GOVERNMENT OF INDIA
MINISTRY OF
PARLIAMENTARY AFFAIRS

Azadi Ka Amrit Mahotsav

mygov मेरी सरकार

PREAMBLE TO THE CONSTITUTION

PREAMBLE

WE, THE PEOPLE OF INDIA,

having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC **REPUBLIC** and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity;

and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this 26th day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

I have read the Preamble

[redacted]

Signature

23-01-2022

SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

("Deemed to be University u/s 3 of the UGC Act, 1956")

Accredited 'A+' Grade by NAAC

Agalakote, B.H.Road, Tumkur – 572 107.KARNATAKA, INDIA.

No. SSAHE/ACA-S&C/ 25/UG(BE)/2024 Date: 15/07/2024

NOTIFICATION

Sub: - Ordinance pertaining to Curriculum of Undergraduate Programme Bachelor of Engineering (4th Year Electronics and Communication Engineering)

Ref: Proceedings of the Academic Council meeting held on 10/07/2024 vide agenda No. SSAHE/AC/XXVIII-12/2024

In exercise of the powers vested under section 6 of 6.05 of MoA / Rules of SSAHE, the Revised Ordinance pertaining to Curriculum of Undergraduate Bachelor of Engineering Programme (4th Year Electronics and Communication Engineering) is notified herewith as per Annexure.

By Order,

REGISTRAR

REGISTRAR
Sri Siddhartha Academy of Higher Education
TUMKUR - 572 107, Karnataka.

To,
Dean / Principal, Sri Siddhartha Institute of Technology,

Copy to
1) Office of the Chancellor, SSAHE, for kind information,
2) PA to Vice-Chancellor / PA to Registrar / Controller of Examinations / Finance Officer, SSAHE
3) All Officers of the Academy Examination Branch / Academic Section
4) Guard File / Office copy.

S.S.A.H.E TUMKUR

SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

(DEEMED TO BE UNIVERSITY), Accredited A+ Grade by NAAC

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHEME OF TEACHING AND EXAMINATION FOR BE DEGREE COURSE

Academic Year 2024-25 `

Vision

Mould quality technocrats in the field of Electronics and Communication with human values to cater the societal needs

Mission

- To impart high-quality academic environment.
- To provide training in new tools and technologies.
- To facilitate continuous learning and research environment.
- To inculcate professionalism with ethical values, with little impact on environment.

Program Educational Objectives:

PEO-1: Proficient to apply the knowledge gained in mathematics, science and engineering to the field of electronics and communication engineering for the synthesis and analysis of systems

PEO-2: Competent to pursue higher studies and research, with effective communication

PEO-3: Aware of new technologies in the domain field, apply the same for the societal requirement minimizing the impact on environment and ethical practices in their domain

Program Outcomes:

Engineering Graduates will be able to

PO 1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO 6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

- The ability to identify, analyze and design systems related to modern engineering hardware and software tools, in Electronics and Communication Engineering in the areas of electronics, communication, image processing, VLSI, signal processing and embedded systems for solving day to day problems.
- Impact the awareness about the impact of professional engineering solutions in societal and environmental context, professional ethics and be able to communicate effectively.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHEME OF TEACHING AND EXAMINATION FOR BE DEGREE COURSE-2022 (170 Credits Scheme)
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

VII Semester B E **Academic Year: 2024-25**

Sl No	Course Code		Course Title	Teaching Dept.	L	T	P	C	CIE	SEE	Total Marks	Exam Hrs.
1	PC	EC7TH1	Mobile and Wireless Communications	EC	3			3	50	50	100	3
2	PC	EC7TH2	IOT and its Applications	EC	3			3	50	50	100	3
3	PE	EC7PE3X	Professional Elective III	EC	3			3	50	50	100	3
4	PE	EC7PE4X	Professional Elective IV	EC	3			3	50	50	100	3
	PE	EC7PE5X	Professional Elective V	EC	3			3	50	50	100	3
5	PC	EC7LB1	Wireless Communication Lab	EC			3	1.5	50	50	100	3
6	PC	EC7LB2	IOT Lab	EC			3	1.5	50	50	100	3
8	PC	EC7PW1	Project Phase I	EC			4	2	50	-	50	-
								20	400	350	750	

Elective III EC7PE31: ARM Programming and optimization EC7PE32: Machine Learning EC7PE33: Essential of information technology	**Elective IV** EC7PE41: Artificial Neural Networks EC7PE42: Business management for entrepreneurs EC7PE43: Biomedical Signal Processing
Elective V EC7PE51: Nano Technology EC7PE52: Satellite Communications and GPS EC7PE53: Advanced Multimedia	

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHEME OF TEACHING AND EXAMINATION FOR BE DEGREE COURSE-2022 (170 Credits Scheme)
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

VIII Semester B E **Academic Year: 2024-25**

Sl No	Course Code		Course Title	Teaching Dept.	L	T	P	C	CIE	SEE	Total Marks	Exam Hrs.
1	PE	EC8PE1X	Professional Elective VI	EC	3	-	-	3	50	50	100	3
2	PE	EC8PE2X	Professional Elective VII	EC	3	-	-	3	50	50	100	3
3	PC	EC8TS1	Technical seminar	EC		-	-	2	50	-	50	-
4	PC	EC8PW2	Project Phase II	EC	-	-	16	8	50	50	100	3
								16	200	150	350	

Elective VI	**Elective VII**
EC8PE11: Digital Signal Compression	EC8PE21: Applied Embedded Systems
EC8PE12: Low power VLSI DESIGN	EC8PE22: RF IC Design
EC8PE13: Data structure and algorithm	EC8PE23: Deep Learning

Department: Electronics and Communication Engineering		Semester:	7
Subject: Mobile and Wireless Communications			
Subject Code:	EC7TH1	L – T – P - C:	3 – 0 – 0 – 3

Sl. No	Course Objectives
1	Understand the basic cellular system concepts.
2	Learn the various signal propagation mechanisms including Large scale and small-scale effects.
3	Study multiple access techniques and modulation schemes for mobile communication.
4	Acquire the knowledge of wireless standards.

Unit	Description	Hrs
I	**Cellular concepts:** Introduction, Cellular Telephone systems and call initiation, Cell structure, frequency reuse, cell splitting, channel assignment, handoff, interference, capacity, power control, Wireless Standards: Overview of 2G to 5G cellular standards. System examples- GSM, EDGE, GPRS, IS-95, CDMA 2000 and WCDMA. (Text 1: Sec 1.1,1.3 to 1.4.4, 2.1, 2.1.2, 2.1.3, 2.2.1, 2.2.2, 2.2.3, 3.1 to 3.7.4)	**8**
II	**Signal propagation:** Introduction, Propagation mechanism-reflection, refraction, diffraction and scattering. Large scale signal propagation, Practical link budget design using path loss models, Outdoor and indoor Propagation models. (Text 1: Sec 4.1 to 4.10.1, 4.10.3 to 4.10.4, 4.11 to 4.11.4)	**8**
III	**Fading channels:** Introduction, Multipath and small scale fading- Doppler shift, power delay profile, average and RMS delay spread, coherence bandwidth and coherence time, flat and frequency selective fading, slow and fast fading, average fade duration and level crossing rate, statistical multipath channel models, Capacity of flat and frequency selective channels. (Text 1: Sec 5.1 to 5.1.2, 5.4 to 5.5.2, 5.7.3, 5.7.4)	**8**
IV	**Antennas and multiple access schemes:** Introduction, Antennas at Cell site and mobile terminal- Smart antennas, Types and applications, Handset considerations, RF antenna characterization and types of handsets, monopole antennas, PIFA, base station antennas and arrays, SDMA Modulation scheme, QAM, MSK and GMSK, M-ary and OFDM. (Text 2: Sec 8.13, 8.15, 8.16 to 8.17.4 Text 1: Sec 9.5, 6.9.2. 6.9.3, 6.10.2 , 6.10.3)	**8**
V	**Receiver structure:** Introduction, Diversity techniques, Practical space diversity considerations -selection and MRC receivers RAKE receiver. Equalization techniques, Maximum Likelihood Sequence Estimation (MLSE) equalizer, multiple antenna communications, MIMO. (Text 1: Sec 7.5, 7.7.2, 7.10,7.10.3, 7.11 Text-2: Sec 8.15.4)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Infer wireless standards for telecommunication applications. (L1)
CO2	Demonstrate the effects of fading of changing channels. (L2)
CO3	Identify different models For path loss measurement under different environment. (L3)
CO4	Apply various methodologies to improve cellular capacity. (L3)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3			2						2		
CO2	2		1									2		
CO3	3	1	2			3								
CO4		1	2											

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Wireless Communications, Principles and Practice	Theodore S. Rappaport	Prentice Hall, 2nd Edition, 2010
2	Wireless and Cellular Telecommunications	WCY Lee	McGraw Hill, 3rd Edition, 2006

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Mobile communications Design Fundamentals	WCY Lee	Prentice Hall, 2ndEdition, 1993.
2	Wireless communications and Networks	William Stallings	Pearson, 2ndEdition, 2009.
3	Wireless communications	P.Muthu Chidambara Nathan	PHI Publications, 2008.
4	Mobile Radio Communications	Aymond Steele	IEEE Press, 2nd Edition, 1992.

Department: Electronics and Communication Engineering			Semester:	7
Subject: IoT and its Applications				
Subject Code:	**EC7TH2**		**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Study the basic concepts of Internet of things.
2	Learn the conceptual framework for IoT applications and architecture.
3	Acquire the knowledge of prototype models and software tools .
4	Understand sensor networks concepts, which may be considered as the basic building blocks of IoT system.

Unit	Description	Hrs
I	**Overview of Internet of Things:** Introduction, IoT Conceptual Framework, IoT Architectural View, Technology Behind IoT, Sources of IoT, M2M communication, Examples of IoT. Modified OSI Model for the IoT/M2M Systems, data enrichment, data consolidation and device management at IoT/M2M Gateway, web communication protocols used by connected IoT/M2M devices, Message communication protocols (CoAP-SMS, CoAP-MQ, MQTT, XMPP) for IoT/M2M devices. (Text 1: chapter 1, 2 and 3)	**8**
II	**Architecture and Design Principles for IoT:** Introduction, Internet connectivity, Internet-based, communication, IPv4, IPv6,6LoWPAN protocol, IP Addressing in the IoT, Application layer protocols: HTTP, HTTPS, FTP, TELNET and ports, Data Collection, Storage and Computing using a Cloud Platform: Introduction, Cloud computing paradigm for data collection, storage and computing, Cloud service models, IoT Cloud-based data collection, storage and computing services using Nimbits. (Text 1: chapter 4 and 6)	**8**
III	**Prototyping and Designing Software for IoT Applications:** Introduction, Prototyping Embedded device software, Programming Embedded Device Arduino Platform using IDE, Reading data from sensors and devices, Devices, Gateways, Internet and Web/Cloud services software development. Programming MQTT clients and MQTT server. Introduction to IoT privacy and security. Vulnerabilities, security requirements and threat analysis, IoT Security Tomography and layered attacker model. (Text 1: chapter 9 and 10)	**8**
IV	**Communication Protocols:** Introduction, Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols and Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Contention based protocols (CSMA, PAMAS), Schedule based protocols (LEACH, SMACS, TRAMA) Address and Name Management in WSNs, Assignment of MAC Addresses, Routing Protocols-Energy-Efficient Routing, Geographic Routing, Hierarchical networks by clustering. (Text2:Chapter 5)	**8**
V	**Domain Specific IoTs:** Introduction, Applications, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, health & Lifestyle. (Text1:2.1 to 2.10).	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Outline the application of IoT and M2M Communication protocols. (L2)
CO2	Analyze Cloud computing and design principle of IoT- architecture of WSNs. (L4)
CO3	Apply the knowledge of communication protocols for assigning and routing. (L3)
CO4	Identify the software tools for IoT applications. (L3)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		2					2	2		2		
CO2			3	3		2								
CO3			2											
CO4		2		3	3							2		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Internet of Things Architecture and design principles	Raj Kamal	McGraw Hill Education, 1st 2017
2	Wireless sensor networks – an information processing approach	Feng Zhao & Leonidas J. Guibas	Elsevier, 2007

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Wireless Sensor Networks-Technology, Protocols, and Applications	Kazem Sohraby, Daniel Minoli, & Taieb Znati	John Wiley, 2007
2	Wireless Sensor Network Designs	Anna Hac	John Wiley, 2003

Department: Electronics and Communication Engineering			Semester:	7
Subject: Arm Programming and Optimization				
Subject Code:	**EC7PE31**		**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Understand the of architecture and programming techniques of advanced embedded microcontrollers.
2	Learn the design knowledge of real time sophisticated embedded systems like tablets, hand held devices, automation and industrial control systems.
3	Acquire the Embedded C programming skills : LPC2148 for GPIO, ADC, DAC, UART, LCD and Timers.
4	Study the hardware and software communication tools for industrial production applications.

Unit	Description	Hrs.
I	**ARM Embedded Systems:** Introduction, RISC Design Philosophy, The ARM Design Philosophy, Embedded System Hardware, Embedded System Software. ARM Processor Fundamentals: Registers, Current Program Status Register, Pipeline, Exceptions, Interrupts, and Vector Table, Core Extensions, Architecture Revisions, ARM Processor Families, LPC2148 Microcontroller Architecture, Memory Mapping, Register Description.Text-1:Sec 1.1.2-1.2.6	**8**
II	**ARM Instructions Set:** Introduction, Data Processing Instructions, Branch Instructions, Load-Store Instructions, Software Interrupt Instructions, Program Status Register Instruction, Example Programs. Text-1:Sec 1.1.2-1.2.6	**8**
III	**ARM Instructions Set(continued):** Loading Constants, ARMv5E Extensions, Conditional Execution, and Example Programs. Efficient C Programming: Overview of C Compilers and Optimization, Basic C Data Types, C Looping Structures, Register Allocation, Function Calls, Pointer Aliasing, Structure Arrangement, Bit-fields, Unaligned Data and Endianness, Division, Floating Point, Inline Functions and Inline Assembly. Text-1:Sec 1.1.2-1.2.6	**8**
IV	**Interfacing:** Introduction, Interfacing Sensors, Actuators, GPIO, LED, 7 segment display, stepper motor, Keyboard, Push button switch, Data Conversions (ADC, DAC), Timers. Text-1:Sec 1.1.2-1.2.6	**8**
V	**Communication Protocols:** Introduction, UART, I2C (onboard) Programming using C. Embedded System Components: Embedded v/s General computing system, Classification of Embedded systems, Major applications and purpose of Embedded systems. Core of an Embedded System including all types of processor/controller, Memory. Text-1:Sec 1.1.2-1.2.6	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Become aware of ARM processor architecture and its family. (L1)
CO2	Write assembly language programs to perform specific tasks using ARM instructions(L3)
CO3	Identify ARM microcontroller applications using Embedded C language. (L2)
CO4	Apply programming skills for interfacing external hardware with LPC214x microcontroller. (L3)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	2	3	3		2									
CO3		3			3									
CO4	2	3	3	2	3	3	3		1					

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	ARM Systems Developer's Guide Designing and Optimizing System Software	Andrew N. Sloss, Dominic Symes, Chris Wright	Morgan Kaufmann Publishers, Elsevier Inc, 2004
2	Introduction to Embedded Systems	Shibu K V	Tata McGraw Hill Education Private Limited, 2nd edition 2017

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	ARM System On Chip Architecture	SteveFurber	Pearson Education Limited, 2nd Edition 2000
2	ARM ASSEMBLY LANGUAGE Fundamentals and Techniques	William Hohl	CRC Press, Edition 2015
3	ARM Assembly Language An Introduction	Gibson	2nd Edition, 2007

Department: Electronics and Communication Engineering			Semester:	7
Subject: Machine Learning				
Subject Code:	EC7PE32		**L – T – P - C:**	**3 –0 –0 –3**

Sl. No	Course Objectives
1	Understand the basic theory underlying machine learning.
2	Study supervised, unsupervised and reinforcement learning methods.
3	Acquire the basic concepts of decision trees.
4	Learn Bayesian techniques for solving problems in machine learning

Unit	Description	Hrs
I	**Machine learning Landscape**: Introduction, Types of ML, main challenges of ML, Concept learning and Learning Problems – Designing Learning systems, Perspectives and Issues – Concept Learning – Find S-Version Spaces and Candidate Elimination Algorithm. (Text1: section 1.7 to 1.8) ((2.1 to 2.8),(Text2: section 1.1 to 1.6)	8
II	**End to end Machine learning Project**: Introduction, Working with real data, look at the big picture, Get the data, Discover and visualize the data, Prepare the data, select and train the model, Fine tune your model Classification: MNIST, training a Binary classifier, performance measure, multiclass classification, error analysis, multi label classification, multi output classification. (Text2: section 2.1 to 2.6) (3.1 to 3.5)	8
III	**Training Models:** Introduction, Linear regression, gradient descent, polynomial regression, learning curves, regularized linear models, logistic regression Support Vector Machine: linear, Nonlinear. (Text2: section 4.1 to 4.6) (5.1 to 5.4)	8
IV	**Decision Trees** Introduction, Training and Visualizing DT, making prediction, estimating class, the CART training, computational complexity, GINI impurity, Entropy, regularization Hyper parameters, Regression, instability Ensemble learning and Random Forest: Voting classifiers, Bagging and pasting, Random patches, Random forests, Boosting, stacking. (Text2: section 6.1 to 6.4) (7.1 to 7.4)	8
V	**Bayes Theorem**– Introduction, Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier– example Bayesian Belief Network – EM Algorithm (Text2: section 8.1 to 8.4)	8

Course Outcomes:

Course Outcome	Descriptions
CO1	Choose the learning techniques with the basic knowledge of the course.(L2)
CO2	Apply effectively ML algorithms for appropriate applications.(L3)
CO3	Identify the training model related to Machine Learning.(L3)
CO4	Interpret Bayesian Techniques and derive effectively learning rules.(L3)

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	2	2	3		2							2		1
CO3	2		3		2							1		
CO4	1													

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Machine Learning	Tom M. Mitchell	McGraw-Hill Education ,2013
2	Hands-on Machine Learning with Scikit-Learn &TensorFlow , O'Reilly.	Aurelien Geron	Shroff Publishers and Distributors pvt.Ltd , 2019

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	The Elements of Statistical Learning.	T. Hastie, R. Tibshirani, J. H. Friedman.	Springer , 1st Edition, 2001
2	Machine Learning	Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das	Pearson , 2014

Department: Electronics and Communication Engineering			Semester:	7
Subject: Essential of Information Technology				
Subject Code:	EC7PE33		L – T – P – C :	3 – 0 – 0 – 3

Sl. No	Course Objectives
1	Learn the various concepts related to information technology.
2	Acquire the knowledge of problem solving techniques of information technology.
3	Understand the essence of database management systems.
4	Study software testing and project management in engineering.

Unit	Description	Hrs
I	**Operating systems:** Introduction, Goals of an OS, operation of an OS, OS and the computer system, classes of OS. Process management: processes and programs, programmer view of processes, OS view of processes. **Memory management:** Static and dynamic memory allocation, memory allocation to a process. (Text 1: Sec 1.2,1.3, 2.1, 2.3, 3.1, 3.2, 3.3, 5.1, 5.2, 5.3)	**8**
II	**File system:** Introduction, File system and IOCS, files and file operations, fundamental file organizations, file protection, interface between file system and IOCS. **Deadlock:** Introduction, deadlocks in resource allocation, handling deadlocks, deadlock detection and resolution, deadlock prevention. (Text 1: Sec 7.1, 7.2, 7.3, 7.5, 7.6, 11.1, 11.2, 11.3, 11.4, 11.5)	**8**
III	**Problem solving:** Introduction, Fundamentals of algorithmic problem solving, important problem types, fundamental data structures. **Software engineering:** Introduction, Professional software development, software engineering ethics. **Software process:** Introduction, Software process models, process activities, coping with changes, process improvement. (Text 2: Sec 1.1, 1.2, 2.1, 2.2, 2.3, 2.4)	**8**
IV	**Software testing:** Introduction, Development testing, test-driven development, release testing, user testing. **Project management:** Introduction, Risk management, managing people, and team work. (Text 2: Sec 8.1, 8.2, 8.3, 8.4, 22.1, 22.2, 22.3)	**8**
V	**Database system concepts:** Introduction, Data models, schemas and instances, three schema architecture and data independence, database languages and interfaces, the database system environment, classification of database management systems, Relational model concepts, relational model constraints and relational database schemas. (Text 3: Sec 2.1, 2.2, 2.3, 2.4, 2.6, 5.1, 5.2)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Illustrate computer operating system concepts and basic concepts of database management systems(L2)
CO2	Identify the needs of software engineering(L3)
CO3	Apply the knowledge of various operations as needed during functioning (L3)
CO4	Analyze the operations occurring in performing different functions. (L4)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	2		3		2							2		
CO3	2		3		2									
CO4														

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Operating Systems	D M Dhamdhere	Tata MGraw Hill, 2nd edition, 2006
2	Software Engineering	Ian Sommerville	Pearson Education Limited, 10th edition, 2016
3	Fundamentals of Database Systems	Ramez Elmasri and Shamkant B Navathe	Pearson Education Limited, 7th edition, 2016

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	The Design and Analysis of Algorithms	AnanyLevitin	Pearson, 3rd edition, 2012
2	Operating Systems Concept	Silberschatz and Galvin, Jhon	Wiley sons, 6th edition, 2018
3	Data Structures	Lipschutz, Seymour and GAV Poai	Schaums Outline, 1st edition, 2014
4	Algorithms and Data Structures	Baldwin, Douglas and Scargg Greg W	Tata MGraw Hill, 1st edition, 2004

Department: Electronics and Communication Engineering			Semester:	7
Subject: Artificial Neural Networks				
Subject Code:	EC7PE41		L – T – P – C:	3 – 0 – 0 – 3

Sl. No	Course Objectives
1	Study the biological neural network and its equivalent neuron models.
2	Understand the concept of Learning process, architecture and learning algorithm
3	Learn the issues of various feed forward and feedback neural networks.
4	Acquire the knowledge of Single layer and Multilayer perceptions

Unit	Description	Hrs.
I	**Introduction:** Human Brain, Models of a Neuron, Neural Networks viewed as directed graphs, Network Architectures, Knowledge representation, Artificial Intelligence and Neural Networks. (Text 1: sec 1.1-1.8)	**8**
II	**Learning process:** Introduction, Error correction learning, memory-based learning, credit assignment problem, memory adaption, statistical nature of the learning process. Self-Organization Maps: Two basic feature mapping models, Self-organization map, SOM algorithm, properties of feature map, learning vector quantization, Adaptive patter classification. (Text1: Sec 2.2,2.3,2.7,2.11-2.13, 9.2-9.8)	**8**
III	**Single layer perceptions:** Introduction, Adaptive filtering problem, unconstrained optimization techniques, linear least square filters, least mean square algorithm, learning curves, learning rate annealing techniques. Perception – convergence theorem, relation b/w perception and Bayes classifier for a Gaussian Environment. (Text1: sec 3.1-3.10)	**8**
IV	**Multilayer perception:** Introduction, Back Propagation algorithm XOR problem, Heuristics, Output representation and decision rule, computer experiment, feature detection. (Text1: sec 4.1-4.12)	**8**
V	**Back Propagation:** Introduction, Back propagation and differentiation, Hessian matrix, Generalization, cross validation, Network pruning techniques, virtues and limitations of back propagation learning, accelerated convergence, supervised learning. (Text 1: sec 4.10-4.12,4.14-4.18)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Apply synaptic connectivity as the basis of neural computation and learning. (L3)
CO2	Infer the ideological basics and origins of artificial Neural networks. (L2)
CO3	Interpret application of artificial neural networks and to identify the different structures of artificial neural networks. (L4)
CO4	Illustrate single and multilayer perceptions along with back- propagation algorithms. (L3)

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2												
CO2	3	2		1										
CO3			2			2							3	
CO4				3										1

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Neural Networks a Comprehensive Foundations	Simon Haykin	PHI, 2nd edition, 2004

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Artificial Neural Networks	B. Vegnanarayan a	Prentice Hall of India P Ltd, 2009
2	Neural Networks in Computer Inteligance	Li Min Fu	Mc Graw Hill Education, 2003
3	Neural Networks	James A Freeman David M S Kapura	Pearson Education, 2004

Department: Electronics and Communication Engineering			Semester:	7
Subject: Business Management for Entrepreneurs				
Subject Code:	EC7PE42		L – T – P – C :	3 – 0 – 0 – 3

Sl. No	Course Objectives
1	Understand the ideas and concepts of management.
2	Learn the different skills needed in managing an enterprise.
3	Acquire the ideas to become an entrepreneur, its development phase.
4	Study the importance of entrepreneur in economic growth.

Unit	Description	Hrs.
I	**BASICS OF MANAGEMENT:** Introduction, Meaning, nature and characteristics of Management, Scope and functional areas of Management, Management & Administration, Management as a science, art or profession, Roles of Manager, Levels of Management, and Development of Management Thought - Early classical Approaches, Modern approaches.(Text 2: Section 22.1, 22.2, 22.4, Text 1: Chapter 1)	8
II	**PLANNING, ORGANIZING AND STAFFING:** Introduction, Nature, importance and forms of planning process, Objectives - Types of plans (Meaning only), steps in planning & planning premises - Hierarchy of plans**. Organization:** Meaning, Process of organising, Span of management, Principles of organization, Departmentalisation, Committees, MBO and MBE (Meaning only). **Staffing:** Nature and importance of Staffing - Process of Recruitment and Selection (Text 1: Chapter 4, 7 and 11)	8
III	**DIRECTING & CONTROLLING:** Introduction, Meaning and nature of directing - Leadership styles, Motivation Theories. Communication - Meaning and importance. Meaning and steps in controlling - Essentials of a sound control system -Methods of establishing control. (Text 1: Chapter 15, 16, 17 and 18)	8
IV	**ENTREPRENEURSHIP:** Introduction, Meaning of Entrepreneur, Characteristics of successful Entrepreneurs, Functions of an Entrepreneur, Types of Entrepreneur, Concept of Entrepreneurship, Growth of Entrepreneurship in India, Role of entrepreneurship in Economic Development. **MICRO AND SMALL ENTERPRISES:** Introduction, Definition, Characteristics, Need and rationale: Scope, Objectives, Role of Micro Enterprises in Economic Development, Government policy for Small-Scale Enterprise (Text 2: Section 1.1, 1.3, 1.6, 1.8, 2.1, 2.2, 2.3, 13.1, 13.5, 13.6, 13.7, 13.9, 23.1)	8
V	**OPPORTUNITY IDENTIFICATION AND SELECTION:** Introduction, Need, Identification of Business Opportunity, Opportunity Selection. **Formulation of Business Plans:** Meaning, Contents, Significance, Formulation, Planning Commission's Guidelines for Project report, Network Analysis, Common Errors in Business Plan Formulation, Project Appraisal. (Text 2: Section 14.1, 14.4, 14.5, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 16.1, 16.2)	8

Course Outcomes:

Course outcome	Descriptions
CO1	Interpret the different types of planning and its importance (L2)
CO2	Identifying motivation theory for directing and controlling the management (L3)
CO3	Apply the concepts of directing and controlling Management and Entrepreneurship. (L3)
CO4	Analyze the Characteristics of successful Entrepreneurs (L4)

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						2		2	1					
CO2							2	3	3					
CO3									3	3				
CO4	2								3	3	3	1		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Principles of Management:	P.C. Tripathi, P.N. Reddy	Tata McGraw Hill, 4th Edition Vol 4, 2007
2	Entrepreneurship Development	S S Khanka	S Chand & Co, Revised Edition Vol 3, 2007

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Management Fundamentals: Concepts Applications and Skill	Robert N Lusier	SAGE Publications, Vol. 7, 7th Edition 2015
3	Management: Principles and Practice	S K Mandal	Jaico Publishing House, Vol.2, 2nd Edition 2011
4	Patterns of Entrepreneurship Management	Jack M. Kaplan, Anthony C. Warren	Wiley Textbooks, Vo.3, 4th Edition 2012

Department: Electronics and Communication Engineering			Semester:	7
Subject: Biomedical Signal Processing				
Subject Code:	EC7PE43		L – T – P - C:	3 – 0 – 0 – 3

Sl. No	Course Objectives
1	Understand the basic signal processing techniques in analyzing biological signals..
2	Study the different models for processing Biological signals such as ECG and EEG
3	Learn computational skills relevant to the field of biomedical signal processing.
4	Acquire design principle of ECG signal compression algorithms.

Unit	Description	Hrs
I	**Biomedical Signals**: Introduction, the nature of Biomedical Signals, Examples of Biomedical Signals, Objectives and difficulties in Biomedical analysis. **Electrocardiography:** Basic electrocardiography, ECG leads systems, ECG signal characteristics. **Signal Conversion:** Introduction, Simple signal conversion systems, Conversion requirements for biomedical signals, Signal conversion circuits. (Text 1: 1.1 - 1.9)	**8**
II	**Signal Averaging:** Introduction, Basics of signal averaging, signal averaging as a digital filter, a typical average, software for signal averaging, limitations of signal averaging. **Adaptive Noise Cancelling:** Introduction, Principal noise canceller model, 60-Hz adaptive cancelling using a sine wave model, other applications of adaptive filtering. (Text 2: 2.1 - 2.8)	**8**
III	**Data Compression Techniques:** Introduction, Turning point algorithm, AZTEC algorithm, Fan algorithm, Huffman coding, data reduction algorithms The Fourier transform, Correlation, Convolution, Power spectrum estimation, Frequency domain analysis of the ECG. (Text 2: 3.2 - 3.7)	**8**
IV	**Cardio logical signal processing:** Introduction, Basic Electrocardiography, ECG data acquisition, ECG lead system, ECG signal characteristics (parameters and their estimation), Analog filters, ECG amplifier, and QRS detector, Power spectrum of the ECG, Band pass filtering techniques, Differentiation techniques, Template matching techniques, A QRS detection algorithm, Real-time ECG processing algorithm, ECG interpretation, ST segment analyzer, Portable arrhythmia monitor. (Text 2: 4.2 - 4.8)	**8**
V	**Neurological signal processing:** Introduction, the brain and its potentials, the electrophysiological origin of brain waves, The EEG signal and its characteristics (EEG rhythms, waves, and transients), Correlation. **Analysis of EEG channels:** Introduction, Detection of EEG rhythms, Template matching for EEG, spike and wave detection. (Text : 6.1 - 6.9)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Rephrase the basic mathematical, scientific and computational Skills necessary to analyze ECG and EEG signals. (L1)
CO2	Apply classical and modern filtering techniques for ECG and EEG signals. (L3)
CO3	Analyze mathematical and Computational skills relevant to the field and biomedical signal processing (L3)
CO4	Interpret the challenges of the biomedical engineering. (L2)

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3			2						2		
CO2	2		1									2		
CO3	3	1	2			3								
CO4		1	2											

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Biomedical signal analysis	Rangaraj M. Rangayyan	John Wiley &Sons, 2nd Edition, 2015
2	Biomedical Signal Processing Principles and Techniques	D C Reddy	McGraw-Hill publications, 2nd Edition, 2015

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Biomedical Digital Signal Processing	Willis J. Tompkins	PHI, 2nd Edition, 2001

Department: Electronics and Communication Engineering			Semester:	7
Subject: Nano Technology				
Subject Code:	EC7PE51		L – T – P - C:	3 – 0 – 0 – 3

Sl. No	Course Objectives
1	Study the basics of nanoscale science, classical physics and quantum mechanics, importance of nanoscale materials and their devices.
2	Learn the different types of Nanostructures, Nanomaterials and Devices.
3	Familiarize with the performance of advanced Smart Nanomaterials.
4	Explore the students about the applications of nanomaterials

Unit	Description	Hrs
I	**Introduction to Nanoscience and Nanotechnology:** Introduction, History, background and interdisciplinary nature of nanoscience and nanotechnology, challenges of Rechard Feynman, scientific revolutions, Nano sized effects surface to volume ratio, examples of surface to volume ratio, atomic structure, Bohr atomic model, molecules and phases, introduction to classical physics and quantum mechanics, importance of nanoscale materials and their devices. (Text 1: section 1.1-1.4,3.1-3.4)	**8**
II	**Classification of Nanostructures:** Introduction, Zero dimensional, one-dimensional and two dimensional nanostructure materials - classification of solids: conductor, semiconductors, insulator, types of semiconductor, doping, diodes, current flow in semiconductors, ceramics and nanocomposites, quantum size effect(QSE) in 1D, 2D, 3D nano materials, quantum dots, nanowires, nanotubes, nanosheets, top down and bottom up approach. (Text 1: section 5.1-5.5)	**8**
III	**Nanomaterials and Devices:** Introduction, Types of nanomaterials: Metal nanoparticles eg Au, Ag, Cu, Pt and their application as FETs. Metal oxide nanoparticles TiO2, ZnO, SnO2 and their application in solar cells, MEMS based gas sensors, Semiconducting Cadmium and Selenide quantum dots bio imaging, Carbon based nanomaterials and their applications in FETs, MOSFETS, sensors and actuators , Silicon based nanostructures and their application in single electron electronics used as tips for AFM and Field emission microscopy, magnetic and ceramics nanomaterials and their application. (Text 1: section 6.1-6.8)	**8**
IV	**Advanced Smart Nanomaterials:** Introduction, Carbon Based Nanostructures: Carbon Nanotubes (CNTs), Graphene, Fullerenes, Carbon clusters. Smart fluids (magneto-and Electro-rheological fluids), Polymeric materials, Metal & Metal oxide nanomaterials, Core-Shell nanostructures, Meta (Electromagnetic) materials, Nanocomposite materials, Glasses, Glazes & other ceramics. (Text 1: section 8.1-8.7)	**8**
V	**Applications of nanomaterials:** Introduction, Applications based on anisotropic, Giant &Colossal magneto-resistance and Super-paramagnetism; Spintronic, Dielectric, Piezoelectric, Pyroelectric, Multiferroics. Ferromagnetic & Ferroelectric memory devices. P-N junctions, Lasers, Photodetectors, Field Effect Transistors, High Electron Mobility Transistors. (Text 2: section 11.1-11.6)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Outline the fundamental concepts of nanoscience and Nanotechnology. (L2)
CO2	Classify the Nano-structures and Nano materials. (L2)
CO3	Interpret the concepts of smart nanomaterials like Carbon Based Nanostructures. (L3)
CO4	Analyze the applications of Nanomaterials. (L4)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2													
CO2	2	3				2	1							
CO3		2										1		
CO4				2	2						2			

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Nanophysics and Nanotechnology - An Introduction to Modern Concepts in Nanoscience	Edward L. Wolf	John Wiley & Sons, 2006.
2	Introduction to Nanotechnology	Chareles P.poolejr. and frank J.Owens	Wiley inter science, 2012

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	An Introduction to Nanoscience and Nanotechnology	Alain Nouailhat	Wiley, 2008

Department: Electronics and Communication Engineering			Semester:	7
Subject: Satellite Communications and GPS				
Subject Code:	**EC7PE52**		**L – T – P – C :**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Understand the basic principle of satellite orbits trajectories.
2	Study the electronic systems associated with a satellite and the earth station.
3	Focus on a communication satellites and the national satellite system.
4	Introduce the applications focusing various domains services such as remote sensing, weather forecasting and navigation.

Unit	Description	Hrs
I	**Satellite Orbits and Trajectories:** Introduction, Basic Principles, Orbital parameters, Injection velocity and satellite trajectory, Types of Satellite orbits, Orbital perturbations, Satellite stabilization, Orbital effects on satellite performance, Eclipses, Look angles, Azimuth angle, Elevation angle. (Text 1: Sec2.1, 2.2, 2.3, 2.5, 2.6, 2.8 and 2.9 to 2.9.7)	**8**
II	**Satellite subsystem:** Introduction, Power supply subsystem, Attitude and Orbit control, Tracking, Telemetry and command subsystem, Payload Earth Station: Types of earth station, Architecture, Design considerations, Testing, Earth station Hardware, Satellite tracking. (Text 1: Sec 7.2, 7.3, 7.5 to 7.11)	**8**
III	**Satellite Link Design Fundamental:** Introduction, Transmission Equation, satellite link up-link and down link parameters under various propagation conditions. (Text 1: Sec 14.1 to 14.74 and 14.8 to 14.10.5)	**7**
IV	**Communication Satellites:** Introduction, Related applications, Frequency Bands, Payloads, and Satellite verses terrestrial networks, Satellite Telephony, Satellite Television Satellite radio, Regional satellite Systems, National Satellite Systems. (Text 1:Sec 16.1 to 16.13)	**8**
V	**Remote Sensing Satellites:** Introduction, Classification of remote sensing satellite systems, orbits, Payloads, Types of images: Image Classification, Interpretation, Applications. Weather Forecasting Satellites: Fundamentals, Images, Orbits, Payloads. .**Navigation Satellites:** Introduction, Development of Satellite Navigation Systems, GPS system, applications. (Text1: Sec 17.1 to 17.5, Text 2 : 9.3.2 to 9.6)	**9**

Course Outcomes:

Course outcome	Descriptions
CO1	Identify the satellite orbits and its trajectories with the definitions of parameters associated with it. (L2)
CO2	Investigate the electronic hardware systems associated with the satellite subsystem and earth station. (L2)
CO3	Analyze the fundamentals of satellite link design. (L4)
CO4	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques. (L3)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		3		2									
CO2	1		3	2										
CO3		3			1								2	
CO4		1		3	2									

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Satellite Communications	Dennis Roddy,	4th Edition, Wiley India Pvt. Ltd., 2015
2	Satellite Communications	Timothy Pratt, Charles Bostian, Jeremy Allnutt	2nd Edition,Wiley India Pvt.Ltd, 2017

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Satellite Communications	Anil K. Maini, Varsha Agrawal	Wiley India Pvt.Ltd., 2015

Department: Electronics and Communication Engineering			Semester:	7
Subject: Advanced Multimedia				
Subject Code:	**EC7PE53**		**L – T – P – C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Study the Multimedia Communication Models.
2	Understand the concept of Multimedia Transport in Wireless Networks.
3	Learn the Security issues in multimedia networks.
4	Acquire the knowledge of real-time multimedia network applications.

Unit	Description	Hrs.
I	**Multimedia Communications:** Introduction, Multimedia information representation, multimedia networks, multimedia applications, Application and networking terminology. Information representation, text, Images (Chap. 1 of Text1), (Chap. 2- Sections 2.2 and 2.3 of Text 1).	**8**
II	**Information Representation:** Introduction, Audio and Video. Distributed multimedia systems: main Features of a DMS, Resource management of DMS, Networking and Multimedia operating systems. (Chap. 2 - Sections 2.4 and 2.5 of Text 1) (Chap. 4 - Sections 4.1 to 4.5 of Text 2).	**8**
III	**Multimedia Processing in Communication:** Introduction, Perceptual coding of digital Audio signals, Transform Audio Coders, Audio Sub Band Coders. (Chap. 3 - Sections 3.1, 3.2, 3.6, 3.7 of Text 2).	**8**
IV	**Multimedia Communication Standards:** Introduction, MPEG approach to multimedia standardization, MPEG-1, MPEG-2, Overview of MPEG-4. (Chap. 5 - Sections 5.1 to 5.4 and 5.5.1 of Text 2).	**8**
V	**Multimedia Communication Across Networks:** Introduction, Packet audio/video in the network environment, Video transport across generic networks, Multimedia Transport across ATM Networks. (Chap. 6 - Sections 6.1, 6.2, 6.3 of Text 2).	**8**

Course Outcomes:

Course Outcome	Descriptions
CO1	Rephrase basic methodologies of design and development of multimedia communication and management systems(L1)
CO2	Analyse the stages of creating and editing multimedia content such as digitization, editing, coding, compression, transmission, analysis and retrieval of multimedia information(L4)
CO3	Choose the best Internet, streaming technologies and quality of service mechanisms multimedia systems(L2)
CO4	Interpret problems across different application areas and select the right mechanisms for managing multimedia content. (L3)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2									2		
CO2	2	2										2		
CO3	3	1	2			1								
CO4		1	2											

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Multimedia Communications	Fred Halsall, K.	Pearson education, 2001.
2	Multimedia Communication Systems	R. Rao, Zoran S. Bojkovic, Dragorad A. Milovanovic	Pearson education, 2004.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Multimedia: Computing, Communications and Applications.	Ralf Steinmetz, Klara Nahrstedt,	Pearson education, 2002.

Department: Electronics and Communication Engineering			Semester:	7
Subject: Wireless Communication Lab				
Subject Code:	EC7LB1		L – T – P – C :	0 –0 – 3 –1.5

Sl. No	Course Objectives
1	Understand the principles of Radio wave propagation models, channel models and channel equalizer.
2	Study the performance parameters of different modulation techniques.
3	Learn the knowledge of antenna design using simulation.

Sl. No	Experiment Description
	Programs using MATLAB/ PYTHON/ NS2
1	To determine power received using Free space propagation – Path loss model
2	To determine power received using Outdoor propagation model - Okumura model
3	To determine power received using Outdoor propagation model - Hata model
4	To generate orthogonal codes in Code Division Multiple Access (CDMA)
5	Comparison of Bit Error Rate between Coherent and Noncoherent modulation techniques
6	To Simulate Rayleigh Fading channel.
7	To Simulate of wireless channel Equalizer.
8	To study Constellation diagram of Quadrature Amplitude Modulation (QAM) technique using MATLAB SIMULINK.
9	To study radiation pattern of Dipole antenna using 4NEC2 simulator
10	To study radiation pattern of Yagi-Uda Antenna (3, 5 and 7 – element) using 4NEC2 simulator

Course Outcomes:

Course outcome	Descriptions
CO1	Construct MATLAB codes to realize and interpret the radio wave propagation models, channel models and channel equalizer. (L2)
CO2	Analyze the antenna parameters: Design and simulate dipole and Yagi-Uda antennas using 4NEC2 simulator. (L4)
CO3	Interpret and record the experimental data, analyze the results, and prepare a formal laboratory report. (L3)

Course Articulation Matrix:

PO/PSO COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2		1	1									
CO2		1	1	2						2				
CO3										2				
CO4		1	2											

Department: Electronics and Communication Engineering			Semester:	7
Subject: IoT Lab				
Subject Code:	EC7LB2		L – T – P - C:	0 – 0 – 3 – 1.5

Sl. No	Course Objectives
1	Study the application areas of IoT.
2	Learn the knowledge of programming skills for handling and processing the data with Internet of Things.
3	Understand the concepts of Interfacing the sensors in embedded systems.

Sl. No	Experiment Description
1	Blink a RGB LED
2	Push button with LED
3	Interfacing relay with AC applications
4	Interfacing Pot for reading analog value
5	Interfacing BMP280 sensor
6	Interfacing of MPU6050
7	Interfacing of TFT LCD
8	Interfacing DHT11, BMP 180, MQ 135, ADXL345, OLED, Seven segment sensor with ESP32
9	Interfacing Pot for reading analog value
10	Interfacing and controlling relay with AC applications/Interfacing using cloud.

Course Outcomes:

Course outcome	Descriptions
CO1	Demonstrate the working of IoT devices. (L2)
CO2	Implement the interfacing of various sensors. (L2)
CO3	Interpret and record the experimental data, analyze the results, and prepare a formal laboratory report. (L3)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3			2						2		
CO2	2		1									2		
CO3	3	1	2			3								
CO4		1	2											

Department: Electronics and Communication Engineering			Semester:	7
Subject: Project Phase-I				
Subject Code:	EC7PW1		L – T – P - C:	0 – 0 – 4 – 2

Description
1. Students (maximum-4) shall carry out a detailed survey on the area and the topic on which they are interested to do the Project work. 2. Students are instructed to prepare synopsis of three different topics with title of the project work and submit to class teachers. 3. Project Evaluation Committee will review the synopsis and suggest suitable title in relevance to the recent trends in Electronics and Communication Engineering domain. 4. Students are instructed to give a detailed presentation and justify the title of the project with problem definition. 5. Get the observations and recommendations in the dairy from the respective Guide with signature and Submit the project dairy to Head of the department. 6. Project work Seminar consists of overview of the Project work: Introduction, Literature Survey (minimum-10 papers related to the topic), problem statement, motivation, objectives, proposed methodology for solving societal problems. 7. **Evaluation Scheme:** Continuous evaluation will be done by respective Project Guides and Project Evaluation Committee (PEC) members based on the Regularity, Technical Knowledge and Competence, Programming Skills, Communication Skills, Demonstration skills, Collaborative Learning and Documentation Skills of the students. NOTE: **Maintain project work dairy**: Frequently monitored (every 15 days) by the respective guide.

Course Outcomes:

Course Outcome	Descriptions
CO1	Identify the problem in the specified area by literature survey. (L2)
CO2	Apply the proposed methodology for solving the problems. (L3)
CO3	Interpret Hardware and software tools for implementation of project work. (L3)

Course Articulation Matrix:

	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3								3				3	
CO2	2	2	2			2						2		
CO3		2			3			2		3	3			

Department: Electronics and Communication Engineering		Semester:	8
Subject: Digital Signal Compression			
Subject Code:	**EC8PE11**	**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Understand source coding techniques for signal compression.
2	Acquire the knowledge of various quantization techniques in digital signal compression.
3	Learn the different applications of digital signal compression.
4	Study the concepts of audio, image and video compression standards.

Unit	Description	Hrs
I	**Compression techniques:** Introduction, Compression techniques, probability model, Markova model, The Kraft-McMillan Inequality, The Huffman Coding Algorithm, Applications of Huffman Coding, Static Dictionary, Adaptive Dictionary, Applications of Adaptive Dictionary. Text 1(1.1, 2.3.2, 2.3.3, 2.4.3, 3.2, 3.8 ,5.3 to 5.5)	**8**
II	**Quantization:** Introduction, Uniform Quantizer , Adaptive Quantization, Entropy-Coded Quantization , Advantages of Vector Quantization over Scalar Quantization,LBG algorithm, Tree-Structured Vector Quantizers, Trellis-Coded Quantization. Text 1(9.4,9.5,9.7,10.3,10.4,10.8)	**8**
III	**Transform coding:** Introduction, Coding: Transforms – DCT, DST, DWHT, Quantization and Coding of Transform Coefficients, Application to Image Compression—JPEG. Sub-band Coding: Sub-band Coding, Application to Speech Coding—G.722, Application to Audio Coding—MPEG Audio, Application to Image Compression. Text 1(13.4 to 13.6,14.4,14.10 to 14.12)	**8**
IV	**Wavelet Based Compression:** Introduction, Wavelets, Multi resolution analysis & scaling function, Implementation using filters, Image compression, JPEG 2000. Text 1(15.3 to 15.6 and 15.9)	**8**
V	**Video Compression:** Introduction, Motion compensation, Video signal representation, ITU-T Recommendation H.261, The MPEG-1 Video Standard, MPEG-2 Video Standard—H.262 Algorithms, ITU-T Recommendation H.263. Text 1(18.3 to 18.5 and 18.8 to 18.10)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Outline various compression and quantization techniques applied in digital signal compression. (L2)
CO2	Interpret the concepts of different filters for application of speech processing. (L2)
CO3	Apply the concepts of transform coding techniques and wavelet techniques for image compression. (L3)
CO4	Analyze the different algorithms for video compression. (L4)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	3	2	2										
CO3	3	3	2	2										
CO4	3	3	2	2								1		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Introduction to Data Compression	Khalid Sayood	Morgan Kaufmann Publishers, 2013, Third Edition.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Multimedia	Z. Li and M.S. Drew.	Pearson Education (Asia) Pte. Ltd., 2014, Second Edition.
2	Data Compression: The Complete Reference	D. Salomon	Springer, 2007, Fourth Edition.

Department: Electronics and Communication Engineering		Semester:	8
Subject: Low power VLSI Design			
Subject Code:	**EC8PE12**	**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Understand the power optimization and trade off in digital circuits.
2	Study the power estimation at different abstract levels.
3	Acquire the knowledge general purpose and special techniques for low power system design.
4	Learn the software co design in low power design.

Unit	Description	Hrs
I	**Low Power VLSI Design and Analysis:** Introduction to low power VLSI design, need for low power, charging and discharging capacitance, short-circuit current in CMOS, CMOS leakage current -Static current, basic principles of low power design. (Text 1: 1.1 to 1.6)	**8**
II	**Simulation and Probabilistic Power Analysis:** Introduction, Spice circuit simulation, discrete transistor modeling and analysis, gate level logic simulation, architecture level analysis, probabilistic power analysis-random logic signal, probability and frequency, power analysis techniques, signal entropy. (Text 1: 2.1 to 2.6, 3.1 to 3.4)	**8**
III	**Circuit level and Logic Level Design Techniques:** Introduction, Circuit- transistor and gate sizing, pin ordering, network restructuring and reorganization, logic-gate reorganization, signal gating, logic encoding, pre-computation logic. (Text 1: 4.1 to 4.3, 5.1 to 5.3,5.5)	**8**
IV	**Special Low Power VLSI Design Techniques:** Introduction, Power reduction in clock networks, CMOS floating node, Delay balancing, Switching activity reduction, parallel architecture voltage reduction, operator reduction, loop unrolling. (Text 1: 6.1 to 6.4, 7.2 to 7.4)	**8**
V	**Software Design and Power Estimation:** Introduction, Low power circuit design style, sources of software power dissipation, software power estimation, co design for low power. (Text 2: 7.6,7.7 8.1 to 8.4)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Analyze the need for low power design and different sources of power dissipation in CMOS circuits. (L2)
CO2	Demonstrate the different power optimization technique with trade off at various levels of abstraction. (L3)
CO3	Identify special techniques for low power applications. (L3)
CO4	Provide software co design for low power designs. (L2)

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2	3	2										
CO3	2		2									
CO4			1		2							

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Practical Low Power Digital VLSI Design	Gary Yeap	Springer US, Kluwer Academic Publishers, 2002.
2	Low power CMOS VLSI circuit design	Kaushik Roy, Sharat C. Prasad	Wiley Inter science Publications, 2000.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Low Voltage Low Power VLSI Subsystems	Kiat-Seng Yeo, Kaushik Roy	Tata Mc-Graw Hill, 2017

Department: Electronics and Communication Engineering		Semester:	8
Subject: Data structure and algorithm			
Subject Code:	EC8PE13	L – T – P - C:	3 – 0 – 0 – 3

Sl. No	Course Objectives
1	Study the basic data abstraction, data structures and algorithms.
2	Understand the relevant data structures to develop solutions to problem.
3	Learn the programming techniques like Sorting and Searching Algorithms.
4	Acquire the knowledge of developing an algorithm based on data structure.

Unit	Description	Hrs
I	**The Role of Algorithms in Computing: :** Introduction, Algorithms, Algorithms as a technology, Analyzing algorithms, Growth of Functions- Asymptotic notations, Recursive algorithms: Factorial, GCD, Fibonacci Sequence, Tower of Hanoi, Mathematical analysis of Recursive and Non-recursive algorithms. (Text 1: Sec 1.2,1.3, 2.1, 2.3, 3.1, 3.2, 3.3,3.4)	**8**
II	**Elementary Data Structures Stacks and Queues: :** Introduction, stacks, queues, linked list, Stacks, Stacks Using dynamic arrays, Infix to post fix, Evaluation of expression using stack Queues, Circular Queues Using Dynamic arrays, Linked list: Singly linked list, Doubly Linked List. (Text 1: Sec 5.1, 5.2, 5.3, 5.5, 5.6, 6.1, 6.2, 6.3, 6.4, 6.5)	**8**
III	**Sorting and Searching Algorithms: :** Introduction, Heap Sort, Quick Sort, Merge sort, Linear search, binary search algorithm and analysis of all algorithms. (Text 2: Sec 1.1, 1.2, 2.1, 2.2, 2.3, 2.4)	**8**
IV	**Elementary Graph Algorithms:** Introduction, Linked list Representation of Graphs, Topological Sort, Minimum Spanning tree, Growing minimum spanning tree, The algorithms of Prim, Dijkstra's algorithm and The Floyd-War shall algorithm. (Text 2: Sec 8.1, 8.2, 8.3, 8.4)	**8**
V	**Trees: :** Introduction, Binary search tree, Querying a binary search tree, Insertion and deletion from BST, State space tree: Back tracking, N-queens, Subset Sum problem, Branch Bound: Traveling Salesman problem, Assignment problem. (Text 2: Sec 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Analyze data abstraction, data structures, order notation and various complexity measures. (L4)
CO2	Identify relevant data structures to develop solutions for a problem. (L2)
CO3	Apply relevant data structures and programming techniques to design efficient algorithms for different applications. (L3)
CO4	Interpret the algorithms based on the data structures used, order of notation and performance metrics. (L2)

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2			2										
CO2		2												
CO3		3	2								2			
CO4				2										

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Introduction to Algorithms	Thomas H Corman, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	MIT press, Cambridge, Massachusetts, London, England, 3rd edition, 2009.
2	Fundamentals of Data Structures in C	Horowitz, Sahni, Anderson-Freed	University Press, 2nd Edition, 2012.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Introduction to Analysis and Design of Algorithms	Anany Levitin	VPT, 3rd Edition, 2016

Department: Electronics and Communication Engineering		Semester:	8
Subject: Applied Embedded Systems			
Subject Code:	**EC8PE21**	**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Understand the implementation and applications of the embedded system.
2	Learn the historical background of real-time systems and its classifications.
3	Study the various software development approaches and a operating system services required.
4	Acquire the knowledge of languages to develop software for real- time Applications

Unit	Description	Hrs
I	**Real-Time Systems:** Introduction, Historical background, Elements of a Computer Control System, RTS-Definition, Classification- time Systems, Time Constraints, Classification of Programs. Concepts of Computer Control: Introduction, Sequence Control, Loop Control, Supervisory Control, Centralized Computer Control, Hierarchical Systems. (Text Book 1: 1.1 to 1.6 and 2.1 to2.6)	**8**
II	**Embedded controller (PIC) CPU architecture and instruction sets:** Introduction, Hardware architecture and pipelining, program memory consideration, Register file structure and Addressing modes, CPU register, Instruction set, Loop time subroutine, Timer2 and Interrupts: Timer2 use interrupt logic, Timer2 Scalar Initialization. External interrupts and Timers: Timer0 Compare/capture mode, Timer1/CCP programmable period scalar. Timer1 and sleep mode, PWM O/P Port B change interrupts. (Text Book2: 2.1 to 2.6, 2.9 to 2.10, 2.12)	**8**
III	**Computer Hardware Requirements for Real-Time Applications:** Introduction, General Purpose Computer, Single Chip Microcomputers and Microcontrollers, Specialized Processors, Process-Related Interfaces, Data Transfer Techniques, Communications, Standard Interface. (Text Book1 : 3.1 to 3.8)	**8**
IV	**Operating Systems:** Introduction, Real-Time Multi-Tasking OS, Scheduling Strategies, Priority Structures, Task Management, Scheduler and Real-Time Clock Interrupt Handler, Memory Management, Code Sharing, Resource Control, Task Co-Operation and Communication, Mutual Exclusion. (Text Book1: 6.1 to 6.11)	**8**
V	**Embedded RTOS Inter process communication: :** Introduction, Process Management, Timer Functions , Event Functions, Memory management, Device, File, and IO Subsystems Management, Interrupt Routines in RTOS environment and handling of interrupt source calls by RTOS, Introduction to Real Time Operating System, Basic Design Using a Real Time Operating System, RTOS Task Scheduling Models, Latency, Response Times, Deadline as Performance Metric, Latency and Deadlines as Performance Metric in Scheduling Models For Periodic, Sporadic and Aperiodic Tasks, CPU Load as Performance Metric, Sporadic Task Model Performance Metric. OS security issues. (Text Book3 : 8.1 to 8.11)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Rephrase the concepts and architecture of embedded systems. (L2)
CO2	Develop embedded program for PIC microcontroller. (L2)
CO3	Demonstrate the open source RTOS and solve the design issues for the same. (L2)
CO4	Analyze life cycles of embedded design and its testing. (L4)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2												
CO2		3			2									
CO3		2	1		3									
CO4		2				2								

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Real-Time Computer Control	Stuart Bennet	Pearson Education, 2nd Edition, 2008.
2	Design with PIC Microcontrollers	John BPitman	Pearson Education, 1st Edition, 1996.
3	Embedded Systems: Architecture and Programming	Raj Kamal	Mcgraw Hill, 2nd Edition, 2008.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Real-Time Systems Analysis	Phillip. A. Laplante	Prentice Hall, 2nd Edition, 2005.
2	Real –Time Systems	C.M. Krishna, Kang G. Shin	McGraw –Hill, , 3rd Edition, 1997.

Department: Electronics and Communication Engineering		Semester:	8
Subject: RF IC Design			
Subject Code:	**EC8PE22**	**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Introduce the concept of Radio Frequency Integrated system.
2	Study different types of key RF circuits including Amplifier, Switch, Mixer, Oscillator, frequency divider, Frequency doublers, Power divider and Transmission lines.
3	Learn the design trade-off of radio frequency communication systems.
4	Understand the concepts of High frequency amplifiers, Low Noise amplifiers and RF amplifiers.

Unit	Description	Hrs
I	**Wireless Principles:** Introduction, A brief history of wireless systems, Non-cellular wireless applications, Shannon, Modulations & Alphabet Soup, Propagation. Passive RLC Networks: Parallel RLC Tank, Series RLC Networks, Other RLC networks, RLC Networks as impedance Transformers. (Text 1: Chapter 2, 3)	**8**
II	**Distributed Systems:** Introduction, Link between lumped and distributed regimes, Driving-point Impedance of Iterated structures, Transmission lines in more detail, Behavior of Finite – length transmission lines. (Text 1 : Chapter 6)	**8**
III	**High frequency amplifier design:** Introduction, Zeros as bandwidth Enhancers, The shunt –series amplifier, Bandwidth Enhancement with fT-Doublers, Tuned amplifiers, Neutralization and unilateralization, Cascaded amplifiers, AM – PM conversion. (Text 1: chapter 9)	**8**
IV	**Voltage references and biasing:** Introduction, Review of diode behavior, Diodes and bipolar transistors in CMOS technology, Supply –independent bias circuits, Bandgap voltage reference, Constant gm bias. Noise: Thermal noise, Shot noise, Flicker noise, Popcorn noise, Classical two- port noise theory, Examples of noise calculations, A handy rule of thumb, Typical noise performance. (Text 1: chapter 10)	**8**
V	**RF Power Amplifiers:** Introduction, General considerations, Class A, AB, B and C power amplifier. **Low noise Amplifier:** Introduction, amplifiers with feedback, Noise, linearity , stability, Broad band linear amplifier design example. (Text 1: Chapter 12, Text 2: Chapter 7)	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Summarize the Wireless systems, RLC networks, Transmission lines, Amplifiers and Mixer. (L2)
CO2	Analyze characteristics of RLC Networks: Rise time, Delay, Bandwidth and Amplifiers. (L3)
CO3	Compute the parameters for designing circuit networks of High frequency amplifiers, and RF amplifiers. (L3)
CO4	Differentiate the characteristics of various RF amplifiers. (L2)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2		3												
CO3			2											
CO4		3		2								1		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	The Design of CMOS Radio Frequency Integrated Circuit	Thomas H. Lee	Cambridge, 2004, 2nd edition.
2	Radio Frequency Integrated Circuits Design	John Rogers	Artech House, 2003.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Design of Analog CMOS Integrated Circuits,	Behzad Razavi	Tata McGraw Hill, 2005
2	RF circuit design, theory and applications	Reinhold Ludwig, Pavel Bretchko	Pearson Asia Education edition, 2001

Department: Electronics and Communication Engineering		Semester:	8
Subject: Deep Learning			
Subject Code:	**EC8PE23**	**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Study the mathematical, statistical and computational challenges of building neural networks and deep learning concepts.
2	Introduce dimensionality reduction techniques.
3	Acquire the knowledge of deep learning techniques to support real-time applications.
4	Understand the case studies of deep learning techniques.

Unit	Description	Hrs
I	**Linear models**: Introduction to machine learning- Linear models like SVMs and Perceptron's, Logistic regression - Introduction to Neural Nets: Shallow network, Training a network: loss functions. Text-1: Sec-2.1-2.6	**8**
II	**Deep networks:** Introduction, History of Deep Learning- A Probabilistic Theory of Deep Learning-Back propagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Shallow Networks. Text-1: Sec-3.1-3.9.	**8**
III	**Dimensionality reduction:** Introduction, Linear (PCA, LDA) and manifolds, metric learning – Auto encoders and dimensionality reduction in networks. Text-1: Sec-4.5-4.8.	**8**
IV	**Optimization and generalization:** Introduction, Optimization in deep learning– Non-convex, optimization for deep networks- Stochastic Optimization, Generalization in neural networks- Spatial Transformer Networks. Text-1: Sec-5.2-5.6.	**8**
V	**Case study and applications:** Introduction, ImageNet- Detection-Audio Wave Net- Natural Language Processing Word2Vec - Joint Detection Bioinformatics- Face Recognition- Scene Understanding-Gathering Image Captions. Text-1: Sec-6.6-6.9.	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Rephrase the basics of deep learning and summarize various deep learning models. (L1)
CO2	Optimize high dimensional data using reduction techniques. (L3)
CO3	Analyze optimization and generalization in deep learning. (L4)
CO4	Outline the deep learning applications. (L2)

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												
CO2		2	2	2										
CO3						2							2	
CO4						2				2				

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Advanced Data Analysis from an Elementary Point of View	Cosma Rohilla Shalizi	PHI International, 2015.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Deep Learning: Methods and Applications	Deng & Yu	Tata McGraw Hill, 2013
2	Deep Learning	Ian Goodfellow, Yoshua Bengio, Aaron Courville,	MIT Press, 2016
3	Neural Networks and Deep Learning	Michael Nielsen	Determination Press, 2015

Department: Electronics and Communication Engineering		Semester:	8
Subject: Technical seminar			
Subject Code:	EC8TS1	L – T – P - C:	0 – 0 – 0 – 2

Description
1. Selection of topic/area: • Each Student shall carry out a detailed survey on the area and the topic on which they are interested to present the Technical seminar. • Student are instructed to prepare the abstract of three different topics with title of the Technical seminar and submit to class teachers. • Evaluation Committee members will review the abstract of the topic and suggest suitable title in relevance to recent trends in Electronics and Communication Engineering domain. • Student are instructed to give a detailed presentation and justify the title of the paper with recent trends and applications. • Presentation consists of Overview of the topic: Introduction, Literature Survey (minimum-06 papers related to the topic), recent trends and applications. 2. **Evaluation Scheme:** Continuous evaluation will be done by respective Guide and Evaluation Committee members based on Technical Knowledge and Competence, Communication Skills, Presentation skills (Slide preparation) and report submission.

Course Outcomes:

Course outcome	Descriptions
CO1	Outline the recent technologies relevant to the topic selected. (L2)
CO2	Interpret the impact of the technology on the society, environment and domain. (L3)
CO3	Compile and present the report of the study made. (L3)

Course Articulation Matrix:

	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1				2	1	3		2						
CO2	3			1	1	3		3		3		3		
CO3										1		3		

Department: Electronics and Communication Engineering		Semester:	8
Subject: Project Phase II			
Subject Code:	EC8PW2	L – T – P - C:	0 – 0 – 16 – 8

Description
1. Each project group are instructed to demonstrate the partial outcome of the project during beginning of the final semester. 2. Each project group are instructed to meet the guide for reviewing the progress with dairy. 3. Get the observations and recommendations in the dairy from the respective Guide with signature and Submit the project dairy to Head of the department 4. After completion of the project work, each group need to make an arrangement for final demonstration at Department/Institution/Industry. 5. Final presentation includes: Introduction, Literature Survey, problem statement, motivation, objectives, proposed methodology, implementation details, Software/Hardware tools used and experimental results for fulfilling the defined objectives and conclusion of the project work. 6. Final report submission as per guidelines of Department. Note: All the above activities in adherence with calendar of events of the department (Late submission will not be permitted).

Course Outcomes:

Course outcome	Descriptions
CO1	Design and Implement the work using appropriate Hardware and Software tools. (L3)
CO2	Test the performance of the system with suitable data. (L3)
CO3	Analyze and compare earlier results with obtained results. (L4)

Course Articulation Matrix:

	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			3	3	2			2					3	
CO2		2				2	3			2				
CO3		2		2							2			