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

COs, POs, PSOs Mapping

Subject Advanced Communication Systems	**Subject Code MECE1-101**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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	

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%

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

COs, POs, PSOs Mapping

Subject Microcontrollers and Embedded Systems	**Subject Code MECE1-102**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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

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%

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

COs, POs, PSOs Mapping

Subject Electronics System Design	**Subject Code MECE1-103**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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

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%

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

COs, POs, PSOs Mapping

Subject Research Lab-1	**Subject Code MECE1-104**	**Semester 1st**
Credit: 2	**L T P 0 0 4**	**Duration: _____**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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
CO3	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

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%

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

COs, POs, PSOs Mapping

Subject Advance Semiconductor Physics	**Subject Code MECE1-156**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Ability to justify the role of different materials in modern electronic devices and applications.	3	3				2	3	2	3	
CO2	Ability to justify the use of specific semiconductor devices for different applications	3	3				2	3	2	3	2
CO3	Ability to develop a research temperament to propose optimal design solutions to complex engineering problems.	3	3	3		2	2	3	2	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%

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

COs, POs, PSOs Mapping

Subject Biomedical Electronics	**Subject Code MECE1-157**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Describe the basics of human nervous system.	3						3		3	
CO2	Develop the basic understanding of electro-physiological measurements.	2	2				2	3		3	
CO3	Demonstrate the measurements of non-electrical parameters of human body.	3	3					3		3	
CO4	Identify and discuss about the different medical imaging equipment.	3	3	2			2	3		3	3

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%

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

COs, POs, PSOs Mapping

Subject Information Theory and Coding	**Subject Code MECE1-158**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	To apply various channel and source coding schemes.	3	3					3		3	
CO2	Differentiate between baseband and bandpass sampling theorems.	3	3					3		3	
CO3	Performance evaluation of various digital modulation techniques.	3	3					3		3	
CO4	To understand various waveform coding techniques.	3	3				2	3		3	

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%

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

COs, POs, PSOs Mapping

Subject Hardware Description Languages and VLSI Design	**Subject Code MECE1-159**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	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

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%

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

COs, POs, PSOs Mapping

Subject Micro and Nano Sciences	**Subject Code MECE1-160**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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

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%

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

COs, POs, PSOs Mapping

Subject Sensors and transducers	**Subject Code MECE1-161**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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

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%

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

COs, POs, PSOs Mapping

Subject Speech and Audio Processing	**Subject Code MECE1-162**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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

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%

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

COs, POs, PSOs Mapping

Subject Soft Computing	**Subject Code MECE1-163**	**Semester 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Understand and analyze different neural network models.	3	3					3		3	
CO2	Demonstrate various soft computing techniques.	3	3	3			3	3		3	
CO3	Analyze and reveal different applications to solve various problems using soft computing techniques.	3	3	3			3	3	2	3	3

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%

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

COs, POs, PSOs Mapping

Subject Optical Communication System	**Subject Code MECE1-205**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	To analyze the development of different optical networks.	3	3					3		3	
CO2	Differentiate between various optical sources and detectors	3	3					3		3	
CO3	To evaluate various optical fiber measurements.	3	3	3			2	3	2	3	2
CO4	To compare the various optical n/w topologies.	3	3					3		3	

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%

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

COs, POs, PSOs Mapping

Subject Advanced Digital Signal Processing	**Subject Code MECE1-206**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Able to differentiate between various types of signals and systems	3	3					3		3	
CO2	The students will be able to design adaptive filters.	3	3				2	3	2	3	2
CO3	Differentiate between various wavelet transforms.	3	3					3		3	

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%

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

COs, POs, PSOs Mapping

Subject Research Lab 2	**Subject Code MECE1-207**	**Semester 2nd**
Credit: 2	**L T P 0 0 4**	**Duration: _____**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	A student shall know about specific software toolboxes available in the field of ECE.	3	3	3	3	2	2	3	2	3	
CO2	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
CO3	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

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%

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

COs, POs, PSOs Mapping

Subject Digital Image Processing	**Subject Code MECE1-264**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 40 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	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

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%

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

COs, POs, PSOs Mapping

Subject Satellite Communication	**Subject Code MECE1-265**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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	

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%

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

COs, POs, PSOs Mapping

Subject Information Security	**Subject Code MECE1-266**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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

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%

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

COs, POs, PSOs Mapping

Subject Parallel Processing	**Subject Code MECE1-267**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
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
CO3	Describe various system interconnect architectures and advanced processor architectures like RISC/CISC/superscalar/VLIW etc	3	2	3		2		3	2	3	3
CO4	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
CO5	To describe multiprocessor architectures and related issues of memory consistency, cache coherence and directory protocols	3	2	3		2		3	2	3	3

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%

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

COs, POs, PSOs Mapping

Subject Nano Electronics	**Subject Code MECE1-268**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Explain the conceptual background of nano-technology.	2						3		3	
CO2	Demonstrate the types, formation and properties of nanotubes.	3						3		3	
CO3	Identify, describe and learn the characterization techniques used in nano-scale devices	3						3		3	

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%

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

COs, POs, PSOs Mapping

Subject Multimedia Communication System	**Subject Code MECE1-269**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	To compare various text, audio and video multimedia tools.	3	3	3			2	3	2	3	2
CO2	To design 2D and 3D animations.	3	3	3			2	3	2	3	2
CO3	To analyze various designing tools.	3	3	3			2	3	2	3	2
CO4	To understand the concept of multimedia.	3	3					3		3	

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%

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

COs, POs, PSOs Mapping

Subject Advanced Network Synthesis and Analysis	**Subject Code MECE1-270**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Understand the concept of data transmission and various transmission impairments.	3	3					3		3	
CO2	Create switching and computer/communication networks.	3	3	3	2		2	3	2	3	2
CO3	Apply various network security considerations in real time applications	3	3	3	2		2	3	2	3	2
CO4	Analyze network problems and various factors such as throughput, latency and bandwidth.	3	3	3	2		2	3	2	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%

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

COs, POs, PSOs Mapping

Subject Micro & Nano Electrotechnical Systems (MEMS and NEMS)	**Subject Code MECE1-271**	**Semester 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 48 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Discuss the basic concepts of MEMS technology.	3						3		3	
CO2	Explain the technology involved in fabrication of MEMS devices.	3						3		3	
CO3	Demonstrate the design considerations of microwave systems using MEMS technology.	3						3		3	

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%

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

COs, POs, PSOs Mapping

Subject Research Methodology	**Subject Code MREM1-101**	**Semester 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Analyze and investigate the business problems and development into research problems.	1								2	
CO2	Identify and apply the latest appropriate research approaches and techniques for developing solutions of research problems		2	3	1					2	2
CO3	Relate ethical and philosophical consideration in business reach findings in report form						2				2
CO4	Apply various statistical techniques and present the research findings in report form.					1		2			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%

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

COs, POs, PSOs Mapping

Subject Project	**Subject Code MECE1-308**	**Semester 3rd**
Credit: 8	**L T P 0 0 10**	**Duration: _____**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Synthesis of knowledge.	3	3	2			3	3	3	3	2
CO2	To demonstrate the aptitude of applying the own knowledge to solve a specific problem.	3	3	2			2	3	2	3	2
CO3	To mature the knowledge.	3	3	2						3	
CO4	Able to organize, compile and record all work details in an efficient manner	3	3	2						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%

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

COs, POs, PSOs Mapping

Subject Seminar	**Subject Code MECE1-309**	**Semester 3rd**
Credit: 2	**L T P 0 0 4**	**Duration: _____**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	An ability to utilize technical resources	3	3					3		3	
CO2	An ability to write technical documents and give oral presentations related to the work completed	3	3				3	3	3	3	3
CO3	To learn preparation and presentation of scientific papers in an exhaustive manner	3	3				3	3	3	3	3

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%

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

COs, POs, PSOs Mapping

Subject Antenna System Design	**Subject Code MECE1-372**	**Semester 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Gain understanding of different parameters used to characterize antennas.	3	3					3		3	
CO2	Know how to analyze wire and aperture radiating elements	3	3	2				3		3	
CO3	Be able to design various antennas and arrays for many communication systems.	3	3	3		2	2	3	2	3	2
CO4	Implementation of radio wave propagation mechanisms while designing an antenna.	3	3	3		2	2	3	2	3	2
CO5	An ability to understand basic terminology	3	3					3		3	

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%

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

COs, POs, PSOs Mapping

Subject Error Control and Coding	**Subject Code MECE1-373**	**Semester 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Describe the model and calculate the capacity of typical digital communication channels.	3	3					3		3	
CO2	Demonstrate the encoding and decoding procedures of various error control codes	3	3					3		3	
CO3	Compare the error correction capability of different error control codes and their performances.	3	3					3		3	
CO4	Apply error control coding to achieve error detection and correction in digital transmission systems	3	3	2				3		3	
CO5	Design an error detecting and correcting system for semiconductor memory system to meet given system specification.	3	3	2			2	3	2	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%

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

COs, POs, PSOs Mapping

Subject Wireless and Adhoc Networks	**Subject Code MECE1-374**	**Semester 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	To understand the adhoc networks.	3	3					3		3	
CO2	To learn the data transmission flow in adhoc networks	3	3					3		3	
CO3	To understand the security of sensor networks	3	3					3		3	
CO4	To understand the applications of adhoc and sensor networks	3	3				2	3	2	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%

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

COs, POs, PSOs Mapping

Subject Speech and Audio Processing	**Subject Code MECE1-375**	**Semester 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 45 Hrs.**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Qualitatively describe the mechanisms of speech production.	3	3					3		3	
CO2	Apply programming tools (such as MATLAB) to analyze speech and audio signals in time and frequency domains.	3	3	3		2	3	3	2	3	2
CO3	Analyze, compare and implement methods and systems for filtering and coding of speech and audio signals	3	3	3				3		3	2
CO4	Analyze the methods and systems for enhancement of speech and audio signals in environmental noisy conditions.	3	3	3				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%

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

COs, POs, PSOs Mapping

Subject Thesis/Dissertation	**Subject Code MECE1-410**	**Semester 4th**
Credit: 24	**L T P 0 0 20**	**Duration: _____**

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	Design and execute a meaningful research project that demonstrates spatial thinking and uses the knowledge and skills.	3	3	3	3	2	3	3	2	3	2
CO2	Define and analyze a problem in latest research areas.	3	3	3	3	3	3	3	3	3	3
CO3	Formulate and write a research proposal.	3	3	3	3	3	3	3	3	3	2
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%