Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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.
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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.

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.
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) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

II SEMESTER						
S. No	**Course Name**	**L**	**P**	**C**	**I**	**E**
1.	**Core III:** Wireless Communications	3	-	3	40	60
2.	**Core IV:** Coding Theory & Applications	3	-	3	40	60
3.	**Programme Specific Elective III**					
	Radar Signal Processing	3	-	3	40	60
	Spread- Spectrum Techniques					
	Soft Computing Techniques					
4.	**Programme Specific Elective IV**					
	Image and Video Processing	3	-	3	40	60
	VLSI Technology & Design					
	Embedded System Design					
5.	Lab1: Advanced Communications Lab	-	4	2	40	60
6.	Lab2:Advanced Image Processing Lab	-	4	2	40	60
7.	Mini Project	-	4	2	50	-
8.	**Audit Course II**	2	-	-	-	-
	Pedagogy Studies					
	Total	**14**	**12**	**18**	**290**	**360**
					650	

II SEMESTER

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

R19 M.Tech.(DECS) SYLLABUS

Course Name	WIRELESS COMMUNICATIONS			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT -I: The Cellular Concept and System Design Fundamentals

Introduction, Frequency Reuse, Interference and system capacity – Co channel Interference and system capacity, Channel planning for Wireless Systems, Adjacent Channel interference , Power Control for Reducing interference, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Trunking and Grade of Service

UNIT –II: Mobile Radio Propagation (Large-Scale Path Loss)

Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, Basic Propagation Mechanisms, Reflection: Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction: Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models- Longley-Ryce Model, Okumura Model, Hata Model, Log-distance path loss model, Attenuation Factor Model, Signal penetration into buildings, Ray Tracing and Site Specific Modeling.

UNIT –III: Mobile Radio Propagation (Small –Scale Fading and Multipath–I)

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 Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time.

UNIT –IV: Mobile Radio Propagation (Small –Scale Fading and Multipath–II)

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, spectral shape due to Doppler spread in Clarke"s model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT -V: Equalization and Diversity

Introduction, Fundamentals of Equalization, Training a Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non-linear Equalization. Diversity -Derivation of selection, Diversity improvement, Derivation of Maximal Ratio Combining improvement,

Practical Space Diversity Consideration-Selection Diversity, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

TEXT BOOKS:

1. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002, PHI.
2. Wireless Communications-Andrea Goldsmith, 2005 Cambridge University Press.
3. Mobile Cellular Communication – Gottapu Sasi bhushana Rao, Pearson Education, 2012.

REFERENCE BOOKS:

1. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, 2002, PE
2. Wireless Digital Communications – Kamilo Feher, 1999, PHI.
3. Wireless Communication and Networking – William Stallings, 2003, PHI.
4. Wireless Communication – Upen Dalal, Oxford Univ. Press
5. Wireless Communications and Networking – Vijay K. Gary, Elsevier.

Course Name	CODING THEORY AND APPLICATIONS			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT –I: Coding for Reliable Digital Transmission and Storage

Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.

UNIT –II: Linear Block Codes

Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT –III: Cyclic Codes

Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding ,Cyclic Hamming Codes, Shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT –IV: Convolutional Codes

Encoding of Convolutional Codes, Structural and Distance Properties, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT –V: Burst –Error-Correcting Codes and BCH – Codes:

Decoding of Single-Burst error Correcting Cyclic codes, Single-Burst-Error-Correcting Cyclic codes, Burst-Error-Correcting Convolutional Codes, Bounds on Burst Error-Correcting Capability, Interleaved Cyclic and Convolutional Codes, Phased-Burst –Error-Correcting Cyclic and Convolutional codes. BCH code- Definition, Minimum distance and BCH Bounds, Decoding Procedure for BCH Codes- Syndrome Computation and Iterative Algorithms, Error Location Polynomials and Numbers for single and double error correction

TEXT BOOKS:

1. Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello, Jr, Prentice Hall, Inc.
2. Error Correcting Coding Theory-Man Young Rhee- 1989, McGraw-Hill Publishing.

REFERENCE BOOKS:

1. Digital Communications-Fundamental and Application - Bernard Sklar, PE.
2. Digital Communications- John G. Proakis, 5th Ed., 2008, TMH.
3. Introduction to Error Control Codes-Salvatore Gravano-oxford
4. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, Wiley India.
5. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Ed, 2009, TMH.

Course Name	RADAR SIGNAL PROCESSING (Program Elective III)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT -I:

Introduction: Radar Block Diagram, Bistatic Radar, Monostatic Radar, Radar Equation, Information Available from Radar Echo. Review of Radar Range Performance– General Radar Range Equation, Radar Detection with Noise Jamming, MTI and Pulse Doppler Radar. Matched Filter Receiver – Impulse Response, Frequency Response Characteristics and its Derivation, Cross Correlation Receiver, Matched Filter for Non-White Noise.

UNIT -II:

Detection of Radar Signals in Noise: Detection Criteria – Neyman-Pearson Observer, Likelihood-Ratio Receiver, Inverse Probability Receiver, Sequential Observer, Detectors– Envelope Detector, Logarithmic Detector, I/Q Detector. Automatic Detection-CFAR Receiver, Cell Averaging CFAR Receiver, CFAR Loss, CFAR Uses in Radar. Radar Signal Management– Schematics, Component Parts, Resources and Constraints.

UNIT -III:

Waveform Selection: Radar Ambiguity Function and Ambiguity Diagram – Principles and Properties; Specific Cases – Ideal Case, Single Pulse of Sine Wave, Periodic Pulse Train, Single Linear FM Pulse, Noise Like Waveforms, Waveform Design Requirements, Optimum Waveforms for Detection in Clutter.

UNIT -IV:

Pulse Compression in Radar Signals: Introduction, Significance, Types, Linear FM Pulse Compression – Block Diagram, Characteristics, Reduction of Time Side lobes, Stretch Techniques, Generation and Decoding of FM Waveforms – Block Schematic and Characteristics of Passive System, Digital Compression, SAW Pulse Compression.

UNIT V:

Phase Coding Techniques: Principles, Binary Phase Coding, Barker Codes, Maximal Length Sequences (MLS/LRS/PN). Poly Phase Codes : Frank Codes, Costas Codes, Non-Linear FM Pulse Compression, Doppler Tolerant PC Waveforms – Short Pulse, Linear Period Modulation (LPM/HFM), Side lobe Reduction for Phase Coded PC Signals.

TEXT BOOKS:

1. Radar Handbook - M.I. Skolnik, 2nd Ed., 1991, McGraw Hill.

2. Radar Design Principles: Signal Processing and the Environment - Fred E. Nathanson, 2nd Ed., 1999, PHI.
3. Introduction to Radar Systems - M.I. Skolnik, 3rd Ed., 2001, TMH.

REFERENCE BOOKS:

1. Radar Principles - Peyton Z. Peebles, Jr., 2004, John Wiley.
2. Radar Signal Processing and Adaptive Systems - R. Nitzberg, 1999, Artech House.

Course Name	SPREAD SPECTRUM TECHNIQUES (Program Elective III)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT -I: INTRODUCTION TO SPREAD SPECTRUM SYSTEMS

Communication in the presence of pulse noise jamming - Low probability detection scheme - Direct sequence spread spectrum methods - Frequency Hop spread spectrum methods - Hybrid DS/FH spread spectrum - Complex envelope representation of spread spectrum systems - examples of Spread Spectrum Systems

UNIT -II: MULTICARRIER SPREAD SPECTRUM SYSTEMS

Amalgamating DS-CDMA and OFDM - Multi-Carrier CDMA techniques – MC CDMA – MC DS CDMA – MT CDMA

UNIT -III: BINARY SHIFT REGISTER SEQUENCES FOR SPREAD SPECTRUM SYSTEMS

Definition - PN sequence generator fundamentals - Maximal length sequences - Properties, Power spectrum and Polynomial tables for maximal length sequences - Gold codes - Rapid Acquisition systems - Non-linear code generators.

UNIT -IV: SYNCHRONIZATION OF SPREAD SPECTRUM SYSTEMS:

Optimal tracking of wideband signals - Early-late tracking loops - Code tracking loops for FHSS - Optimum synchronization techniques - Multiple dwell and sequential detectors - Synchronization using a matched filter - Synchronization by estimating the received spreading code.

UNIT -V: PERFORMANCE OF SPREAD SPECTRUM SYSTEM

SS Systems communications models - Performance without coding under AWGN and different jamming environments - spread spectrum systems performances with forward error correction - Block coding - Convolutional coding and specific error correcting codes - Inter leaving - Random coding bounds.

TEXT BOOKS:

1. Rodger E Ziemer, Roger L. Peterson and David E Borth, “Introduction to Spread Spectrum Communication”, Pearson, 1st Edition, 1995.
2. Mosa Ali Abu-Rgheff – “Introduction to CDMA Wireless Communications”, Elsevier Publications, 2008.

3. Hanzo L and Keller T, “OFDM and MC-CDMA: A Primer”, John Wiley and sons Ltd., 2006.
4. Dixon R C, “Spread Spectrum Systems with Commercial Applications”, John Wiley & Sons, 1994.
5. Holms J K, "Coherent Spread Spectrum Systems", Wiley Inderscience, 1982.

REFERENCE BOOKS:

1. George R. Cooper, Clare D. Mc Gillem, “Modern Communication and Spread Spectrum”, McGraw Hill, 1986.
2. Andrew j. Viterbi – “CDMA: Principles of spread spectrum communication”, Pearson Education, 1st Edition, 1995.
3. Kamilo Feher, “Wireless Digital Communications”, PHI, 2009.
4. Ziemer R E and Peterson R L, "Digital Communication and Spread Spectrum Systems", Macmillan Publishing Co., 1985.
5. Andrew Richardson, “WCDMA Design Handbook”, Cambridge University Press, 2005.
6. Steve Lee, “Spread Spectrum CDMA”, McGraw Hill, 2002.

Course Name	SOFT COMPUTING TECHNIQUES (Program Elective III)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT –I: Introduction

Approaches to intelligent control, Architecture for intelligent control, Symbolic reasoning system, Rule-based systems, the AI approach, and Knowledge representation - Expert systems.

UNIT –II: Artificial Neural Networks

Concept of Artificial Neural Networks and its basic mathematical model, McCulloch-Pitts neuron model, simple perceptron, Adaline and Madaline, Feed-forward Multilayer Perceptron, Learning and Training the neural network, Data Processing: Scaling, Fourier transformation, principal-component analysis and wavelet transformations, Hopfield network, Self-organizing network and Recurrent network, Neural Network based controller.

UNIT –III: Fuzzy Logic System

Introduction to crisp sets and fuzzy sets, basic fuzzy set operation and approximate reasoning, Introduction to fuzzy logic modeling and control, Fuzzification, inferencing and defuzzification, Fuzzy knowledge and rule bases, Fuzzy modeling and control schemes for nonlinear systems, Self-organizing fuzzy logic control, Fuzzy logic control for nonlinear time delay system.

UNIT –IV: Genetic Algorithm

Basic concept of Genetic algorithm and detail algorithmic steps, Adjustment of free parameters, Solution of typical control problems using genetic algorithm, Concept on some other search techniques like Tabu search and an D-colony search techniques for solving optimization problems.

UNIT –V: Applications

GA application to power system optimization problem, Case studies: Identification and control of linear and nonlinear dynamic systems using MATLAB-Neural Network toolbox, Stability analysis of Neural-Network interconnection systems, Implementation of fuzzy logic controller using MATLAB fuzzy-logic toolbox, Stability analysis of fuzzy control systems.

TEXT BOOKS:

1. Introduction to Artificial Neural Systems - Jacek. M. Zurada, Jaico Publishing House, 1999.
2. Neural Networks and Fuzzy Systems - Kosko, B., Prentice-Hall of India Pvt. Ltd., 1994.

REFERENCE BOOKS:

1. Fuzzy Sets, Uncertainty and Information - Klir G.J. &Folger T.A., Prentice-Hall of India Pvt. Ltd., 1993.
2. Fuzzy Set Theory and Its Applications - Zimmerman H.J. Kluwer Academic Publishers, 1994.
3. Introduction to Fuzzy Control - Driankov, Hellendroon, Narosa Publishers.
4. Artificial Neural Networks - Dr. B. Yagananarayana, 1999, PHI, New Delhi.
5. Elements of Artificial Neural Networks – Kishan Mehrotra, Chelkuri K. Mohan, Sanjay Ranka, Penram International.
6. Artificial Neural Network –Simon Haykin, 2nd Ed., Pearson Education.
7. Introduction Neural Networks Using MATLAB 6.0 - S.N. Shivanandam, S. Sumati, S. N. Deepa,1/e, TMH, New Delhi.

Course Name	IMAGE AND VIDEO PROCESSING (Program Elective IV)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT –I: Fundamentals of Image Processing and Image Transforms

Introduction, Image file formats, Elements of image processing system, Applications of Digital image processing. Need for transform, image transforms, Fourier transform, 2 D Discrete Fourier transform, Walsh transform, Hadamard transform, Haar transform, slant transform Discrete cosine transform, KL transform, singular value decomposition, Hough transform.

UNIT –II: Image Enhancementand Restoration

Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.
Introduction to Image restoration, Image degradation, Types of image blur, Classification of image restoration techniques, Image restoration model, Linear and Nonlinear image restoration techniques, Blind deconvolution

UNIT –III: Image Segmentation and Compression

Introduction to image segmentation, Point, Line and Edge Detection, Region based segmentation.
Introduction, Need for image compression, Redundancy in images, Classification of redundancy in images, image compression schemes - Arithmetic coding, Predictive coding, Transformed based compression, Image compression standard.

UNIT -IV: Basic Steps of Video Processing

Analog Video, Digital Video. Time-Varying Image Formation models: Three-Dimensional Motion Models, Geometric Image Formation, Photometric Image Formation, Sampling of Video signals, filtering operations.

UNIT –V: 2-D Motion Estimation

Optical flow, General Methodologies, Pixel Based Motion Estimation, Block- Matching Algorithm, Mesh based Motion Estimation, Global Motion Estimation, Region based Motion Estimation, Multi resolution motion estimation, Waveform based coding, Block based transform coding, Predictive coding, Application of motion estimation in Video coding.

TEXT BOOKS:

1. Digital Image Processing – Gonzaleze and Woods, 3rd Ed., Pearson.

2. Video Processing and Communication – Yao Wang, Joem Ostermann and Yaquin Zhang. 1st Ed., PH Int.
3. S.Jayaraman, S.Esakkirajan and T.Veera Kumar, "Digital Image processing, Tata McGraw Hill publishers, 2009

REFRENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with CVIP Tools – Scotte Umbaugh, 2nd Ed, CRC Press, 2011.
2. Digital Video Processing – M. Tekalp, Prentice Hall International.
3. Digital Image Processing – S.Jayaraman, S.Esakkirajan, T.Veera Kumar – TMH, 2009.
4. Multi dimentional Signal, Image and Video Processing and Coding – John Woods, 2nd Ed, Elsevier.
5. Digital Image Processing with MATLAB and Labview – Vipula Singh, Elsevier.
6. Video Demystified – A Hand Book for the Digital Engineer – Keith Jack, 5th Ed., Elsevier.

Course Name	VLSI TECHNOLOGY AND DESIGN (Program Elective IV)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT-I: VLSI Technology and VLSI Design

Fundamentals and applications, semiconductor processes, design rules and process parameters, layout techniques and process parameters. Electronic design automation concept, ASIC and FPGA design flows, SOC designs, design technologies: combinational design techniques, sequential design techniques, state machine logic design techniques and design issues.

UNIT-II: CMOS VLSI Design, Building Blocks of a VLSI circuit, and VLSI Design Issues

MOS Technology and fabrication process of pMOS, nMOS, CMOS and BiCMOS technologies**,** comparison of different processes. Computer architecture, memory architectures, communication interfaces, mixed signal interfaces. Design process, design for testability, technology options, power calculations, package selection, clock mechanisms, mixed signal design.

UNIT-III:

Basic electrical properties of MOS and BiCMOS circuits, MOS and BiCMOS circuit design processes, Basic circuit concepts, scaling of MOS circuits-qualitative and quantitative analysis with proper illustrations and necessary derivations of expressions.

UNIT-IV: Subsystem Design and Layout and Subsystem Design Processes

Some architectural issues switch logic, gate logic, examples of structured design (combinational logic), some clocked sequential circuits, other system considerations. Some general considerations and an illustration of design processes, design of an ALU subsystem.

UNIT-V: Floor Planning, Architecture Design, and Chip Design

Introduction**,** Floor planning methods, off-chip connections. Register-Transfer design, high-level synthesis, architectures for low power, architecture testing, and Design methodologies.

TEXT BOOKS:

1. Essentials of VLSI Circuits and Systems, K. Eshraghian, Douglas A. Pucknell, Sholeh Eshraghian, 2005, PHI Publications.
2. Modern VLSI Design-Wayne Wolf, 3rd Ed., 1997, Pearson Education.
3. VLSI Design-Dr.K.V.K.K.Prasad, KattulaShyamala, Kogent Learning Solutions Inc., 2012.

REFERENCE BOOKS:

1. VLSI Design Technologies for Analog and Digital Circuits, Randall L.Geiger, Phillip E.Allen, Noel R.Strader, TMH Publications, 2010.
2. Introduction to VLSI Systems: A Logic, Circuit and System Perspective- Ming-BO Lin, CRC Press, 2011.
3. Principals of CMOS VLSI Design-N.H.E Weste, K. Eshraghian, 2nd Edition, Addison Wesley.

Course Name	EMBEDDED SYSTEM DESIGN (Program Elective IV)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	3	-	3

UNIT-I: Introduction to Embedded Systems

Definition of Embedded System Embedded Systems vs. General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT-II: Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT-III: Embedded Firmware

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT-IV: RTOS Based Embedded System Design

Operating System Basics, Types of Operating Systems, 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, How to Choose an RTOS.

TEXT BOOKS:

1. Shibu K. V, “Introduction to Embedded Systems”, McGraw Hill, 2013.

REFERENCE BOOKS:

1. Raj Kamal, “Embedded Systems”, TMH.
2. Frank Vahid, Tony Givargis, John Wiley, “Embedded System Design”.
3. Lyla, “Embedded Systems”, Pearson, 2013.
4. David E. Simon, “An Embedded Software Primer”, Pearson Education

Course Name	PEDAGOGY STUDIES (Audit Course II)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	2	0	0

UNITS I

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology. Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions**.** Overview of methodology and Searching.

UNITS II

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

UNITS III

Evidence on the effectiveness of pedagogical practices. Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers‟ attitudes and beliefs and Pedagogic strategies.

UNITS IV

Professional development: alignment with classroom practices and follow-up support. Peer support. Support from the head teacher and the community. Curriculum and assessment. Barriers to learning: limited resources and large class sizes.

UNITS V

Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

REFERENCES:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.

4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, „learning to read" campaign.

Course Name	ADVANCED COMMUNICATIONS LAB			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	0	4	2

All experiments simulated using MATLAB

List of Experiments:

1. Measurement of Bit Error Rate using Binary Data
2. Verification of minimum distance in Hamming code
3. Determination of output of Convolutional Encoder for a given sequence
4. Determination of output of Convolutional Decoder for a given sequence
5. Efficiency of DS Spread- Spectrum Technique
6. Simulation of Frequency Hopping (FH) system
7. Effect of Sampling and Quantization of Digital Image
8. Verification of Various Transforms (FT / DCT/ Walsh / Hadamard) on a given Image (Finding Transform and Inverse Transform)
9. Point, Line and Edge detection techniques using derivative operators.
10. Implementation of FIR and IIR filter using DSP Trainer Kit (C-Code/ Assembly code).

Course Name	DIGITAL IMAGE AND VIDEO PROCESSING LAB			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2019-20	0	4	2

All experiments simulated using

MATLAB List of experiments:

1. Perform basic operations on images like addition, subtraction etc.
2. Plot the histogram of an image and perform histogram equalization
3. Implement segmentation algorithms
4. Perform video enhancement
5. Perform video segmentation
6. Perform image compression using lossy technique
7. Perform image compression using lossless technique
8. Perform image restoration
9. Convert a colour model into another
10. Calculate boundary features of an image
11. Calculate regional features of an image
12. Detect an object in an image/video using template matching/Bayes classifier