

M.Tech - Electronics and Telecommunication (Specialization: Signal Processing)

The Postgraduate students are

PEO I: Employable in the diversified sectors of the core industry, public sector or multi-national corporations, in the domain of signal, image, video and multidimensional signal processing, hardware and software development for acquisition, analysis and synthesis of signals.

PEO II: Able to pursue higher education in technologies related to signal processing at institutes of repute leading to contribution in technology and research.

PEO III: Competent with attitude of lifelong learning, and skills of effective interpersonal communication, resulting in leading diverse teams, with ethical and social behavior.

PO1: Apply the knowledge of science, mathematics, and engineering principles for developing problem solving attitude.

PO2: Identify, formulate and solve engineering problems in the signal processing areas such as developing robust and problem specific algorithms for acquisition, processing, analysis and synthesis of signals, which are applied in Signal Processing, Machine Vision and Communication Networks.

PO3: Understand different software tools in the domain of signal processing. Analysis and Verification of algorithms, Functional and timing Simulation on platforms like MATLAB, code composer studio and assembly language.

PO4: Design and conduct experiments, analyze and interpret data, programming skills for development of simulation experiments and, presentation of technical findings by seminars and documentation of own work for effective demonstration.

PO5: Function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility.

Contribution (Mapping) of Course Outcomes to POs

Sr. No.	Course Outcome (CO)	Course Name	Program outcome				
			a	b	c	d	e
		Courses					
1		Image Processing and Applications((OEC) ETC(ILE)-15002)					
	CO 1.	Understand basic image processing techniques.		X	X		
	CO 2.	Identify applications of each of the techniques.		X	X		
	CO 3.	Apply image processing techniques for real life interdisciplinary applications (based on student's specialization)	X	X			
2.		Mathematical Techniques in Signal processing ((PSMC) ESP-15001)					
	CO 1.	Solve linear system of equations having numbers of unknowns equal to, less or more than number of equations.	X	X	X		
	CO 2.	Factorize matrix into components such as LU, QR, SVD etc.	X	X	X		
	CO 3.	Characterize random variables and its functions with probability distributions and cumulative distributions	X	X	X		
	CO 4.	Specify and apply standard distributions to various applications in engineering		X	X		
3.		DSP Architecture((PCC) ESP-15002)					
	CO 1.	Identify and formalize architectural level characterization of P-DSP hardware.				X	
	CO 2.	Ability to design, programming, and testing code for DSP applications using CodeComposer Studio environment in simulation mode and using starter kits.			X		
	CO 3.	Deployment of DSP hardware for Control, Audio and Video Signal processing applications		X			
4.		Multirate and Adaptive Signal Processing((PCC) ESP-15003)					
	CO 1.	Evaluate the performance of various methods for designing adaptive filters through estimation of different parameters of stationary random process.		X		X	
	CO 2.	Ability to experiment and identify merits and demerits of various adaptive algorithms.				X	
	CO 3.	Design and implement filtering solutions for various applications.		X		X	
5.		Audio processing((PCC) ESP(DE)-15001)					

	CO 1.	Understand different characteristics of Speech.		X			
	CO 2.	Identify and analyze different speech analysis system.		X			
	CO 3.	Write algorithms for Recognition of speech.		X	X		
		Multirate and Adaptive Signal Processing Lab(ESP-15003)					
6.	CO 1.	Devise filtering solutions for various applications and appreciate the need for adaptation in design.	X	X	X	X	
	CO 2.	Analyze convergence and stability issues associated with adaptive filter design	X	X	X	X	
		DSP Architecture Lab(ESP-15004)					
7	CO 1.	Implement various digital signal processing algorithms using Code Composer Studio in simulation mode.	X	X	X	X	
	CO 2.	Demonstrate various digital signal processing algorithms on DSP hardware.	X	X	X	X	
	CO 3.	Deploy DSP hardware using Code Composer Studio for various digital signal processing applications.	X	X	X	X	
		Audio processing Lab(ESP-15006)					
8	CO 1.	Analyze audio signal characteristics using PRAAT software.		X	X	X	
	CO 2.	Process audio signals and implement various speech analysis techniques in MATLAB	X	X	X	X	
	CO 3.	Implement any audio processing application in MATLAB.	X	X	X	X	
		Seminar(ESP-15007)					
9.	CO 1.	Explore and engage in higher order thinking activities.		X			
	CO 2.	Express themselves clearly and persuasively.				X	
	CO 3.	Practice oral and written communication skills.				X	
		Research Methodology(ML-15001)					
10.	CO 1.	Understand research problem formulation.		X			
	CO 2.	Analyze research related information				X	
	CO 3.	Follow research ethics					X
11.		Humanities(ML-15002)					

	CO 1.	Understand the need, basic guidelines, content and process for value education.						X
	CO 2.	Understand the harmony in the family, difference between respect and differentiation						X
	CO 3.	Understand the harmony in nature, interconnectedness and mutual fulfillment in nature, holistic perception of harmony.						X
	CO 4.	Understand natural acceptance of human values, competence in professional ethics.						X
		Digital Image and Video Processing((PCC) ESP-15008)						
12.	CO 1.	Understand basic principles behind fundamental image and video processing tasks like enhancement, segmentation and compression.		X				
	CO 2.	Perform the key image and video processing tasks using state of the art techniques and tools.				X		
	CO 3.	Apply these techniques in solving practical problems.		X				
		Biomedical Signal Processing((PCC) ESP-15009)						
13.	CO 1.	Understand different types of biomedical signal.		X				
	CO 2.	Identify and analyze different biomedical signals.		X				
	CO 3.	Apply biomedical signal processing concepts to relevant domain.	X	X				
		Computer vision and Machine Learning((PCC) ESP-15010)						
14.	CO 1.	Understand various image processing, enhancement and segmentation techniques.	X					
	CO 2.	Study and analysis of various statistical techniques for dimensionality reduction and prediction analysis in computer vision and machine learning.			X			
	CO 3.	Implement and evaluate the performance of various computer vision algorithms and classifiers.				X	X	
15.		Elective – II- a. Voice and Data Network b. Multispectral Signal Analysis/ c. Signal Acquisition Devices and System						
		a.Voice and Data Network(ESP(DEC)-15004)						

	CO 1.	Understand switching and routing protocols used in data communication system.		X			
	CO 2.	Analyze network design issues and learned queuing models of networks.		X	X		
	CO 3.	Acquire the knowledge about next generation network architecture.		X			
		b.Multispectral Signal Analysis(ESP(DEC)-15002)					
	CO 1.	Distinguish between Hyperspectral and Multispectral systems and select appropriate hyperspectral data for a particular application.		X			
	CO 2.	Understand basic concepts of data acquisition and image processing tasks required for multi and hyperspectral data analysis.		X			
	CO 3.	Learn techniques for classification and analysis of multi and hyperspectral data	X	X			
		c. Signal Acquisition Devices and System(ESP(DEC)-15003)					
	CO 1.	Understands the elements of data acquisition techniques.		X			
	CO 2.	Critically evaluate and select appropriate techniques and devices for realizing a data acquisition system.	X	X			
	CO 3.	To design and implement a data acquisition solution for a particular application.			X	X	
16.		Elective – III- a. Soft computing Systems b. JTFA and MRA Techniques/c. Multimedia Signal Processing					
		a. Soft computing Systems((DEC) ESP(DE)-15006)					
	CO 1.	Implement Artificial Intelligence algorithms			X	X	
	CO 2.	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems	X				
	CO 3.	Demonstrate genetic algorithms to combinatorial optimization problems and neuralnetworks to pattern classification and regression problems				X	
		b. JTFA and MRA Techniques((DEC) ESP(DE)-15005)					
	CO 1.	Understand the limitations of Fourier Transform and the significance of Wavelets.	X				
	CO 2.	Analysis and study oftechniques for Time-Frequency Analysis and Multi-Resolution Analysis.	X	X			
	CO 3.	Understand applications of Time-Frequency and Multi-Resolution Analysis techniques.		X			

		c. Multimedia Signal Processing((DEC)-ESP(DE)-15007)					
	CO 1.	Understand the fundamentals of multimedia signal processing.		X			
	CO 2.	Use model based approach for signal processing.			X		
	CO 3.	Apply the acquired knowledge to specific multimedia related problems.	X	X			
		Digital Image and Video Processing Lab(ESP-15011)					
17.	CO 1.	To design and implement a data acquisition solution for a particular application	X	X	X	X	
	CO 2.	Execute various image segmentation techniques.		X	X	X	
	CO 3.	Implement image and video compression techniques.		X	X	X	
		Biomedical Signal Processing Lab(ESP-15012)					
18.	CO 1.	Analyze ECG signal and process ECG signal for noise removal.	X	X	X	X	
	CO 2.	Implement various techniques for analysis and classification of biomedical signals.		X	X	X	
	CO 3.	Implement any biomedical signal processing application in MATLAB.		X	X	X	
		Computer Vision and Machine Learning Lab(ESP-15013)					
19.	CO 1.	Implement various algorithms for computer vision and machine learning in MATLAB.		X	X	X	
	CO 2.	Apply computer vision and machine learning approach for various image processing applications.	X	X	X	X	
	CO 3.	Execute different machine learning based classifiers.		X	X	X	
		Intellectual Property Rights(ML-15004)					
20.	CO 1.	Understand that today's world is controlled by Computer, Information Technology, but tomorrow's world will be ruled by ideas, concept, and creativity.					X
	CO 2.	Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.					X

	CO 3.	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.						X
		Liberal Learning Course(LL-15002)						
21.	CO 1.	Exhibit self learning capabilities and its use in effective communication.						X
	CO 2.	Inculcate impact of various areas to relate with society at large.						X
		Dissertation Phase I and II						
22.	CO1	Conceive a problem statement either from rigorous literature survey or from the requirements raised by external entity.	X	X	X	X	X	X
	CO2	Design, implement and test the prototype/algorithm in order to solve the conceived problem	X	X	X	X	X	X
	CO3	Publish the research work in journals/conferences of repute contributing to growth of technology in the domain	X	X	X	X	X	X