



GOVT. COLLEGE OF ENGINEERING AND TECHNOLOGY, JAMMU
(Autonomous College)

COURSE SCHEME
M.Tech. 1st SEMESTER Electronics and Communication Engineering
(Batch 2025 & Onwards)

Contact Hours/Week: 23

Course Code	Course Title	Credits	Load Allocation			Marks Distribution					
			L	T	P	CWA	PRS	MSE	ESE	PRE	TOTAL
MECT11	Advance Digital Communication	4	3	1	0	20	-	20	60	-	100
MECT12	Digital System Design	4	3	1	0	20	-	20	60	-	100
MECT13	Embedded System Design	4	3	1	0	20	-	20	60	-	100
MECT14	Wireless and mobile communication	4	3	1	0	20	-	20	60	-	100
MHST11	Research Methodology	4	3	1	0	20	-	20	60	-	100
MECL11	Embedded system laboratory	1	0	0	2	-	40	-	-	60	100
MECL12	VHDL Programming Laboratory	1	0	0	2	-	40	-	-	60	100
	TOTAL	22	15	04	04	-	-	-	-	-	

CWA: Class work Assessment; **PRS :** Practical Sessional; **PRE:** Practical Exam; **MSE:** Mid Semester Exam; **ESE:**End Semester Exam

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GOVT. COLLEGE OF ENGINEERING AND TECHNOLOGY, JAMMU
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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	1st		
Name of the Course	Advance Digital Communication		
Course Code	MECT11	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	Explain the fundamental concept of digital communication, including modulation, demodulation, encoding and decoding.
CO2	Analyse the properties of basic Modulation techniques and apply them to Digital Communication
CO3	Analyse the impact of noise on digital communication system and its effect on signal quality.
CO4	Familiarize the students with Optimum receiver for AWGN and symbol synchronization

Section-A

Elements of a Digital communication system: Communication channels and their characteristics, mathematical models for communication channels, recent trends in digital communication, Deterministic and Random Signal Analysis, Bandpass and Low pass Signal Representation, Signal space representation of waveforms, Vector Space Concepts, Signal Space Concepts, Orthogonal Expansions of Signals.

(10Hrs)

Digital modulation Schemes: Representations of digitally modulated signals, memoryless modulation methods, Linear Modulation with Memory, Non-linear Modulation Methods with Memory, Spectral Characteristics of Digitally Modulated Signals, Power Spectra of Linearly Modulated Signals, Power Spectra of CPFSK and CPM Signals, Power Spectra of Modulated Signals with Memory.

(12 Hrs)

Spread Spectrum Signals for Digital Communication: Model of spread spectrum digital communication system, direct sequence spread spectrum signals, Error Rate Performance of the Decoder, Some applications of DS Spread Spectrum Signals, Effect of Pulsed Interference on DS Spread Spectrum Systems, Generation of PN Sequences, Frequency hopped spread spectrum signals, CDMA system based on FHSS signals, Synchronization of spread spectrum systems.

(8 Hrs)

Section-B

Optimum Receivers for Additive White Gaussian Noise Channels: Waveforms and vector channel models, Optimum detection for the Vector AWGN channel, Implementation of the optimal receiver for AWGN channels, the correlation receiver, matched filter receiver, frequency domain interpretation of the matched filter, Probability of Error for Binary PAM, Probability of Error for M-ary PAM, Probability of Error for M-ary PSK.

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Carrier and symbol synchronization: Signal parameter estimation, the likelihood function, carrier recovery and symbol synchronization in signal demodulation, carrier phase estimation, maximum likelihood carrier phase estimation, phase locked loop, effect of noise on the phase estimation, Decision- Directed Loops, Non-Decision Directed Loops, symbol timing estimation, maximum-likelihood timing estimation, non-decision directed timing estimation. **(15Hrs)**

Suggested Books:

- "Digital Communications", JG Proakis & MSalehi, 5th Edition McGrawHill
- "Digital Communication", Simon Haykins, John Wiley & Sons
- "Principle of Communication systems", Taub & Schilling, Tata McGrawHill

Reference Book:

- "Digital Communications: Fundamentals and applications", Bernard Sklar, Prentice Hall Publications

INSTRUCTIONS (End Semester Examinations)

The question paper shall consist of three sections (I, II & III). Section-I will be compulsory consisting of conceptual/analytical/objective type/short type questions with maximum 12 marks, spread over the entire syllabus (both sections A & B).

Sections II & III of the question paper will have three questions each from the respective sections (A & B) of the syllabus and each question will carry 12 marks. The candidate will have to attempt four questions, from sections (II & III) selecting two from each.

Use of scientific calculators (non-programmable) are permitted, wherever required.

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	1 st		
Name of the Course	Digital System Design		
Course Code	MECT12	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
Mid Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	Understand the combinational circuits using VHDL
CO2	Understand theoretical and practical aspects of all the combinational & sequential circuits.
CO3	Analyse and design sequential circuits by using the concepts of statetable and state reduction techniques.
CO4	Analyse and design of Asynchronous machines.

Section-A

Combinational Design Circuits using VHDL: Introduction to VHDL, basics of VHDL: entity , architecture ,data types, operators, statements used in architecture body etc, different types of modelling using VHDL, half adder, Encoder, Decoder, Comparators, Multiplexers, Demultiplexers, Code converters, 4 -bit Adder, 4-bit arithmetic circuit. **(12hrs)**

Sequential Machine Fundamentals: Need for sequential circuits, Difference between Combinational and sequential circuits, Concept of Memory, Binary Cell , Fundamental of Sequential Machine Operation, Classification of Sequential Machines , Flip-Flop, Type of Traditional Clocked Flip-Flop, Design of Clocked Flip-Flops, Conversion of Flip- Flops. **(15Hrs)**

SECTION-B

Analysis and Design of Sequential Circuits: State Diagram, Analysis of Synchronous Sequential Circuits, Design of Synchronous sequential circuits, State Reduction, Minimizing the next state decoder, Design steps Leading to next State Decoders, Output decoder design, Counters, Design of Single Mode Counters, Multi-Mode Counters, Ripple Counters, Ring Counters, Shift Registers, Ring Counters using Shift Registers. **(11Hrs)**

Combinational MSI/LSI Circuits: Read Only Memories, ROM' SPROMS and applications, Using the PROM for Random Logic, Programmed Logic arrays, Applications of PLA. **(11Hrs)**

Asynchronous Finite-State Machines: Introduction, Asynchronous Analysis, The Design of Asynchronous Machines, Cycles and races, Hazards, Essential Hazards. **(8Hrs)**

Suggested Books:

- An Engineering Approach to Digital Design by Willian Fletcher,PHI.
- Logic and Computer Design Fundamentals by Morris Manoand CharlesR. Kime.





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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	1 st		
Name of the Course	Embedded System Design		
Course Code	MECT13	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	Acquire a basic knowledge about fundamentals of microcontrollers.
CO2	Apply the concepts of embedded processors with various interfaces
CO3	Acquire & implement the knowledge about Life cycle of embedded design and its testing.
CO4	Developing an application with LPC2148 processor/ARM Cortex

Section-A

Definition of Embedded System, Embedded systems Vs Computing systems. Embedded system model. Major application areas. Purpose of embedded systems. Characteristics and quality attributes of embedded systems. Introduction to PIC 16F8XX Microcontrollers, CPU architecture, register file structure, Instruction Set, Programs, Timers and Interrupts, Interrupt Service Routine, Features of Interrupts, Interrupt vector & Priority. **(20 hrs.)**

Interfacing 16F8XX in PIC, I/O Interface, LCD interfacing, seven segment interfacing, I2C bus, DAC, ADC. **(10 hrs.)**

Section-B

System on chip, Application specific integrated circuit, Overview of Embedded Processors like LPC 2148 features and instruction set, interfacing of LPC 2148 with LED, DC motor, buzzer, ultrasonic sensor HC SR04, seven segment display, ADC, keypad, switches UART, etc., Design using LPC2148, study of MIPS Architecture. **(15 hrs.)**

Data parallel issues e.g., SIMD, MIMD. Introduction to FPGA, Basics of FPGA, RTOS overview. Architecture of an RTOS, Important features of Linux, Locks and Semaphores, Operating System Timers, and Interrupts, System, Applications of Embedded Systems in Embedded Networking Introduction to Wireless Sensor Networks, Architecture of Wireless Sensor Node **(15 hrs.)**

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Suggested Books:

- "Microcontrollers(Theory and Applications)",AjayV.Deshmukh
- "PIC Microcontroller",JohnB.Peatman
- PIC Microcontroller and embedded Systems MA Mazidi,Mckinlay and Causey
- Embedded Real Time Systems Dr.K.V.K.K Prasad
- "Embedded Systems",RajKamal
- "Embedded Systems",K.V.Shibu

Reference Book:

- Wireless Sensor Networks",Heath,S.
- ARMSystemDeveloper'sGuideDesigningandOptimizingSystemSoftware,by Morgan Kaufman Publication(2010).
- ARM system architecture",SteveFurber,AddisonWesley
- Real Time Systems",H.Kopetz

INSTRUCTIONS (End Semester Examinations)

The question paper shall consist of three sections (I, II & III). Section-I will be compulsory consisting of conceptual/analytical/objective type/short type questions with maximum 12 marks, spread over the entire syllabus(both sections A & B).

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE/CSE		
Semester	1 st		
Name of the Course	Research Methodology		
Course Code	MHST11	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	To develop understanding of the basic frame work of research process by exploring vari research designs and techniques.
CO2	To comprehend the details of sampling designs, and also different methods of data collections
CO3	Design experimental hypothesis through computational techniques and analyze data through model adequacy checking
CO4	Critically evaluate research publication misconducts and ethical issues

Section-A

Research Methodology: Introduction, Objectives of Research, Significance of Research, Research Methods versus Methodology, Types of Research - Exploratory Research, Descriptive Research, Casual Research, Research Process, Defining a Research Problem, Techniques involved in defining a Problem. **(10hrs)**

Research Design: Need for Research Design, Features of Good Design, Different Research Designs, Sampling Design, Steps in Sampling Design, Types of Sampling Design, Sample size determination, Questionnaire Design and Testing, Measurement and Scaling, Scaling Techniques. **(10Hrs)**

Methods of Data Collection and presentation: Methods of Data Collection (Primary and Secondary Data) , Selection of appropriate method, Data Processing Operations, Diagrammatic and graphical representation of data with Pie chart, Bar diagram, Line chart, Histogram, Frequency Polygon, Ogive curves and Spreadsheets. **(11Hrs)**

Section-B

Statistical tools: Measure of central tendencies – Arithmetic Mean (For individual observation, Discrete series & continuous series) Median, Mode, Quartiles, Deciles and Percentiles; Measure of Dispersion- Range, Quartile Deviation, Standard Deviation, Variance and Coefficient of Variance. **(11 Hrs)**

Techniques of Hypotheses: Hypotheses meaning and basics concepts, Types and Limitations hypothesis, Correlation (Meaning, types, merits and limitations) and Regression (Meaning, types, merits and limitations). **(10Hrs)**

Research and Publication Ethics: Meaning, concept and principles of research ethics, Steps involved in research ethics, Research Misconduct (Fabrication, Falsification and Plagiarism). **(9 Hrs)**

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Recommended Books:

- C.R.Kothari, Research Methodology, Methods and techniques, 5th edition, 2023, New age international publisher.
- John W. Best and V. Kahn, Research in Education, 10th edition, Pearson Publication.
- John W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 3rd Edition, 2008, Sage Publications.

References:

- Ranjit Kumar, RESEARCH METHODOLOGY: A Step-By-Step Guide for Beginners, 4th edition, 2016, Sage publications.
- Booth, Colomb and Williams, The Craft of Research, 2nd Edition, 2003, University of Chicago Press.
- R. Panneerselvam, Research Methodology, 2nd Edition, 2013, Prentice Hall India Learning Private Limited Publisher.
- Vishal Verma and Geetika Tandon Kapoor, Research and Publication Ethics: Core Concepts And Principles, First Edition, 2023, Bharti Publications.

INSTRUCTIONS (End Semester Examinations)

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	1 st		
Name of the Course	Wireless and Mobile Communication		
Course Code	MECT14	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

CO1	Demonstrate a solid understanding of the fundamental principles, concepts, and technologies underlying wireless and mobile communication systems.
CO2	Imbibe knowledge about Wireless Systems And Standards GSM channels, multiplex access scheme.
CO3	Understand the concepts of Handoff, dropped calls and cell splitting, Intersystem handoff.
CO4	Evaluate the performance and analyze the challenges of wireless channels, including fading, diversity, interference, multipath propagation, and channel capacity.
CO5	Understand and Analyse the features and technologies used in advance wireless standards, viz GSM, CDMA2000,4G and 5G.

Section A

Wireless communication systems: Overview of 2G 3G, 4G and 5G Need for 3G and 4G technology; IMT-2000 Global standards: vision, compatibility, service and spectrum requirements ;W-CDMA standard: features, architecture, CDMA2000,features, Next Generation mobile standards :features of 4G &4G LTE,VoLTE,4.5G, 5G. **(10hrs)**

Cellular concept fundamentals- Cell structure, cluster, frequency reuse, basic cellular system: channel assignment strategies, Handoff strategies: concept, types, Hard, Soft, MAHO, Proper and improper handoff, Umbrella cell approach; interference and system capacity: cochannel interference and adjacent channel interference , Improving coverage and capacity in cellular systems: mechanism for capacity improvement-cell splitting, cell sectoring, and micro cell zone concept. **(18hrs)**

Section B

Mobile Radio Propagation: Fading, Large scale path loss, reflection, Diffraction, Scattering, Outdoor Propagation model-Okumura Model, Hata Model, Indoor Propagation Models; Small-scale multipath propagation, Types of small scale fading, Rayleigh and Ricean distributions, Diversity Schemes. **(10 Hrs)**
Digital cellular mobile standards: Global system for Mobile communication (GSM): features and services, GSM radio aspect, GSM architecture, GSM channels; GSM call routing: Mobile terminated call and mobile originated call sequence, stages of call processing in GSM; TDMA, FDMA, CDMA, OFDM **(12Hrs)**

Introduction to 5G: Propagation scenario in and challenges in 5G modelling, spectrum for 5G , Spectrum access and spectrum sharing, carrier aggregation, dual connectivity. Multiple access : OFDMA and NOMA. MIMO technology **(8Hrs)**

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Suggested Books:

- "Wireless Communications: Principles & Practice", T.S. Rappaport
- "Mobile Communications", Jochen Schiller, Pearson Education
- "Mobile and Personal Communication-System and Services", Raj Pandya, PHI
- "Wireless Communications and Network", W. Stallings, Pearson Education

INSTRUCTIONS (End Semester Examinations)

The question paper shall consist of three sections (I, II & III). Section-I will be compulsory consisting of conceptual/analytical/objective type/short type questions with maximum 12 marks, spread over the entire syllabus(both sections A & B).

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	1 st		
Name of the Course	Embedded System Laboratory		
Course Code	MECL11	Credits- 1	L-0 , T-0 , P-2
Practical Sessional	Max. Marks = 40		
Practical Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	Interface ARM controller with various applications.
CO2	Implement macros in any software.
CO3	Implement binary counters using ARM
CO4	Implement programmes on FPGA

Section-A

S.No	List of experiments
1	Write a program to operate LED with the help of ARM controller
2	Write a program to control LED with a switch using ARM controller
3	Write a program to implement 8 bit binary counter using ARM
4	Write a program to interface seven segment display with ARM
5	Write a program to implement macros in any software
6	Write a program to implement ADC using ARM
7	Write a program to interface keypad with ARM
8	Write a program to use INTO interrupt in ARM
9	Implementation on FPGA

NOTE: Additional Practical / Experiments will be performed based on the course content requirements.

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	1 st		
Name of the Course	VHDL Programming Laboratory		
Course Code	MECL12	Credits- 1	L-0 , T-0 , P-2
Practical Sessional	Max. Marks = 40		
Practical Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	Design, simulate and verify with hardware description languages
CO2	Understand and the use of VHDL HDL - entities, architectures, processes, functions, common concurrent statements, and common sequential statements
CO3	Design of combinational and sequential digital logic circuits by using different types of modeling of VHDL HDL language.
CO4	Design of RAM circuits by using VHDL language

S.No	List of experiments
1	Verification of combinational designs
2	Verification of sequential designs.
3	Design and verification of full adder.
4	Design and verification of 4-bit adder.
5	Design and verification of 4-bit look ahead carry adder
6	Design and verification of 8-bit arithmetic circuit.
7	Design and verification of 8-bit ALU.
8	Design and verification of 1024x4 RAM.

NOTE: Additional Practical / Experiments will be performed based on the course content requirements.

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**GOVT. COLLEGE OF ENGINEERING AND TECHNOLOGY, JAMMU
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COURSE SCHEME

**M.Tech. 2nd SEMESTER Electronics and Communication Engineering
(Batch 2025 & Onwards)**

Contact Hours/Week: 28

S.N O.	Course Code	Course Title	Credits	Load Allocation			Marks Distribution					
				L	T	P	CWA	PRS	MSE	ESE	PRE	Total
1	MECT21	IoT and its Industrial Applications	4	3	1	0	20	-	20	60	-	100
2	MECT22	Advance Digital Signal Processing	4	3	1	0	20	-	20	60	-	100
3	MOOC	NPTEL	4	3	1	0	20	-	20	60	-	100
		Elective-I										
4	MECT21	RF and Microwave circuit Design	4	3	1	0	20	-	20	60	-	100
	MECT22	VLSI Process Technology										
	MECT23	Digital ASIC Design										
		Elective-II										
5	MECT24	Advance Computer Networks	4	3	1	0	20	-	20	60	-	100
	MECT25	Digital VLSI Circuit Design										
	MECT26	Digital Image Processing										
		Elective-I laboratory										
6	MECL21	Advance Computer Networks laboratory	1	0	0	2	-	40			60	100
	MECL22	Digital VLSI Circuit Design laboratory										
	MECL23	Digital Image Processing laboratory										
7	MECL24	IOT laboratory	1	0	0	2	-	40			60	100
8	MECS25	Research Seminar-I	2	-	-	4		100				
		Total Credits	24	15	5	8						

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	IoT and its Industrial Applications		
Course Code	MECT21	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	Attain knowledge of IoT, design, Architecture, communication protocols and sensors.
CO2	Implement the concepts Python programming tools, Res-pi and Aurdino.
CO3	Analyze challenges in Iot and its applications in real time scenario.
CO4	While the promise of the Industrial Internet of Things (IIoT) brings many new business prospects, it also presents significant challenges ranging from technology architectural choices to security concerns.

Section-A

Introduction to IoT: IoT Definition, Characteristics, Conceptual framework. IoT Functional Blocks, Physical design of IoT, Logical design of IoT, IoT Architecture, Various architectural views of IoT ,IOT Communication protocols, Cloud platforms for IOT. **(12 Hours)**

IoT to M2M: IoT and M2M fundamentals, Devices and gate ways, Definitions, M2M Value Chains, IoT Value Chains, Difference between IoT and M2M. **(8 Hour)**

Sensors and Actuators Modules: Concept, layout, working and different applications of sensors and actuators, Temperature Sensor, Pressure Sensor, Proximity Sensor, Accelerometer and Gyroscope Sensor, IR Sensor, Optical Sensor, Gas Sensor, Smoke Sensor. ultrasonic sensor, relay. **(10hours)**

SECTION-B

Developing IoT based systems: Architecture and platform board anatomy of Arduino Uno and Raspberry Pi. Introduction to Arduino and Raspberry Pi programming, Implementation of IoT sensors with Arduino and Raspberry, Smartphone (Cellular), Bluetooth, LoRa WAN, Zigbee and wifi interfacing with R-Pi and Arduino. Introduction to ESP8266, Interfacing ESP8266 wi-fi module with web services. **(12 Hours)**

Control & Supervisory Level of Automation: Programmable logic controller (PLC), Real-time control system, Supervisory Control & Data Acquisition (SCADA). HMI in an automation process, ERP & MES. **(8 Hours)**

Application of IIOT: Health monitoring, IOT smart city, Smart irrigation, Robot surveillance. Home Appliances Control Using Blynk Application, IIoT based smart energy meter. **(10 Hours)**

Suggested Books:

- "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatls Karnouskos, David Boyle, 1st Edition, Academic Press, 2014.
- "Internet of Things (A Hands-onApproach)", Vijay Madisetl and ArshdeepBahga, 1st Edition, VPT, 2014
- "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",Francis da Costa, 1st Edition, Apress Publications, 2013

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- "Getting Started with the Internet of Things", Cuno Pfister, O'Reilly Media, 2011, ISBN: 978-1-4493-9357-1
- The Internet of Things in the Industrial Sector, Mahmood, Zaigham (Ed.) (Springer Publication)
- Industrial Internet of Things: Cybermanufacturing System, Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat (Springer Publication)
- Industrial IoT Challenges, Design Principles, Applications, and Security by Ismail Butun (editor)

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M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	Advanced Digital Signal Processing		
Course Code	MECT22	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

COURSE OUTCOMES (COs): On completion of the course the students will be able to	
CO1	Understand the principle of DFT, algorithm approaches in FFT and its use in data reduction.
CO2	Demonstrate proficiency in designing and implementing advanced digital filters including finite impulse response(FIR), infinite impulse response(IIR) filters using various methods.
dCO3	Understand the effect of finite word length and apprehend multi rate signal processing.
CO4	Recognize the concepts of adaptive filters design and its applications

Section-A

Discrete and Fast Fourier Transform: Review of z-transform, Discrete Fourier Transform (DFT) and Discrete Time Fourier Transform (DTFT), Divide and Conquer approach, Introduction to FFT algorithms- Decimation in time and decimation in frequency algorithms. **(15Hrs)**

Digital Filters Design: Design of FIR filters using window methods, frequency sampling method. Design of IIR filter using Impulse Invariant method, Bi-linear transformation, Butter worth filters, Chebyshev filters, Realization structures. **(15Hrs)**

Section-B

Effect of Finite word length in Digital Filters: Introduction, rounding and truncations errors, Quantisation effects, Output noise power from Digital systems, Limit cycle oscillation, Product Quantisation, Scaling. **(10Hrs)**

Multi-rate Digital Signal Processing: Sampling rate conversion, filters in sampling rate alteration systems, multi rate structure for sampling rate conversion, Poly phase Decomposition, Multi stage decimator and interpolator, Digital filter banks, Quadrature mirror filter bank. **(10Hrs)**

Adaptive Filters: Concepts of Adaptive filters, The Windrow LMS algorithm, Recursive Least square Algorithm, Forward-Backward lattice method, Gradient adaptive lattice method, Applications of adaptive filters. **(10Hrs)**

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Suggested Books:

- "Digital Signal Processing", Sallahaman, Vallavaraj and Gnanapriya, Tata McGraw Hill.
- "Digital Signal Processing: Principles, Algorithms and Applications", J.G. Proakis and D.G. Manolakis, Pearson Education.
- "Digital Signal Processing", J.S. Chitode, Technical Publications.

REFERENCE BOOKS:

- "Signals and Systems", Alan V. Oppenheim and Alan S. Willsky, PHI
- "Digital Signal Processing: A practical approach", I. Feacher, and Jervis, Pearson Education.
- "Digital Signal Processing: A computer based approach", S.K. Mitra, Tata McGraw Hill.

INSTRUCTIONS (End Semester Examinations)

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**GOVT. COLLEGE OF ENGINEERING AND TECHNOLOGY, JAMMU
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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	RF and Microwave Circuit Design		
Course Code	MECT21	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes:By the end of the course students will be able to:

CO1	Recognize the significance of boundary conditions in transmission lines and waveguides.
CO2	Understand the fundamentals of semiconductors, followed by their circuit models and analyze the theory and application of microwave measuring instruments.
CO3	Design microwave passive devices with the knowledge of various simulation tools.

SECTION- A

UNIT 1 Review of boundary conditions: Wave-guides and Cavity resonates (rectangular, circular & cylindrical) passive Circuits (design principles), impedance transformers, filters, hybrids, isolates. Detail discussion on S-matrix.
(15 Hrs)

UNIT 2 High frequency semi-conductor devices: Intel valley Scattering, Gunn diodes, IMPATT diodes, Step recovery diodes. Lumped elements: Equivalence circuits of Capacitors and Inductors, Design of lumped element resonators and circuits, Basic blocks in RF system and their VLSI implementation, Design of mixer, Basic topologies VCO and phase noise, Various RF Synthesizer architecture and frequency dividers, Design issues in integrated RF filters. Thin & Thick film technologies.
(15 Hrs)

SECTION-B

UNIT 3 Design aspects: Transmission lines for microwave circuits, Strip lines, Micro-strip lines, Slot line & Coupled lines. Characteristics impedance, Lumped parameters etc. Design considerations and implementation using simulation tools, Design of power dividers, combiners, and directional couplers
(13 Hrs)

UNIT 4 Microwave measurements: SWR, Return loss, impedance, Scattering parameters, attenuation and familiarization with equipments such as vector network analyzer, Spectrum analyzer, power meters and their block diagrams discussion. Fabrication techniques in microwave **(18Hrs)**

Suggested Books:

1. "Stripline- Loke Transmission lines for MICS", B.Bhat&S.koul, John Wiley
2. "Hand book of Microwave Technology, Vol.1", T.K. Ishii, Academics Press
3. "Microwave integrated Circuit", Y.Konishi, Marcel Dekker
4. "Microwave Circuit Analysis and Amplifier Design", S.Y.Liao, PHI
5. "RF Micro-Elements", B.Razavi, PHI

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INSTRUCTIONS (End Semester Examinations)

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	VLSI Process Technology		
Course Code	MECT22	Credits- 4	L-4 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes: By the end of the course, students will be able to:

CO1	Identify the various design limits material used for fabrication technology
CO2	Understand the complexities and Processes involved in the integrated circuits
CO3	Apply principles to Identify and Analyze the various steps for the fabrication of VLSI Chips
CO4	Understand the Assembly Techniques & Packaging of VLSI chip

Section A

Crystal growth: Source of silicon; Single crystalline and Poly crystalline; Requirement of purity for electronics industry; Electronics grade silicon production; Crystal growth techniques; refining; Silicon Wafer Preparation & Crystal Defects; Epitaxial Process: Need of epitaxial layer; vapors phase epitaxy, chemistry of epitaxial process, transport mechanism doping & auto doping; selective epitaxy, epitaxial process induced defects, molecular beam epitaxy. **(15 Hrs)**

Oxidation: Importance of oxidation; types of oxidation techniques; growth mechanism & kinetics; factors affecting the growth mechanisms; silicon oxidation model, dry & wet oxidation; oxidation induced faults. **(08 Hrs)**

Lithography: Basic steps in lithography; lithography techniques-optical lithography, electron beam lithography, x-ray lithography, ion beam lithography; resists and mask preparation of respective lithographic, printing techniques-contact, proximity printing and projection printing. **(10 Hrs)**

Section B

Etching: Performance metrics of etching; types of etching- wet and dry etching; dry etching techniques-ion beam or ion-milling, sputter ion plasma etching and reactive ion etching (RIE); etching induced defects. **(07 Hrs)**

Diffusion and Ion Implantation: Diffusion mechanisms; diffusion reactor; diffusion profile; diffusion kinetics; parameters affecting diffusion profile; Dopants and their behaviour, choice of dopants; Ion Implantation- impurity distribution profile, properties of ion implantation, low energy and high energy ion implantation. **(10 Hrs)**

Metallization: Desired properties of metallization for VLSI; metallization choices; metallization techniques -vacuum evaporation, sputtering. **(05 Hrs)**

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Assembly Techniques & Packaging of VLSI chip: Introduction to packaging; packaging process; various package types, Prototype fabrication of MOSFETs (Enhancement and depletion mode), n-MOS, p-MOS, CMOS.

(05 Hrs)

Suggested Books:

1. VLSI Technology by S.M. Sze, TMH.
2. VLSI Fabrication Principles by S.K. Gandhi, John Willey & Sons.
3. James D. Plummer, Silicon VLSI Technology: Fundamentals, Practice and Modeling, Pearson Education, 2000
4. C.Y. Chang & S.M. Sze, ULSI Technology, McGraw Hill, 1996

INSTRUCTIONS (End Semester Examinations)

The question paper shall consist of three sections (I, II & III). Section-I will be compulsory consisting of conceptual/analytical/objective type/short type questions with maximum 12 marks, spread over the entire syllabus (both sections A & B).

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards

Branch	ECE		
Semester	2 nd		
Name of the Course	Digital ASIC Design		
Course Code	MECT23	Credits- 4	L-4 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes: By the end of the course, students shall be able to:

CO1	Understand the algorithms used for ASIC construction
CO2	Design chip using the Full Custom Design Flow and Tool.
CO3	Understand the basics of System on Chip and on chip communication architecture appreciate high performance algorithms for ASICs.
CO4	Learn the designing and Implementation using FPGA

Section A

Introduction: ASIC and FPGA devices, ASIC and FPGA Design flows, Top-Down and Bottom-Up design methodologies, Hardware Description Languages, Design Automation Tools, HDL Support for Synthesis. Language concepts: Design Entity, Declaration statements, concurrent statements, sequential statements, data types, data objects, expressions, operands, if-else, for-loop, case statements, synthesis equivalents and constraints.

(15 Hrs)

Modelling Combinational Circuits: Control & Data partitioning, Synthesis concepts, non-synthesizable constructs, operators, expressions, conditional statements, post synthesis simulation, basic test bench, Logic and arithmetic equations, multiplexers, encoders, decoders, comparators, adders, subtractors, multipliers, ALUs, synthesis constraints.

(15 Hrs)

Section B

Modelling sequential circuits: Latches and Flip-flops, counters, mealy and Moore FSM, shifters, sequential adders, multipliers and dividers. Blocking and non-blocking statements, Static timing analysis, Procedures and timing control, procedural blocks, loops, Tasks and functions, Test bench modelling techniques, Path delay modelling, Timing analysis, User defined primitives, compiler directives, and system task.

(15 Hrs)

Implementation on FPGA. Unsigned integer, signed integer, fixed-point, floating-point arithmetic, Asynchronous considerations. Memory design: synchronous and asynchronous, single, dual and multi-port, Error detection and correction, compiler directives.

(15 Hrs)

Suggested Books:

1. The Designer's Guide to VHDL by Peter J. Ashenden, Morgan Kaufmann Publishers.
2. A Verilog HDL Primer by J. Bhasker.
3. Verilog HDL: A Guide to Digital Design and Synthesis by Samir Palnitkar, Prentice Hall.
4. The Complete Verilog Book by Vivek Sagdeo, Kluwer Academic Publishers.
5. A VHDL Primer by J. Bhasker, Prentice Hall.

INSTRUCTIONS (End Semester Examinations)

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	Advance Computer Networks		
Course Code	MECT24	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes:By the end of the course, students will be able to:

CO1	Design a network with appropriate protocols selected according to requirement.
CO2	Analyze different routing protocols and traffic engineering methods deployed in networking.
CO3	Analyze the implications of shifting from traditional network architectures to software defined networks.

Section A

Overview: Computer Network, Network Topologies, LAN, MAN, and WAN, The OSI reference model, TCP/IP reference model, Addressing, Circuit Switched, Datagram and Virtual Circuit Networks, Hubs, Bridges, switches, Routers and Gateways. **(10Hrs)**

Data Link Layer: Design Issues, Error Control, Flow-control protocols: Stop-and-wait, and Sliding-window. Link protocols: HDLC, SLIP, and PPP Protocols. **(08Hrs)**

Network Layer: Routing Algorithms: Shortest path routing, Flooding, Distance-vector routing, Link-state routing, Hierarchical routing, Broadcast routing and Multicast routing. Congestion control: Principles and policies congestion control in Virtual-circuit and Datagram subnets. Load shedding and Jitter control. Quality of Service: Techniques for achieving good Quality of Service, Integrated Services, Differentiated Services, Label Switching and MPLS. **(12 Hrs)**

SECTION-B

Internetworking and Internet Protocols: Tunnelling, Fragmentation. The IPv4 Protocol, IPv4 addresses, IPv6 Protocol, Mobile IP, OSPF, BGP, ARP, DHCP, Internet Control Protocols, Classless Inter-domain Routing (CIDR), Network Address Translation (NAT), Sub-netting and Super-netting. **(15 Hrs)**

Transport Layer: Transport layer protocol issues: Addressing, Connection Establishment, Connection Release, Flow control and Multiplexing. Internet Transport Protocols: TCP and UDP. **(15Hrs)**

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INSTRUCTIONS (End Semester Examinations)

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	Digital VLSI Circuit Design		
Course Code	MECT25	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes: By the end of the course, students will be able to:

CO1	Classify ICs, static and dynamic VLSI design techniques
CO2	Design any CMOS digital VLSI Combinational and sequential circuits.
CO3	Design, analyze and verify digital logic circuits and MOS memories
CO4	Understanding the Physical layout designing of circuits

Section A

Overview of Classification of IC Technologies-Trades off, Necessity of CMOS IC, MOS Transistor, MOS structure, MOS System under different bias, Types and principles of MOSFETs, Threshold Voltage, Channel length modulation, substrate bias effect, Introduction to large signal MOS models (long channel) for digital design. MOS scaling and small Geometry effects, MOS Capacitances, MOS Inverters-Static characteristics, Resistive, Depletion and Enhancement load NMOS inverters, CMOS inverter-voltage transfer characteristics, logic threshold, Noise margins. Dynamic behavior, transition time, Propagation Delay, CMOS Power dissipation.
(15 Hrs)

Overview of MOS& CMOS (p-well, n-well and Twin Tub) fabrication processes, MOS layers, MOS Circuit Layout & Simulation, Stick diagrams, Layout design rules, MOS device layout, Transistor layout, Inverter layout, Complex CMOS-circuits layout & simulation, Circuit Compaction, Euler's Rule, Circuit extraction and post-layout simulation.
(15 Hrs)

Section B

Combinational MOS Logic Circuits, MOS Logic Circuits with Depletion nMOS Loads, Static MOS design, CMOS logic circuits , Ratioed logic, Pass Transistor logic, Complex nMOS & CMOS logic circuits, AOI & OAI Gates, CMOS Transmission gate & Circuit design. Pseudo nMOS gates, Dynamic MOS design-Synchronous Dynamic Techniques, CMOS Transmission Gate Logic, Dynamic CMOS Logic, High performance Dynamic CMOS logic families and their performance
(15 Hrs)

Sequential MOS Logic Design-Static and dynamic latches, flip-flops & registers, MOS Memory design, Design of ROM, SRAM and DRAM cells. CMOS Schmitt trigger, adders and multiplier circuits.
(07 Hrs)

Introduction to low power design-Power dissipation in CMOS, design Through Voltage Scaling VTCMOS, MTCMOS Circuits. Bi CMOS Logic Circuits, Basic Bi CMOS Circuit behavior, Switching Delay in Bi CMOS Logic circuits.
(08 Hrs)





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Suggested Books:

1. CMOS Digital Integrated Circuits-Analysis & Design by S.M. Kang & Y. Leblibici, TMH.
2. Digital Integrated Circuits Design by J.M. Rabey, Pearson Education.
3. Principles of CMOS VLSI Design: A System Perspective by NHE Weste & K. Eshraghian, McGraw Hill Pub.
4. CMOS Logic Circuit Design by Uyemera, Springer India Pvt. Ltd. New Delhi.
5. Introduction to VLSI by Eshraghian & Pucknell, PHI.
6. J P Rabaey, A P Chandrakasan, B Nikolic, "Digital Integrated circuits: A design perspective", Prentice Hall electronics and VLSI series, 2nd Edition

INSTRUCTIONS (End Semester Examinations)

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	Digital Image Processing		
Course Code	MECT 26	Credits- 4	L-3 , T-1 , P-0
Mid Semester Examination	Max. Marks = 20	Class Work Assessment (CWA)	Max. Marks = 20
End Semester Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes: By the end of the course, students shall be able to:

CO1	Demonstrate a fundamental understanding of Digital image processing concepts including image representation, enhancement and restoration.
CO2	Apply various image processing techniques to perform tasks such as noise reduction, contrast enhancement, sharpening of images.
CO3	Evaluate the impact of different image compression techniques on image quality and file size considering lossless and lossy compression methods.
CO4	Apply knowledge/skills to solve industrial problems based on image processing.

SECTION-A

Introduction and Digital Image Fundamentals: Image processing definition, steps in image processing, Application of image processing, Elements of visual perception, light and the electromagnetic spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Spatial and Intensity resolution-Effect of reducing spatial resolution, DPI, Effect of reducing image gray levels, Image interpolation, Some basic relationships between pixels, Adjacency, Connectivity, Regions and Boundaries. **(12hrs)**

Intensity Transformation and Spatial Filtering: Basics of intensity transformation and spatial filtering, intensity transformation functions-image negative, log transformation, power law; Piecewise-linear transformation functions-contrast stretching, intensity level slicing, bit plane slicing; Histogram Processing histogram stretching, histogram equalization, Fundamentals of Spatial Filtering. **(10hrs)**

Image Restoration and Reconstruction: Model of the image degradation/restoration process, Noise Models, Periodic Noise, Restoration in the presence of noise-spatial filtering- Mean filters, Order-statistics filters, Median filter, Max and Min filters, Mid-point filter, Alpha-trimmed mean filter, adaptive filters, Image reconstruction from projections. **(8hrs)**

SECTION-B

Color Image Processing: Introduction to the color image processing, color models: RGB, HSI, CMY/CMYK; Conversion of color models: converting colors from RGB to HSI, HSI to RGB, RGB to CMY and CMY to RGB etc. Pseudo coloring of images. **(15hrs)**

Image Compression: Introduction to image compression, need of compression, methods of image compression: coding redundancy, Interpixel redundancy, Psychovisual redundancy, Spatial and temporal redundancy, irrelevant information, models of image compression, Image formats, Containers and compression standards, Huffman coding, Arithmetic coding, LZW coding, run-length coding, block transform coding, JPEG compression, predictive coding. **(15hrs)**

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Suggested Books:

1. Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3rd edition, Pearson Education.
2. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach", Prentice Hall
3. A.K. Jain, "Fundamental of Digital Image Processing",

INSTRUCTIONS (End Semester Examinations)

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GOVT. COLLEGE OF ENGINEERING AND TECHNOLOGY, JAMMU
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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards

Branch	ECE		
Semester	2 nd		
Name of the Course	Advance Computer Network Lab		
Course Code	MECL21	Credits- 1	L-0 , T-0 , P-2
Practical sessional	Max. Marks =40		
Practical Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes: By the end of the course, students shall be able to:

CO1	Understand fundamental underlining principles of computer networking and functionality of layered network architecture.
CO2	Analyze performance of various communication protocols
CO3	Practice packet/ file transfer between nodes.

S.No	Lab Experiments:
1	To study different types of networking cables
2	To implement the cross-wired cable and straight through cable using crimping tool.
3	To study about different networking devices
4	To connect two computers in a local area network and to share file between them.
5	To study about IP addressing.
6	To implement various topologies using the LAN trainer kit.
7	To study the UDP protocol and TCP protocol using the LAN trainer software

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	Digital VLSI Circuit Design Lab		
Course Code	MECL22	Credits- 1	L-0 , T-0 , P-2
Practical sessional	Max. Marks = 40		
Practical Examination	Max. Marks= 60	Max. Time- 3 Hrs	

S.No	Lab Experiments:
1	Study of various simulator commands to perform the different analysis on MOS Devices Circuits.
2	Simulate an NMOS & PMOS with minimum dimensions. Determine its dc drain and transfer characteristics at $V_{BS} =$ zero and a non-zero values. Hence compute the threshold voltage using available EDA tools.
3	Simulate an NMOS with five and ten times the minimum dimensions, determine its dc drain and transfer characteristics at $V_{BS} =$ zero and a non-zero values. Hence determine channel length modulation factor using available EDA tools.
4	Design and Simulate a CMOS Inverter & obtain its transfer characteristics & transient analysis. Extract various design parameters from simulation results. Furthermore, analyze and plot the power and delay variations with supply voltage.
5	Design and Simulate a CMOS OR/NOR Gate, verify its truth table and obtain its transient analysis. Hence analyze and plot their power and delay with load variations.
6	Design and Simulate a CMOS AND/NAND Gate, verify its truth table and obtain its transient analysis.
7	Design and Simulate a CMOS EX-OR/EX-NOR Gate, verify its truth table and obtain transient analysis.
8	Design and Simulate a CMOS SR Latch (using NAND) and verify its Truth Table.
9	Design and Simulate a CMOS SR Latch (Using NOR) and verify its Truth Table.
10	Use 0.18 μ m CMOS process, or any other available Technology. a) Plot I_D vs. V_{GS} at different drain voltages for NMOS, PMOS. b) Plot I_D vs. V_{GS} at particular drain voltage (low) for NMOS, PMOS and determine V_t . c) Plot I_D vs. V_{DS} at different gate voltages for NMOS, PMOS and determine Channel length modulation factor.

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	Digital Image Processing Lab		
Course Code	MECL23	Credits- 1	L-0 , T-0 , P-2
Practical sessional	Max. Marks = 40		
Practical Examination	Max. Marks= 60	Max. Time- 3 Hrs	

S.No	Lab Experiments:
1	Introduction to MATLAB and various commands used in MATLAB for DIP.
2	To study the image processing concept.
3	To perform image sampling and quantization using MATLAB.
4	Implementation of relationships between pixels.
5	To perform intensity transformations of image using MATLAB.
6	To study the histogram and histogram equalization
7	To perform image enhancement by spatial filtering.
8	To generate filters directly in the frequency domain using MATLAB.
9	To study lines in the images using MATLAB.
10	To study points in the image using MATLAB.
11	To perform region-based segmentation of image using MATLAB.
12	To perform analysis of images with different colour models.
13	Program of sharpen image using gradient mask.

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	IoT and its Industrial Applications Lab		
Course Code	MECL24	Credits- 1	L-0 , T-0 , P-2
Practical sessional	Max. Marks =40		
Practical Examination	Max. Marks= 60	Max. Time- 3 Hrs	

Course Outcomes: By the end of the course, students shall be able to:

CO1	Familiarize with various controllers, sensors and actuators.
CO2	Acquire knowledge about various IoT based connectivity modules.
CO3	Design a real time project

Detailed Syllabus

S.No	Lab Experiments:
1	Introduction to Arduino and Raspberry Pi programming.
2	Experiment to perform interfacing of raspberry pi/Arduino with LED and switch.
3	Experiment to perform serial Communication using raspberry pi/Arduino.
4	Experiment to perform interfacing of various sensors with Arduino uno.
5	Experiment to setup the thing speak cloud for data reception & transmission
6	Experiment to transmit temperature & humidity sensor data to thing speak cloud
7	Experiment to perform transferring of data through Bluetooth app to Raspberry Pi/Arduino Uno.
8	Experiment to setup the Blynk app cloud for data reception & transmission
9	Experiment to perform Interfacing of raspberry pi/Arduino with relay module and controlling through blynk platform.
10	Experiment to perform Interfacing of Esp32 with stepper motor & control the direction of motor through IoT platform.
11	Experiment to perform communication between two XBEE modules in AT mode.
12	Experiment to configure a XBEE module in Broadcast and API mode.
13	Experiment to study Digital Input/ Output using Ladder Logic.
14	Experiment to study Analog Input/ Output of PLC.
15	Experiment to perform IOT control applications through SCADA.

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Department of Electronics and Communication Engineering

M.Tech. Syllabus From Batch-2025 & Onwards			
Branch	ECE		
Semester	2 nd		
Name of the Course	Research Seminar – I		
Course Code	MECS21	Credits-2	L-0, T-0, P-4

Course Overview: The course aims to expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions. To promote and develop presentation skills and import a knowledgeable society. To set the stage for future recruitment by potential employers.

Course Outcomes: By the end of the course, students will be able to:

CO1	An ability to work in actual working environment.
CO2	An ability to utilize technical resources.
CO3	An ability to write technical documents and give oral presentations related to the work completed.

General guidelines for Presentation and File:

Content: Report must contain abundant material clearly related to topic; points should be clearly made and all evidence must support the topic along with varied use of materials.

Coherence and Organization: Topic should be clearly stated and developed; specified examples must be incorporated that would clearly develop the concept; conclusion must be clear and must flow together well.

Multimedia Material used: Report should have a balanced use of multimedia materials to properly showcase the work done.

Note: Seminar will be evaluated on internal scheme with following components:

- | | |
|-----------------|-----|
| 1) Presentation | 30% |
| 2) Viva-Voce | 30% |
| 3) Report | 40% |

[Handwritten signatures]