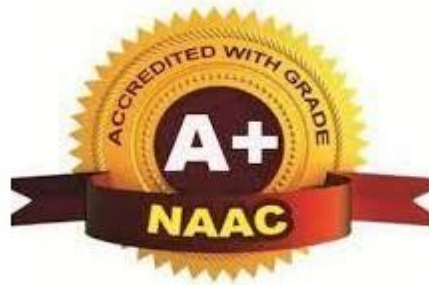




TULSIRAMJI GAIKWAD-PATIL
College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

(An Autonomous Institute)



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

M.Tech Electronics (Communication) Engineering

Structure & Curriculum

From

Academic Year 2021-22

Vision of Institute

“To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management”

Mission of Institute

- [M1]: To strive for rearing standard and stature of the students by practicing high standard of professional ethics, transparency, and accountability.
- [M2]: To provide facilities and services to meet the challenges of industry and society.
- [M3]: To facilitate socially responsive research, innovation and entrepreneurship.
- [M4]: To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

Vision of the Department

To impart state of art education for enabling youth to offer solution for the challenges faced in the field of Electronics & Communication Engineering.

Mission of the Department

- To stimulate and develop the students through quality education to face the challenges.
- To empower youth for developing them as a leader through lifelong learning.
- To infuse scientific temper towards research activities.
- To provide a framework for promoting training in collaboration with industry institute interaction.
- To foster a broad spectrum of knowledge in order to prepare them for ethical and social concern.

Program Education Objectives (PEO)

- Students will apply basic fundamentals in mathematics, physics and electronic engineering discipline to build sound foundations.
- Students will design, analyze and solve engineering problems to develop them as the professional leaders in the field of Electronics & communication Engineering.
- Students will get exposure by providing technical training to execute the multidisciplinary projects as a team.
- Students will channelize their knowledge through lifelong learning to assist in the development of the society.
- Students will acquire work ethics and concern for society.

Program Outcomes (PO)

- PO1:** To achieve competence in designing, analyzing and testing electronic systems for social, industrial and research application in communication, signal processing and embedded system.
- PO2:** An ability to independently carry out research/investigation and development work to solve practical problems.
- PO3:** To inculcate research attributes and approach through industry oriented internships and project.

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur
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Scheme of Instructions and Syllabus

Scheme of Instructions for First Year M. Tech. Programme in Electronics (Communication) Engineering

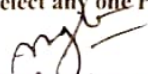
Semester – I (w.e.f.: AY 2021-22)

Sr.	Course Category	CourseCode	Course Title	L	T	P	Contact Hrs / week	Credits	Exam Scheme				
									CT - 1	CT - 2	TA / CA	ESE	TOTAL
1.	PCC	MEC1101	Coding Theory and Techniques	3	1	-	4	4	15	15	10	60	100
2.	PCC	MEC1102	Digital Communication Technology	3	-	-	3	3	15	15	10	60	100
3.	PEC	MEC1103-6*	Professional Elective - I	3	-	-	3	3	15	15	10	60	100
4.	PEC	MEC1107-10*	Professional Elective -II	3	-	-	3	3	15	15	10	60	100
5.	PCC	MEC1111	Adaptive Signal Processing	3	-	-	3	3	15	15	10	60	100
6.	PCC	MEC1112	Digital Communication Technology Lab	-	-	2	2	1	-	-	25	25	50
7.	PCC	MEC1113	Adaptive Signal Processing Lab	-	-	2	2	1	-	-	25	25	50
8.	MCC	MAU 1102	Pedagogy Studies	2	-	-	2	Audit	-	-	-	-	-
Total				17	1	4	22	18	75	75	100	350	600

L- Lecture T-Tutorial P-Practical CT1- Class Test 1 CT2- Class Test 2 TA/CA- Teacher Assessment / Continuous Assessment
ESE- End Semester Examination (For Laboratory: End Semester Performance)

*-Indicates out of the 04 course code each student has to select any one Professional Elective.


HOD (ECE)
Department of Electronics & Comm
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Engg. & Tech Nagpur


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Principal
Tulsiramji Gaikwad - Patil College Of
Engineering & Technology
Nagpur

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Scheme of Instructions and Syllabus

Scheme of Instructions for First Year M. Tech. Programme in Electronics (Communication) Engineering

Semester – II (w.e.f.: AY 2021-22)

Sr.	Course Category	CourseCode	Course Title	L	T	P	Contact Hrs/ week	Credits	Exam Scheme				
									CT - 1	CT - 2	TA / CA	ESE	TOTAL
1.	PCC	MEC 1201	Optical Wireless Communication System	3	-	-	3	3	15	15	10	60	100
2.	PCC	MEC 1202	Smart Antenna Theory	3	-	-	3	3	15	15	10	60	100
3.	PEC	MEC1203-6*	Professional Elective - III	3	-	-	3	3	15	15	10	60	100
4.	PEC	MEC1207-10*	Professional Elective – IV	3	-	-	3	3	15	15	10	60	100
5.	PCC	MEC 1211	Optical Wireless Communication System Lab	-	-	2	2	1	-	-	25	25	50
6.	PCC	MEC 1212	Smart Antenna Theory Lab	-	-	2	2	1	-	-	25	25	50
7.	FC	MEC 1213	Research Methodology #	2	-	-	-	2	-	-	-	-	-
8.	PCC	MEC1214	Code Composer Studio Lab	-	-	4	4	2	-	-	25	25	50
9.	MCC	MAU 1203	Research Paper Writing	2	-	-	2	Audit	-	-	-	-	-
			Total	16	-	08	22	18	60	60	115	315	550

L- Lecture T-Tutorial P-Practical CT1- Class Test 1 CT2- Class Test 2 TA/CA- Teacher Assessment / Continuous Assessment

ESE- End Semester Examination (For Laboratory: End Semester Performance)

*-Indicates out of the 04 course code each student has to select any one Professional Elective.

Students is expected to complete it online by appearing NPTEL/Swayam Certification for 03 credits. Weekly 02 Hrs practical in which students are expected to work on mathematical modeling, Seminar on IPR, Patent filing, Removing Plagiarisms, etc. will be done.

HOD/DECE

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Tulsiramji Gaikwad – Patil College Of
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Scheme of Instructions and Syllabus

Scheme of Instructions for First Year M. Tech. Programme in Electronics (Communication) Engineering

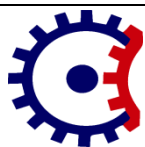
List of Professional Elective Courses

Semester I			
Course Code	Professional Elective I	Course Code	Professional Elective II
MEC1103	Advanced Communication Network	MEC1107	Wireless Sensor Networks
MEC1104	Embedded Systems Design & Application	MEC1108	Active RF Devices and Circuits
MEC1105	Industrial Communication Systems	MEC1109	Cryptography And Information Security
MEC1106	Telecommunication Networks	MEC1110	Fiber Optic Systems
MOOCS COURSES		MOOCS COURSES	
Semester II			
Course Code	Professional Elective III	Course Code	Professional Elective IV
MEC1203	Artificial Neural Networks and Applications	MEC1207	Pattern Recognition and Machine Learning
MEC1204	Remote Sensing	MEC1208	Digital Image and Video Processing
MEC1105	Modelling and Simulation Techniques	MEC1109	Biomedical Signal Processing
MEC1106	IOT and Application	MEC1110	Artificial Intelligence
MOOCS COURSES		MOOCS COURSES	


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Program: M.Tech. Electronics (Communication) Engineering

Semester-I MEC1101: Coding Theory And Techniques

Teaching Scheme		Examination Scheme	
Theory	3 Hrs/week	CT-I	15 Marks
Tutorial	1 Hrs/week	CT-II	15 Marks
Total Credits	4	CA	10 Marks
Duration of ESE: 3Hrs		ESE	60 Marks
Pre-Requisites: Digital Communication		Total Marks	100 Marks

Course Objectives:

1.	Students will learn the behavior of reliable transmission of data and behavior of communication system.
2.	Student will apply the knowledge of error detection and correction for linear block codes in digital communication system.
3.	To present different coding techniques in digital communication with the help of different applications.
4.	Student will get the knowledge of BCH code and apply algorithm of coding and decoding for secure transmission.
5.	To present the importance and need of turbo codes in communication system, discuss viterbi algorithm and their application in digital transmission.

Course Contents

Unit I	Introduction to need of Forward Error Correction: reliable information transmission, Discrete communication channels and Shannon's theorems. Introduction to groups, rings and fields, Finite fields based on integer and polynomial rings, Binary field arithmetic, construction and properties of GF (2 ^m), Vector spaces, Logic circuits for finite field arithmetic.
Unit II	Linear Block Code: Structure of Linear Block Codes, encoding, minimum distance, error detection and correction capabilities, syndrome, Standard array and decoding of block codes, Probability of undetected error over binary symmetric channel, STBC space time block codes, pulse jamming on alamouti space time block codes.
Unit III	Cyclic Codes: Polynomial and matrix description of Cyclic Codes, encoding, decoding, syndrome computation and error detection, Hamming code and Golay code, Reed-Muller, Shortened and quasicyclic codes, Error trapping decoding. Burst-error correction, interleaving and concatenation. Cooperative jamming, Coding technique utilize to enhance MIMO channel capacity,
Unit IV	BCH Codes and RS Code : Berlekamp's iterative algorithm for BCH decoding, decoder implementation; Non-binary BCH and Reed Solomon (R-S) codes, decoding of R-S codes by Berlekamp's algorithm; Frequency domain representation and decoding of R-S codes.

Unit V	Turbo Codes, Trellis Code: Convolution codes, encoding, trellis description, structural and distance properties, Viterbi algorithm (VA), implementation and performance of VA, SOVA and BCJR algorithms. Introduction to Turbo and LDPC codes, Iterative decoding of Turbo codes. Trellis coded modulation.
Text Books	
T.1	Lin, S. and Costello Jr., D.J., “Error Control Coding”, 2nd Ed., Pearson Prentice-Hall.
T.2	Blahut, R.E., “Algebraic Codes for Data Transmission”, 2nd Ed., Cambridge University Press.
T.3	Vucetic, B. and Yuan, J., “Turbo Codes: Principles and Applications”, Springer.
Reference Books	
R.1	McEliece, R., “Theory of Information and Coding”, 2nd Ed., Cambridge University Press.
R.2	Huffman, W.C. and Pless, V., “Fundamentals of Error Correcting Codes”, Cambridge University Press.
R.3	Moon, T.K., “Error Correction Coding: Mathematical Methods and Algorithms”, Wiley Interscience.
Useful Links	
1	https://nptel.ac.in/courses/117/106/117106031/
2	https://nptel.ac.in/courses/108/104/108104092/
3	https://onlinecourses.nptel.ac.in/noc20_ee94/preview

	Course Outcomes	PO/PSO	CL	Class Sessions
MEC1101.1	Examining different theories related to reliable data transmission of digital communication.	PO1,PO2,PO3	3	9
MEC1101.2	Evaluate the types of coding and understand different techniques used for error coding.	PO1,PO2,PO3	5	9
MEC1101.3	Analyze the suitable coding techniques apply on the different application.	PO1,PO2,PO3	4	9
MEC1101.4	Determine use of algorithm in transmission based on application.	PO1,PO2,PO3	4	9
MEC1101.5	Design of convolutional codes and implementation of turbo codes in data transmission.	PO1,PO2,PO3	5	9

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Program: M.Tech. Electronics (Communication) Engineering					
Semester: I		MEC1102:Digital Communication Technology			
Teaching Scheme				Examination Scheme	
Theory	3 Hrs/week			CT-I	15 Marks
Tutorial	--			CT-II	15 Marks
Total Credits	3			CA	10 Marks
Duration of ESE: 3 Hrs.				ESE	60 Marks
Pre-Requisites: Communication Engineering				Total Marks	100 Marks
Course Objectives:					
1.	To analyze the representation of a signal with the help of different presentation models and how effective and useful tool in the analysis of digitally modulated signals.				
2.	Students will learn how digital transmission is more secure and accurately demodulate the data or information, with the help of modulation techniques. Design optimum receivers for digital modulation techniques.				
3.	Students will learn how to design the optimum filter with less probability of error.				
4.	To understand the different multicarrier modulation techniques and their algorithm.				
5.	To analyze different types of spread spectrum technique and transmission of digital data through various techniques and their secure reception at the demodulation.				
Course Contents					
Unit I	Characterization of Communication Signals and Systems: Mathematical model for communication channels and their characteristics, Characterization of Band pass signals and system, Representation of digitally modulated signals, Spectral characteristics of Digitally modulated signals, Non-linear modulation methods with Memory.				
Unit II	Optimum Receiver for Signals Corrupted by AWGN Channel: Performance of the Optimum receiver for Memory less modulation, Optimum receiver for CPM signal in AWGN channel. Probability of Error for Binary and M-ary signaling in AWGN channel.				
Unit III	Detection Strategies and Filter Characteristics: Baseband Reception and Probability of error, The ML & MAP detection strategies, ML detection with Zero mean AWGN, the Optimum Filter, Transfer function of Optimum filter, Matched filter, Properties of Matched filter.				
Unit IV	Multicarrier systems: Orthogonal Frequency Division Multiplexing Technique, MIMO-OFDM modulation system, SISO-OFDM modulation system, Algorithm implementation IFFT/FFT of OFDM Continuous phase Modulation (CPM) schemes channel characterization .				

Unit V	Spread Spectrum Signals: Direct sequence spread spectrum and CDMA systems, Performance analysis of DS-SS system in AWGN channel, Performance analysis of FH-SS system in AWGN channel.			
Text Books				
T.1	Digital Communications1995 4 th Edition J. G. Proakis McGraw Hill			
T.2	Digital Communications 1998 Simon Haykin John Wiley & Sons			
T.3	Principles of Digital Communications and Coding 1979 J. Viterbi and J. K. Omura McGraw Hill			
Reference Books				
R.1	Spread Spectrum Communications 1995. Marvin K. Simon ,Jim K Omura, Robert A. Scholtz, Barry K. Levit John Wiley & Sons.			
R.2	CDMA Principles of Spread Spectrum Communications 1995. Andrew J Viterbi Addison Wesley.			
Useful Links				
1	https://nptel.ac.in/courses/117/105/117105144/			
2	https://nptel.ac.in/courses/117/105/117105077/			
	Course Outcomes	PO/PSO	CL	Class Sessions
MEC1102.1	Analyze the principles that underline the analysis and design of digital communication systems.	PO1,PO2,PO3	4	9
MEC1102.2	Determine reliable transmission and reception of symbols over noisy channels.	PO1,PO2,PO3	3	9
MEC1102.3	Explore representation of digitally modulated signals.	PO1,PO2,PO3	3	9
MEC1102.4	Evaluate baseband reception and probability of error, the ML and MAP detection strategies	PO1,PO2,PO3	4	9
MEC1102.5	Evaluate code Acquisition and Tracking, Spread Spectrum as a Multiple Access Technique.	PO1,PO2,PO3	5	9

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Program: M.Tech Electronics (Communication) Engineering					
Semester: I		MEC1104: Embedded System Design And Application			
Teaching Scheme				Examination Scheme	
Theory	3 Hrs/week			CT-I	15 Marks
Tutorial	--			CT-II	15 Marks
Total Credits	3			CA	10 Marks
Duration of ESE: 3 Hrs.				ESE	60 Marks
Pre-Requisites: Embedded System.				Total Marks	100 Marks
Course Objectives:					
1.		To understand need and application of ARM Microprocessors in embedded systems.			
2.		To study of basics of the architecture of ARM series microprocessor.			
3.		To understand fundamental of IOT and embedded systems including basic design strategy and process modeling			
4.		To understand fundamentals of security in IOT.			
5.		To learn embedded communication systems.			
Course Contents					
Unit I		Introduction to Embedded Systems: Introduction to Embedded Systems, Architecture of Embedded System, Design Methodology, Design Metrics, General Purpose Processor, and System On chip. Embedded system design and development: Embedded system design, Life-Cycle Models, Problem solving, The design process, Requirement identification, Formulation of requirements specification. Development tools.			
Unit II		ARM7, ARM9, ARM11 Processors: Introduction to ARM processors and its versions, ARM7, ARM9 & ARM11 features, advantages & suitability in embedded application,programming in assembly language, registers, CPSR, SPSR, ARM and RISC design philosophy, ARM7 data flow model, programmers model, modes of operations,RTOS, types of RTOS.			
Unit III		Embedded IoT Platform Design Methodology: Introduction to Embedded System and Internet of Things o Embedded Systems, IoT: Definition and characteristics of IoT, Internet of Things: Vision, Emerging Trends, Purpose and requirement specification, Process specification, Domain model specification, information model specification, Service specifications, IoT level specification, Functional view specification, Operational view specification, Device and component integration, Application development			
Unit IV		IoT Protocols and Security Networks: Protocol Standardization for IoT, M2M and WSN Protocols, SCADA and RFID Protocols, Issues with IoT Standardization, Unified Data Standards, Protocols – IEEE 802.15.4, Modbus, Zigbee Architecture, Network layer, APS layer.Bluetooth, IEEE 802.11 ,CAN, I2C and USB,RS232,RS485			
Unit V		Embedded System Design Case Studies: Automated Meter Reading Systems (AMR), Digital Camera, Multimedia System, Electronic Control Unit (ECU) of Car and Medical Instrumentation.			

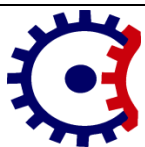
Text Books				
T.1	David E.Simon, —An Embedded Software Primerl, Perason Education, 2003.			
T.2	Hakima Chaouchi, — The Internet of Things Connecting Objects to the Webl ISBN : 978- 1-84821-140-7, Wiley Publication			
Reference Books				
R.1	Noergaard Tammy, —Embedded Systems Architecturel, Elsevier Publication.			
R.2	Vijay Madiseti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”			
Useful Links				
1	https://nptel.ac.in/courses/106/105/106105159/			
2	https://nptel.ac.in/courses/108/102/108102169/			
	Course Outcomes	PO/PSO	CL	Class Sessions
MEC1104.1	Explain the embedded system Design Metrics, Processor Technology, IC Tepchnology, Design Technology.	PO1,PO3	4	9
MEC1104.2	Analyze the Embedded system architecture and feature of ARM7,ARM9,ARM11 processor.	PO1,PO2,PO3	4	9
MEC1104.3	Implement an architectural design for IoT for specified requirement.	PO1,PO2,PO3	3	9
MEC1104.4	Interface the advanced peripherals to ARM based Processor	PO1,PO2,PO3	5	9
MEC1104.5	Design embedded system with available resources.	PO1,PO2,PO3	6	9

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Program: M.Tech. Electronics (Communication) Engineering					
Semester: I		MEC1108: Active RF Device And Circuits			
Teaching Scheme				Examination Scheme	
Theory	3 Hrs/week			CT-I	15 Marks
Tutorial	--			CT-II	15 Marks
Total Credits	3			CA	10 Marks
Duration of ESE: 3 Hrs.				ESE	60 Marks
Pre-Requisites: RF Engineering				Total Marks	100 Marks
Course Objectives:					
1.	Students shall be able to use of Smith chart to determine the various parameter of transmission line.				
2.	Students able to analyze the parameters of active devices to design microwave semiconductor devices.				
3.	Students able to design and evaluate RF Amplifier and low noise amplifier.				
4.	Students shall be able to design a RF mixer Circuit.				
5.	Students able to design oscillators.				
Course Contents					
Unit I	Characteristics of passive components for RF circuits:- Passive RLC networks, Transmission lines, Two-port network modeling, S-parameter model, Smith Chart and its applications				
Unit II	Active devices for RF circuits: - RF Diodes, Microwave BJT's, GaAs FET's,Low noise and power GaAs FET's, MESFET, SiGe MOSFET , GaAs, pHEMT, HBT Device parameters and their impact on circuit performance.				
Unit III	RF Amplifier design: Single and Multi-stage Amplifiers. Low-pass, Highpass, Band-Pass and Band-Reject Filters, Bandwidth Estimation methods. Low Noise Amplifier design: Noise types and their characterization, LNA topologies, power match vs noise match, Low Noise amplifier and Power amplifier : Class A, B, AB, C, D, E, F				
Unit IV	Microwave Mixer Design: Types of mixers,Mixer theory and characteristics, SSB versus DSB mixers.Single-ended mixer and single-balanced mixer, Double balanced and image rejection mixers, In phase quadrature mixture				
Unit V	Oscillators:- Oscillator versus amplifier design, Oscillation conditions, Gunn diode Modes of operation, Equivalent circuit. Design of Gunn diode oscillator, FET oscillators. Frequency tuning techniques, Phase Locked Loop (PLL), Introduction to CAD packages, Microwave integrated circuits(MIC)				
Text Books					
T.1	Radio Frequency and Microwave Communication Circuits Analysis and Design 2004 D. K. Misra John Wiley				
T.2	Microwave Engineering 1998 D. M. Pozar John Wiley				

Reference Books	
R.1	Microwave Transistor Amplifiers Analysis and Design 1997. G. Gonzalez Prentice Hall
R.2	The Design of CMOS Radio-Frequency Integrated Circuits Microwave and Millimeter Wave Phase Shifters, Second Edition 1991 Thomas H. Lee S.K. Koul and B. Bhat CAMBRIDGE .
R.3	Design of Analog CMOS integrated circuits,Razavi Behzad,McGraw Hill
Useful Links	
1	https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-ee35/
2	https://nptel.ac.in/courses/108/107/108107142/

	Course Outcomes	PO/PSO	CL	Class Session
MEC1108.1	Determine the various parameter of transmission line by using of Smith chart.	PO1,PO2, PO3	3	9
MEC1108.2	Analyze the parameters of active devices to design microwave semiconductor devices.	PO1,PO2	4	9
MEC1108.3	Evaluate of RF Amplifier and low noise amplifier.	PO1,PO2,PO3	5	9
MEC1108.4	Design a RF mixer Circuit.	PO1,PO2,PO3	6	9
MEC1108.5	Design oscillators, Phase Locked Loop	PO1,PO2,PO3	6	9

R.3	Scharf, L.L., “Statistical Signal Processing: Detection, Estimation, and Time Series Analysis”, Addison-Wesley.			
Useful Links				
1	https://nptel.ac.in/courses/106/102/106102064/			
2	https://nptel.ac.in/courses/106/102/106102064/			
	Course Outcomes	PO/PSO	CL	Class Sessions
MEC1111.1	Examine filter structure and its types solutions	PO1,PO2,PO3	3	9
MEC1111.2	Analyze linear filtering solutions for optimizing the cost function using wiener filters.	PO1,PO2,PO3	4	9
MEC1111.3	Analyze convergence and stability issues using LMS algorithm and its transform domain.	PO1,PO2,PO3	5	9
MEC1111.4	Evaluate the performance Recursive Least Squares (RLS) techniques to improve convergence behavior.	PO1,PO2,PO3	4	9
MEC1111.5	Explore properties of orthogonalization transform by using mathematical perspective and Convergence analysis of the RLS algorithm	PO1,PO2,PO3	3	9



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Program: M.Tech. Electronics (Communication) Engineering

Semester: I

MEC1112:Digital Communication Technology Lab

Teaching Scheme

Examination Scheme

Practical

2 Hrs/week

CA

25 Marks

Total Credits

1

ESE

25 Marks

Pre-Requisites: Digital Communication.

Total

50 Marks

Course Objectives:

1. Students will Explore the signal representation and estimation in communication channel
2. Students will know the concept of modulation shift keying and maximum input and maximum output concept and how securely they transmit the data with the help of secure modulation technique.
3. Students will Learn multicarrier modulation and examine transmitted signal scattered and reflected from multiple paths due to mobility of transmitter
4. Students will Understand the concept of direct sequence spread spectrum and frequency hopping spread spectrum and their technique for modulation and learn how rapidly they changing their carrier signal for radio transmission.
5. Students will design the structure of content with the help of MATLAB.

Sr. No.

List of Experiment

CO

1

Design and Analysis of Spectrum Estimators using MATLAB

CO1

2

Design and Analyze the Channel equalizer design using MATLAB

CO1

3

Design of Optimum Receiver for signals corrupted by AWGN channel.

CO2

4

Evaluate Probability of Error for Binary in AWGN channel.

CO2

5

Evaluate Probability of Error for M-ary signaling in AWGN channel.

CO3

6

Explore the Multicarrier modulation schemes i.e OFDM,MIMO,SISO in FPGA kit

CO3

7

Explore the Performance analysis of FH-SS system in AWGN channel.

CO4

8

Explore the Performance analysis of DS-SS system in AWGN channel.

CO4

9

Analyze the simulation of ML & MAP detection strategies in AWGN channel using MATLAB

CO5

10

Design Continuous phase Modulation (CPM) schemes channel characterization in FPGA kit

CO5

Text Books				
T.1	Digital Communications 1995 4 th Edition J. G. Proakis McGraw Hil			
T.2	Digital Communications 1998 Simon Haykin John Wiley & Sons			
Reference Books				
R.1	Digital signal processing- A practical approach Second Edition, 2002.E. C. Ifeachar, B. W. Jarvis Pearson			
R.2	Digital Signal Processing - A. NagoorKani 2nd Edition McGraw Hill.			
Useful Links				
1	https://nptel.ac.in/courses/117/105/117105144/			
2	https://nptel.ac.in/courses/117/105/117105077/			
	Course Outcomes	PO/PSO	CL	Lab Sessions
ECE1112.1	Analyze the principles that underline the analysis and design of digital communication systems.	PO1,PO2,PO3	4	2
ECE1112.2	Determine reliable transmission and reception of symbols over noisy channels.	PO1,PO2,PO3	3	8
ECE1112.3	Explore representation of digitally modulated signals.	PO1,PO2,PO3	3	4
ECE1112.4	Evaluate baseband reception and probability of error, the ML and MAP detection strategies	PO1,PO2,PO3	4	2
ECE1112.5	Evaluate code Acquisition and Tracking, Spread Spectrum as a Multiple Access Technique.	PO1,PO2,PO3	5	4



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Wardha Road, Nagpur-441 108

NAAC Accredited with A+ Grade

(An autonomous Institution affiliated to RTMNU, Nagpur)



Program: M.Tech. Electronics (Communication) Engineering

Semester: I		MEC1113:Adaptive Signal Processing Lab			
Teaching Scheme				Examination Scheme	
Practical	2 Hrs/week			CA	25 marks
Total Credits	1			ESE	25 marks
Duration : 2 Hrs.				Total	50 marks

Pre-Requisites: Signal and Systems, Digital Signal Processing

Course Objectives:

1.	Students will implement MATLAB, the Random Number generator and correlation and autocorrelation
2.	Students will implement lattice structure and their convergence with the help of graphical techniques
3.	Students will know the various conversions and implement algorithm.
4.	Students will explore the different types of filter and models in processing of signals.
5.	Students will simulate the algorithm and noise cancellation.

Sr. No.	List of Experiment	CO
1	Random Number generator and correlation and autocorrelation	CO1
2	Implementation of Lattice Structure	CO1
3	Program to convert Direct form coefficient to Lattice Form	CO2
4	Program to convert Lattice form coefficient to Direct Form	CO2
5	Deconvolution using Wiener Filter	CO3
6	Simulation of Linear predictive model	CO3
7	Implementation of Levinson Durbin Algorithm	CO4
8	Simulation of LMS algorithm for adaptive noise cancellation	CO4
9	Adaptive equalizer	CO5
10	RLS algorithm and fast algorithm	CO5

Text Books

T.1	Simon Haykin, —Adaptive Filter Theory, 4th edition, Pearson Education
T.2	Monson Hayes, —Statistical Digital Signal Processing and Modeling, Wiley India Edition

Reference Books

R.1	Dimitris G. Manolakis, Vinay K. Ingle, Stephen M. Kogon, —Statistical and Adaptive Signal Processing: Spectral Estimation, Signal Modeling, Adaptive Filtering and Array Processing, McGrawHill, 2000
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R.2	Bernard Widrow and Samuel Stearns, —Adaptive Signal ProcessingI, Pearson Education Asia,2002
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Useful Links

1	https://nptel.ac.in/courses/117/105/117105075/
2	https://nptel.ac.in/courses/106/102/106102064/

	Course Outcomes	PO/PSO	CL	Lab Sessions
MEC1113.1	Examine filter structure and its types solutions	PO1,PO2,PO3	3	2
MEC1113.2	Analyze linear filtering solutions for optimizing the cost function using wiener filters.	PO1,PO2,PO3	4	8
MEC1113.3	Analyze convergence and stability issues using LMS algorithm and its transform domain.	PO1,PO2,PO3	5	4
MEC1113.4	Evaluate the performance Recursive Least Squares (RLS) techniques to improve convergence behavior.	PO1,PO2,PO3	4	2
MEC1113.5	Explore properties of orthogonalization transform by using mathematical perspective and Convergence analysis of the RLS algorithm	PO1,PO2,PO3	3	4



HoD (ECE)

Department of Electronics & Comm
Tulsiramji Gaikwad Patil College
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