; Inviting through telephone and e-mail or telephone

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 comparisons- Indian and Hispanic. Describing events- festivals-Indian and German

Grammatical Aspects: Negation: of a sentence and words therein.

Sentence structure: general principles observed in German Language.

TEXT BOOK(S)

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

REFERENCE BOOK(S)

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
3. Max Hueber Verlag. Munchen. 2009 ases, imperative constructions

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16EC41L1 - MICROWAVE ENGINEERING AND DIGITAL COMMUNICATIONS LAB

IV Year B.Tech. ECE- I Semester

L	T	P/D	C
-	-	3	2

Prerequisite(s): 1) 16EC4101 – Microwave Engineering
2) 16EC3202 – Digital Communications

Course Objectives: Develop ability to

1) Work with various microwave sources and devices.
2) Calculate the scattering parameters of different microwave devices.
3) Understand various digital modulation techniques through generation and detection of signals.
4) Generate and reconstruct QPSK and QAM signals.

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

CO1. **Analyze** experimentally the effect of velocity modulation and negative resistance in generation of microwave signals.
CO2. **Measure** various waveguide characteristics using microwave test bench.
CO3. **Verify** experimentally the scattering matrices of various microwave devices.
CO4. **Demonstrate** the generation and reconstruction of QPSK and QAM signals.
CO5. **Demonstrate** various digital modulation and demodulation techniques.

List of Experiments:

(At least 12 experiments are to be conducted in total. A minimum of SIX experiments have to be conducted from each part)

Part – A: Microwave Engineering Lab

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Impedance of a given Load
7. Measurement of Scattering parameters of a Magic Tee
8. Measurement of Scattering parameters of a Circulator
9. Attenuation Measurement
10. Microwave Frequency Measurement

Part – B: Digital Communication Lab

1. PCM Generation and Detection
2. Differential Pulse Code Modulation
3. Delta Modulation
4. Frequency shift keying: Generation and Detection
5. Phase Shift Keying: Generation and Detection
6. Amplitude Shift Keying: Generation and Detection
7. QAM : Generation and Detection
8. DPSK: Generation and Detection
9. QPSK: Generation and Detection
10. Study of the spectral characteristics of QPSK.

Equipments required

Part A: Microwave Engineering Lab:

1. Microwave Bench set up with Klystron Power Supply
2. Microwave Bench set up with Gunn Power Supply
3. Micro Ammeter
4. VSWR meter
5. Microwave components

Part B: Digital Communication Lab:

1. DSO(0-20 MHz)
2. Function Generators: 0-1 MHz
3. Experimental Kits/Modules

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16EC41L2- EMBEDDED SYSTEMS LAB
(Soft Core Lab - II)

IV Year. B.Tech., ECE- I Semester

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

Prerequisite: 16EC31L1 – Microprocessor 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, the 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

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16CS41L3 - ANDROID APPLICATION DEVELOPMENT LAB
(Soft Core Lab - II)

IV Year. B.Tech. ECE – I Semester

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

Pre-requisites: None

Course Objectives: Develop ability to

1. Understand the architecture of mobile software applications and mobile development frameworks and tools.
2. Use XML and UML for mobile computing
3. Understand generic user interface development, mobile GUIs, VUIs and their applications and various technologies involved.
4. Understand the process of modelling multichannel and multimodal user interfaces using UML
5. Understand mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

Course Outcomes: After completion of the course, the student would be able to

CO1. Describe the architecture of mobile software applications and mobile development frameworks and tools.
CO2. Model various components of mobile computing using XML and UML.
CO3. Identify various technologies related to generic user interface development, mobile GUIs, VUIs and their applications
CO4. State the process of modelling multichannel and multimodal user interfaces using UML
CO5. Identify and overcome mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

List of Experiments:

1. Create an android application to display a message on the screen.
2. Create android applications using Linear layout
3. Create android applications using Absolute layout
4. Create android applications using Table layout
5. Create android applications using Relative layout
6. Create android applications using Frame layout
7. Create android applications using Basic view
8. Create android applications using Picker view
9. Create android applications using List view

10. Create android applications using Image view
11. Send an SMS message in android programmatically
12. Display a locations marker on a map in android programmatically
13. Design a mobile web application with all HTML5 form elements.
14. Write a mobile web application to demonstrate HTML5 offline storage

16EC4107 – INDUSTRY ORIENTED MINI-PROJECT

IV Year. B.Tech. I Semester

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

16EC4108 – MAJOR PROJECT SEMINAR

IV Year. B.Tech. I Semester

L	T	P/D	C
-	-	**2** / -	1

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16MB4201- FINANCIAL ANALYSIS AND PROJECT MANAGEMENT

IV Year. B.Tech. ECE-II Semester

L	T	P/D	C
4	-	-	4

Pre requisites: None

Course Objective: 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 (COs): At the end of the course, Students 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: A) 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.

B) 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: A) Basics of Project Management:

Introduction, need for project management, project management knowledge areas and processes, the project life cycle.

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

Reference Books:

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

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16EC4201-WIRELESS COMMUNICATION NETWORKS

((Professional Elective - IV)

IV Year B. Tech ECE- II Semester

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

Prerequisite: 16EC4102 - Cellular and Mobile Communications

Course Objectives: Develop ability to

1. Understand the evolution of cellular wireless systems and fundamentals of communication networks.
2. Understand the indoor and outdoor mobile radio channel models and estimate the large-scale path loss during mobile radio propagation.
3. Understand small scale fading effects and multipath effect during mobile radio propagation.
4. Understand the fundamentals of Equalization and Diversity techniques to mitigate the effect of multipath.
5. Understand the evolution of various wireless networks and relevant IEEE standards.

Course Outcomes: After completion of the course, the student would be able to

CO1: Explain the evolution of cellular wireless systems and fundamentals of communication networks.

CO2: Apply suitable large-scale path loss models for outdoor and indoor propagation of wireless communication systems.

CO3: Explain the causes of Small Scale fading, multipath effects and apply statistical models to estimate multipath fading.

CO4: Explain various equalization and diversity techniques to mitigate the effect of multipath due to fading channels.

CO5: Explain various wireless networks their specifications and relevant standards.

UNIT – I : Cellular Wireless Systems and Communication Networks

Principles of cellular Networks, First-Generation Analog, Second - Generation TDMA, Second – Generation CDMA, Third Generation Systems, Fourth - Generation cellular systems.

Communication Networks: LANs, MANs, and WANs, Switching Techniques, Circuit Switching, Packet Switching, Asynchronous Transfer Mode, TCP/IP protocol Architecture, OSI model and Internetworking

UNIT – II : Mobile Radio Propagation – Large Scale Path Loss

Introduction to Radio Wave Propagation, Free Space Propagation Model, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geometry, Outdoor Propagation Models-Longley-Ryce Model, Okumura Model, Hata Model, Indoor Propagation Models-Partition losses (Same Floor), Partition losses between Floors, Log-distance path loss model, Attenuation Factor Model, Signal penetration into buildings.

UNIT – III : Mobile Radio Propagation- Small Scale Fading and Multipath

Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlation Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Types of Small-Scale Fading-Fading effects due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke's model for flat fading, Two-ray Rayleigh Fading Model.

UNIT – IV : Equalization and Diversity

Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non-linear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement.

UNIT – V : Wireless Networks standards

Overview and Motivation of Wireless LANs, Wireless Local Area Network Requirement, WLAN Physical layer, IEEE 802.11 Architecture, IEEE 802.11 Services, IEEE 802.11 Medium Access Control, other IEEE 802.11 standards, Gigabyte Wifi, Bluetooth – Protocol Architecture, Bluetooth Specifications, Zigbee (IEEE 802.15), WIMAX/IEEE 802.16 – Architecture, MAC Layer, Physical Layer.

TEXT BOOKS

1. Theodore S. Rappaport, "Wireless Communications: Principles and Practice", 2nd edition, PHI, 2002.
2. William Stallings," Wireless Communication and Networking", 2nd edition, PHI, 2005.

REFERENCES

1. Cory Beard and William Stallings, "Wireless communication Networks and Systems", Pearson, 2016.
2. Gordon L. Stuber, "Principles of Mobile Communications", 3rd edition, Springer, 2011.

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16EC4202 - RADAR SYSTEMS
(Professional Elective – IV)

IV Year, B.Tech. ECE- II Semester

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

Prerequisite(s): 1) 16EC2102-Theory of Signals and Systems
2) 16EC4101- Microwave Engineering

Course Objectives: Develop ability to

1. Understand the working principle of a radar, identify the frequency bands, and formulate the complete radar range equation, listing out all the losses to be accounted for.
2. Identify the need for modulation and understand the working principles of CW and FM-CW radars.
3. Understand the functioning of MTI and Pulse Doppler radars.
4. Understand the working principle of various tracking radars.
5. Understand the concepts of Matched Filter, duplexers and displays.

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

CO 1. Explain the working principle of a radar, its frequency bands, and derive the radar range equation.
CO 2. Explain the working principles of CW and FM-CW radars.
CO 3. Differentiate between MTI Radar and Pulse Doppler Radar based on their working principle.
CO 4. Explain the working principles of various tracking radars.
CO 5. Explain the concepts of Matched Filter, duplexers and displays.

UNIT – I : Basics of Radar

Introduction, Radar Frequencies and Applications, Simple form of Radar Equation, Radar Block Diagram and Operation, Prediction of Range Performance, Minimum Detectable Signal, False Alarm, Receiver Noise, Probability density functions, SNR, Integration of Radar Pulses, Radar Cross Section of Targets (sphere, cone, thin rod), Transmitter Power, PRF and Range Ambiguities, Antenna parameters, System Losses (qualitative treatment), Modified Radar Range Equation.

UNIT – II : CW and Frequency Modulated Radars

Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar. FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Measurement errors, Multiple Frequency CW Radar.

UNIT – III : MTI and Pulse Doppler Radar

Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

UNIT – IV : Tracking Radar and Phased Array Antennas

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Angular Accuracy, Tracking in Range, Acquisition, Comparison of Trackers.

Phased Array Antennas:

Introduction to Phased Array Antennas –Basic Concepts, Radiation Pattern, Beam Steering, Change of Beam Width steering angle, Applications, Advantages and Limitations.

UNIT – V : Radar Receivers

Detection of Radar Signals in Noise:

Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Nonmatched Filters, Matched Filter with Non-white Noise.

Radar Receivers, Displays and Duplexers:

Radar receive, Noise Figure, Mixer, Displays, Duplexers and receiver protectors.

TEXT BOOK

1. Merrill I. Skolnik, Introduction to Radar Systems,TMH Special Indian Edition, 2nd Ed., 2007.

REFERENCE BOOKS

1. M. Kulkarni, Microwave and Radar Engineering, Umesh Publications, 1998
2. Byron Edde, Radar Principles, Technology. Applications , Pearson Education, 2004.
3. Peebles. Jr., P.Z. Wiley, Radar Principles. New York, 1998.

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16CS4208 – BIG DATA

(Professional Elective - IV)

IV Year B. Tech. ECE-II Sem

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

Prerequisites: None

Course Objectives: Develop ability to

1. Understand the features of R and the process of importing and exporting data from various databases in R
2. Understand the features and modes of Hadoop along with HDFS and MapReduce architectures.
3. Explain RHIPE, RHadoop and Hadoop Streaming with R.
4. Understand all the steps of data analytics project life cycle and application to various data analytics projects.
5. Perform various supervised and unsupervised machine learning algorithms for big data analysis.

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

CO1. Describe the features of R and the process of importing and exporting data from various databases in R
CO2. Identify the features and modes of Hadoop along with HDFS and MapReduce architectures.
CO3. Describe and use RHIPE, RHadoop and Hadoop Streaming with R.
CO4. Identify and perform all the steps of data analytics project life cycle on various data analytics projects.
CO5. Perform various supervised and unsupervised machine learning algorithms for big data analysis.

UNIT-I: Getting Ready to Use R and Hadoop

Features of R language, importing and exporting data from various databases, different Hadoop modes, Hadoop features, HDFS, HDFS and MapReduce architecture. Hadoop MapReduce, fundamentals, writing a Hadoop MapReduce example, Hadoop MapReduce in R.

UNIT-II: Integrating R and Hadoop: RHIPE:

Architecture, samples, function reference, **RHadoop**-architecture, samples, function reference, **Hadoop streaming with R**-basics, run Hadoop streaming with R, Exploring HadoopStreaming R package

UNIT-III: Data Analytics with R and Hadoop:

Data analytics project life cycle-identifying the problem, designing data requirement, preprocessing data, performing analytics over data, visualizing data.

UNIT-IV: Data Analytics Problems:

Exploring web page categorization, computing the frequency of stock market change, predicting the sale price of blue book for bulldozers (case study)

UNIT-V: Big Data Analysis with Machine Learning

Introduction to machine learning, supervised machine learning algorithms-linear regression, logistic regression, unsupervised machine learning algorithm-clustering, recommendation algorithms.

TEXT BOOK

1. Big Data Analytics with R and Hadoop, Vignesh Prajapati, PACKT Publishing, 2013.

REFERENCE BOOK

1. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications, 2016.
2. Big Data, Black BookTM , DreamTech Press, 2015 Edition.
3. Business Analytics 5e , BY Albright Winston
4. Business Intelligence –Practice, Technologies and Management, Rajiv Sabherwal, Irma Becerra- Fernandez, John Wiley 2011.
5. Business Intelligence Roadmap, Lariss T. Moss, ShakuAtre, Addison-Wesley It Service.
6. Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting, Yuli Vasiliev, SPD Shroff, 2012.

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16MB4251 - ENTREPRENEURSHIP
(Open Elective - IV)

IV Year. B.Tech. ECE – 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 financial aspects of establishing an enterprise.
3. Learn entrepreneurial activities and determine strategies for launching.
4. Identify the challenges of entrepreneurship and develop an idea on the entrepreneurial framework.
5. Apply strategic perspectives in entrepreneurship.

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

CO1: Explore and identify the entrepreneurial traits.
CO2: Identify various funding agencies and role of IPR.
CO3: Imagine and identify opportunities to launch new ventures.
CO4: Address entrepreneurial 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 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. D F Kuratko and T V Rao, "Entrepreneurship- A South - Asian Perspective", Cengage Learning, 1/e, 2012.
2. Vasanth Desai, "Small Scale industries and entrepreneurship", Himalaya Publishing, 2012.

REFERENCE BOOKS

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

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16CS4252 - WEB DEVELOPMENT
(Open Elective - IV)

IV Year. B.Tech. ECE – II Semester

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

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

Reference Books

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

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16EE4253– RENEWABLE ENERGY SOURCES
(Open Elective - IV)

IV Year. B.Tech. ECE – II Semester

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

Prerequisites: None

Course Objectives: Develop ability to

1. Understand the basic concepts of solar energy
2. Understand the methods of storage of solar energy
3. Understand basic concepts of wind energy, biomass energy.
4. Understand basic concepts of geothermal energy and ocean energy
5. Understand the need of direct energy conversion.

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

CO1 Get thorough knowledge on various types of renewable energy sources
CO2 Develop storage systems of solar energy for different applications.
CO3 Get thorough knowledge on hybrid energy systems
CO4 Get thorough knowledge on principles of direct energy conversion
CO5 Apply the above conceptual things to real world electrical and electronic problems

UNIT-I : Principles of Solar Radiation

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II: Solar Energy Collection, Storage & Applications:

Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Storage & Applications: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications-solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT -III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Bertz criteria.

Bio-mass: Principles of Bio-conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C Engine operation and economic aspects.

UNIT- IV

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants and their economics.

UNIT-V

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, and principles of DEC.

Text Books:

1. Non-Conventional Energy Sources, G.D.Rai, Khanna Publishers.
2. Introduction to renewable energy, Vaughn Neison, CRC Press (Taylor & Francis)

Reference Books:

1. Renewable Energy Resources, Twidell & Wier, CRC Press (Taylor & Francis)
2. Renewable Energy sources and Emerging Technologies, D.P. Kothari, K.C Singal, Rakesh Ranjan, PHI Learning Private Limited.
3. Fundamentals of Renewable Energy systems, D. Mukherjee, S. Chakrabarty, New age International.
4. Renewable Energy Power for a sustainable Future, Godfrey Boyle, Oxford University Press.

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16ME4255 – MATERIAL HANDLING
(Open Elective -IV)

IV Year B.Tech, ECE- II Semester

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

Pre-requisites: None.

Course Objectives: Develop ability to

1. Know the working principle of earth moving equipment
2. Study types and working principle of conveying and hoisting equipment
3. Understand the working principle of concrete producing, concrete screening and concrete mixing equipment
4. Know the principle of pneumatic equipment and tools

Course Outcomes: At the end of the course, the 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 and Hoisting Equipment

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 and Maintenance

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

TEXT BOOKS

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

REFERENCES

1. PB Mahapatra, "Operations Management", 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.

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)
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Cheeryal (V), Keesara (M), Medchal Dist., Telangana - 501 301

16CE4256 – DISASTER MITIGATION AND MANAGEMENT
(Open Elective – IV)

IV Year. B.Tech., ECE– II Semester

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

Prerequisite(s): 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, the student would be able to

CO1. Explain the different types of disasters.
CO2. Evaluate the impact of disasters on the community.
CO3. Suggest a suitable monitoring technique for disasters.
CO4. Recommend appropriate vulnerability reduction strategy and risk reducing techniques.
CO5. 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 and 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 and 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. Dr.Mrinalini Pandey, "Disaster Management", Wiley India Pvt Ltd., 2014.
3. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill Education, 2015.

REFERENCE BOOKS

1. Pardeep Sahni, "Disaster Mitigation: Experiences and Reflections", PHI Learning, 2010.
2. Donald Hyndman and David Hyndman, "Natural Hazards and Disasters", Cengage Learning, 2013.

3. Rajib, S and Krishna Murthy, R.R, "Disaster Management Global Challenges and Local Solutions", Universities Press Hyderabad, 2012.
4. Navale Pandharinath and C.K. Rajan, "Earth and Atmospheric Disaster Management: Nature and Manmade", B.S. Publications, Hyderabad, 2009.
5. Sahni and Pardeep, "Disaster Risk Reduction in South Asia", PHI learning Pvt Ltd, 2003.

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16MA4257 – ACTUARIAL STATISTICS
(Open Elective - IV)

IV Year. B.Tech. ECE – II Semester

L	T	P/D	C
3	-	-	3

Prerequisite(s): 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, the 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

16EC4203 - MAJOR PROJECT

IV Year. B.Tech. ECE – II Semester

L	T	P/D	C
-	-	15	10

16EC4204 – TECHNICAL SEMINAR

IV Year. B.Tech. ECE – II Semester

L	T	P/D	C
-	-	2	1

16EC4205 – COMPREHENSIVE VIVA

IV Year. B.Tech. ECE – II Semester

L	T	P/D	C
-	-	-	3