



MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA-151001 (PUNJAB), INDIA

(A State University Estb. by Govt. of Punjab vide Punjab Act No. 5 of 2015 and Approved u/s 2(f) & 12 (B) of UGC; Member AIU)

Department: **ELECTRONICS & COMMUNICATION ENGINEERING**
Giani Zail Singh Campus College of Engineering & Technology, MRSPTU

Program: **M Tech Electronics & Communication Engineering**

COURSE ARTICULATION MATRIX (STUDY SCHEME: 2016)

Subject	S Code	Semester	Credit	Duration (Hrs)	L T P	COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
Advanced Communication Systems	MECE1-101	1	4	45	4 0 0	CO1	To understand the concept of orthogonal signals and orthogonalization procedure	3	3					3		3	2
						CO2	To analyze the performance of band-limited channels	3	3				3		3		
						CO3	To evaluate the receiver performance in fading channels	3	3				3		3		
						CO4	To differentiate b/w various OFDM issues.	3	3				3		3		

Microcontrollers and Embedded Systems	MECE1-102	1	4	45	4 0 0	CO1	Understand microcontrollers and components of typical embedded systems.	3		3				3		3	
						CO2	Create embedded hardware design and development.	3	3	3				3		3	2
						CO3	Understand ARM architecture and its design philosophy.	3	3	2				3		3	
						CO4	Apply ARM Programming for real time applications and memory management.	3	3	3		2		3		3	3
Electronics System Design	MECE1-103	1	4	45	4 0 0	CO1	Explain and apply digital electronic principles and guidelines for design of complex electronic systems design, from arithmetic circuit level to higher levels.	3	3				2	3	2	3	2
						CO2	Apply and understand the digital design principles for sequential machines and asynchronous finite state machines	3	3				2	3	2	3	2
						CO3	Describe the design methodology for multi-input system controllers and programmable system controllers-based systems.	3	3	2			2	3	2	3	2
						CO4	Analyze and identify design issues like hazards, cycles and races in digital circuits	3	3				3	3	2	3	2
						CO5	Describe electromagnetic interference and compatibility issues and interfacing of digital system	3	3					3	2	3	2
Research Lab-1	MECE1-104	1	2	-	0 0 4	CO1	A student should know about various software tools available in the field of ECE	3	3	3	2	2		3	2	3	3
						CO2	A student should have skill set for the usage of toolboxes pertaining to their curriculum	2	3	3				3		3	3

						C03	A student should be able to apply these toolboxes for developing experiments/application/project etc.	3	3	3	3	2	2	3	2	3	3
Advance Semiconductor Physics	MECE1-156	1	4	45	4 0 0	C01	Ability to justify the role of different materials in modern electronic devices and applications.										
						C02	Ability to justify the use of specific semiconductor devices for different applications										
						C03	Ability to develop a research temperament to propose optimal design solutions to complex engineering problems.										
Biomedical Electronics	MECE1-157	1	4	45	4 0 0	C01	Describe the basics of human nervous system.	3						3		3	
						C02	Develop the basic understanding of electro-physiological measurements.	2	2				2	3		3	
						C03	Demonstrate the measurements of non-electrical parameters of human body.	3	3					3		3	
						C04	Identify and discuss about the different medical imaging equipment.	3	3	2			2	3		3	3
Information Theory and Coding	MECE1-158	1	4	45	4 0 0	C01	To apply various channel and source coding schemes.	3	3					3		3	
						C02	Differentiate between baseband and bandpass sampling theorems.	3	3					3		3	
						C03	Performance evaluation of various digital modulation techniques.	3	3					3		3	
						C04	To understand various waveform coding techniques.	3	3				2	3		3	
Hardware Description Languages and VLSI Design	MECE1-159	1	4	45	4 0 0	C01	Ability to distinguish between conventional electronic circuit design techniques and CMOS design technology.	3	3	3			2	3	2	3	

						CO2	Ability to design combinational and sequential digital circuits using CMOS technology.	3	3	3		2	2	3	2	3	2
						CO3	Ability to design and model combinational and sequential digital circuits using state-of-the-art CAD HDL tool.	3	3	3		2	2	3	2	3	2
Micro and Nano Sciences	MECE1-160	1	4	45	400	CO1	Discuss the process of crystal growth & preparation process.	3						3		3	
						CO2	Understand the ion implantation techniques.	3						3		3	
						CO3	Develop an understanding of IC technology and IC fabrication process.	3	2				2	3	2	3	2
Sensors and transducers	MECE1-161	1	4	45	400	CO1	Discuss various types of sensors and transducers.	3						3		3	
						CO2	Describe the different sensors for their relevant applications.	3	3					3	2	3	2
						CO3	Analyze the characteristics of radiation, electro analytical and smart sensors.	3	3	2			2	3	2	3	2
Speech and Audio Processing	MECE1-162	1	4	45	400	CO1	To analyze speech signal models.	3	3					3		3	
						CO2	To evaluate speech signal coding.	3	3					3		3	2
						CO3	Designing of various speaker identification systems.	3	3				2	3		3	
						CO4	To understand the concept of audio processing.	3	3					3		3	2
Soft Computing	MECE1-163	1	4	45	400	CO1	Understand and analyze different neural network models.	3	3					3		3	
						CO2	Demonstrate various soft computing techniques.	3	3	3			3	3		3	

						C03	Analyze and reveal different applications to solve various problems using soft computing techniques.	3	3	3			3	3	2	3	3	
Optical Communication System	MECE1-205	2	4	48	400	C01	To analyze the development of different optical networks.	3	3					3		3		
						C02	Differentiate between various optical sources and detectors	3	3					3		3		
						C03	To evaluate various optical fiber measurements.	3	3	3				2	3	2	3	2
						C04	To compare the various optical n/w topologies.	3	3					3		3		
Advanced Digital Signal Processing	MECE1-206	2	4	48	400	C01	Able to differentiate between various types of signals and systems	3	3					3		3		
						C02	The students will be able to design adaptive filters.	3	3				2	3	2	3	2	
						C03	Differentiate between various wavelet transforms.	3	3					3		3		
Research Lab 2	MECE1-207	2	4	-	004	C01	A student shall know about specific software toolboxes available in the field of ECE.	3	3	3	3	2	2	3	2	3		
						C02	A student shall be able to use an application software/toolbox for problem solving in the related field	3	3	3	3	2	2	3	2	3	2	
						C03	A student shall be capable to decide their broad research domain for the thesis work based on their interest and skill set.	3	3	2	2	3	3	3	3	3	3	3
Digital Image Processing	MECE1-264	2	4	40	400	C01	Apply various image transforms for image manipulations.	3	3	3				3	2	3	2	

						CO2	Deal with different operations on image processing for real time applications.	3	3	3		2	2	3	2	3	2
						CO3	Understand the need for image compression and to learn the spatial and frequency domain techniques of image compression.	3	3	3		2	2	3	2	3	2
						CO4	Develop various image processing applications.	3	3	3		2	2	3	2	3	2
Satellite Communication	MECE1-265	2	4	48	400	CO1	Explain the architecture of satellite communication as a means of high speed and high range communication system	3	3				2	3	2	3	
						CO2	Implement general link design equations and concepts related to it.	2	3	2			2	3	2	3	1
						CO3	Describe the various satellite applications.	3						3		3	
Information Security	MECE1-266	2	4	48	400	CO1	Understand various multimedia communication and compression techniques.	3	3					3		3	
						CO2	Analyze network and computer security issues.	3	3					3		3	
						CO3	Apply network security services and mechanisms.	3	3	3			2	3	2	3	2
						CO4	Develop various cryptographic algorithms for real time applications.	3	3	3			2	3	2	3	2
Parallel Processing	MECE1-267	2	4	48	400	CO1	Understand the need and applications of parallel computer models.	3	2					3	2	3	3
						CO2	Explain different types of hardware and software parallelism and conditions	3	2	3		2		3	2	3	3

						C03	Describe various system interconnect architectures and advanced processor architectures like RISC/CISC/superscalar/VLIW etc	3	2	3		2		3	2	3	3
						C04	To understand design basics of different types of pipelines and related issues and defend the need of pipelining	3	2	3		2		3	2	3	3
						C05	To describe multiprocessor architectures and related issues of memory consistency, cache coherence and directory protocols	3	2	3		2		3	2	3	3
Nano Electronics	MECE1-268	2	4	48	4 0 0	C01	Explain the conceptual background of nano-technology.	2						3		3	
						C02	Demonstrate the types, formation and properties of nanotubes.	3					3		3		
						C03	Identify, describe and learn the characterization techniques used in nano-scale devices	3					3		3		
Multimedia Communication System	MECE1-269	2	4	48	4 0 0	C01	To compare various text, audio and video multimedia tools.	3	3	3			2	3	2	3	2
						C02	To design 2D and 3D animations.	3	3	3			2	3	2	3	2
						C03	To analyze various designing tools.	3	3	3			2	3	2	3	2
						C04	To understand the concept of multimedia.	3	3				3		3		
Advanced Network Synthesis and Analysis	MECE1-270	2	4	48	4 0 0	C01	Understand the concept of data transmission and various transmission impairments.	3	3					3		3	
						C02	Create switching and computer/communication networks.	3	3	3	2		2	3	2	3	2

						C03	Apply various network security considerations in real time applications	3	3	3	2		2	3	2	3	2	
						C04	Analyze network problems and various factors such as throughput, latency and bandwidth.	3	3	3	2		2	3	2	3	2	
Micro & Nano Electrotechnical Systems (MEMS and NEMS)	MECE1-271	2	4	48	4 0 0	C01	Discuss the basic concepts of MEMS technology.	3						3		3		
						C02	Explain the technology involved in fabrication of MEMS devices.	3						3		3		
						C03	Demonstrate the design considerations of microwave systems using MEMS technology.	3							3		3	
						C04	Analyze network problems and various factors such as throughput, latency and bandwidth.	3	3	3	2		2	3	2	3	2	
Research Methodology	MREM1-101	3	4	45	4 0 0	C01	Analyze and investigate the business problems and development into research problems.	1								2		
						C02	Identify and apply the latest appropriate research approaches and techniques for developing solutions of research problems		2	3	1					2	2	
						C03	Relate ethical and philosophical consideration in business reach findings in report form						2				2	
						C04	Apply various statistical techniques and present the research findings in report form.					1		2			2	
Project	MECE1-308	3	8	-	0 0 10	C01	Synthesis of knowledge.	3	3	2			3	3	3	3	2	
						C02	To demonstrate the aptitude of applying the own knowledge to solve a specific problem.	3	3	2			2	3	2	3	2	
						C03	To mature the knowledge.	3	3	2						3		
						C04	Able to organize, compile and record all work details in an efficient manner	3	3	2						3	2	

Seminar	MECE1-309	3	2	-	004	C01	An ability to utilize technical resources	3	3					3		3	
						C02	An ability to write technical documents and give oral presentations related to the work completed	3	3			3	3	3	3	3	
						C03	To learn preparation and presentation of scientific papers in an exhaustive manner	3	3			3	3	3	3	3	
Antenna System Design	MECE1-372	3	4	45	400	C01	Gain understanding of different parameters used to characterize antennas.	3	3					3		3	
						C02	Know how to analyze wire and aperture radiating elements	3	3	2				3		3	
						C03	Be able to design various antennas and arrays for many communication systems.	3	3	3		2	2	3	2	3	2
						C04	Implementation of radio wave propagation mechanisms while designing an antenna.	3	3	3		2	2	3	2	3	2
						C05	An ability to understand basic terminology	3	3					3		3	
Error Control and Coding	MECE1-373	3	4	45	400	C01	Describe the model and calculate the capacity of typical digital communication channels.	3	3					3		3	
						C02	Demonstrate the encoding and decoding procedures of various error control codes	3	3					3		3	
						C03	Compare the error correction capability of different error control codes and their performances.	3	3					3		3	
						C04	Apply error control coding to achieve error detection and correction in digital transmission systems	3	3	2				3		3	

						CO4	Able to learn effectively record data and experiments so that others can understand them.	3	3	3	3	2	2	3	2	2	2
						CO5	Communicate the findings by means of a thesis, written in the format specified by the department/institute.	3	3	3	3	3	3	2	3	3	2

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30%

2. Moderate (Medium) – above 30% and upto70%

3. Substantial (High) – above 70%