Shri Shankaracharya Technical Campus,

Shri Shankaracharya Group of Institutions

(An Autonomous Institute affiliated to CSVTU, Bhilai)

SCHEME OF TEACHING AND EXAMINATION

Courses of Study and Scheme of Examination of M. Tech

2nd Semester M.Tech. Electronics &Telecommunication (Communication)

S. No.	Board of Study	Subject Code	Subject	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
							Theory/Practical				
				L	T	P	ESE	CT	TA		
1.	Electronics & Telecom	ET222201	Secure Communication	3	1	-	100	20	20	140	4
2.	Electronics & Telecom	ET222202	Advanced Mobile Communication	3	1	-	100	20	20	140	4
3.	Electronics & Telecom	ET222203	Digital Communication Receivers	3	1	-	100	20	20	140	4
4.	Electronics & Telecom	ET222204	Embedded Technology in communication System	3	1	-	100	20	20	140	4
5.	Electronics & Telecom	Refer Table II	Elective – II	3	1	-	100	20	20	140	4
6.	Electronics & Telecom	ET222291	Embedded Technology in Communication Systems Lab	-		3	75		75	150	2
7.	Electronics & Telecom	ET222292	Signal Processing Lab	-		3	75		75	150	2
Total				**15**	**5**	**6**	**650**	**100**	**250**	**1000**	**24**

Table II

Elective-II			
Sr.No.	**Board of Study**	**Subject Code**	**Subject**
1	Electronics & Telecom	ET222221	Advanced Digital Signal Processing & Applications
2	Electronics & Telecom	ET222222	Microwave Integrated Circuits
3	Electronics & Telecom	ET222223	Optical Communication System

L-Lecture
T- Tutorial
P-Practical
CT- Class Test
TA- Teachers Assessment
ESE- End Semester Exam

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SCHEME OF EXAMINATION AND SYLLABUS

2nd Semester M.Tech. Electronics & Telecommunication(Communication)

Subject Code:- ET222201	**Secure Communication**	**L = 3**	**T = 1**	**P = 0**	**Credits = 4**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**20**	**140**	**3 Hours**

Course Objective	**Course Outcomes**
The objective is to make the students understand and conceptualize the basics of **Secure Communication**. The aim is to impart skills to students for The subject aims to provide an introduction to the fundamental principles of encryption and its applications on the network security domain.	On successful completion of the course, the student will be able to: **CO1:-** Able to understand about various encryption techniques **CO2:-** Able to illustrate various Public key cryptographic techniques and to evaluate the authentication and hash algorithms. **CO3:-** Able to learn the overview and architecture of IP Security **CO4:-**. To Understand the need and overview of Web security **CO5:-** Able to evaluate the security of communication systems, networks and protocols based on a multitude of security metrics.

UNIT- I CONVENTIONAL ENCRYPTION: **CO1**

Introduction, Conventional Encryption model, Stenography, Data Encryption, Standard block cipher, Encryption algorithms, confidentially key distribution. **[5Hrs]**

UNIT–II PUBLIC KEY ENCRYPTION AND HASHING: **CO2**

Principles of public key cryptosystems, RSA algorithm, DiffieHellman key Exchange, Elliptic curve cryptology, message authentification and Hash function, Hash and Mac algorithms, Digital signatures.

UNIT – III IP SECURITY: **CO3**

IP Security Overview, IP Security Architecture, authentification Header, Security payload, Security associations, Key Management. **[5Hrs]**

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UNIT – IV WEB SECURITY: **CO4**

Web security requirement, secure sockets layer, transport layer security, secure electronic transaction, dual signature. **[5Hrs]**

UNIT – V SYSTEM SECURITY: **CO5**

Intruders, Viruses, Worms, Firewall design, Trusted systems, antivirus techniques, digital immune systems.**[5Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	William Stallings	Cryptography and Network Security.	Second	PHI
2	The RC5-CBC,TC5-CBC-PAD and RC5-CT5 algorithms	Baidwin R and Rivest.R	-	RFC

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Cryptography & Network Security	W.stallings	Second	PHI
2	Applied Cryptography	Schneier, Bruce	Fourth	John Wiley

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SCHEME OF EXAMINATION AND SYLLABUS

2nd Semester M. Tech. Electronics & Telecommunication (Communication)

Subject Code:- ET222202	**Advanced Mobile Communication**	**L = 3**	**T = 1**	**P = 0**	**Credits = 4**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**20**	**140**	**3 Hours**

Course Objective	**Course Outcomes**
The objective is to make the students understand and conceptualize the basics of mobile communications. The aim is to impart skills to students for designing the wireless communication.	On successful completion of the course, the student will be able to: **CO1:-** Outline the features of wireless communication. **CO2:-** To understand the cellular concept and fundamentals. **CO3:-** Integrate antenna system in mobile radio propagation. **CO4:-** Make the signal processing required in improvement of signal modulation **CO5:-**Learn to design the wireless system.

Unit -I: Introduction to wireless mobile communications: **CO1**

History & Evolution of Mobile Radio Systems. Types of Mobile Wireless Services / Systems Cellular, WLL, Paging, Satellite Systems, Standards, Future Trends In Personal Wireless Systems.

Unit- II: Cellular Concept and System Design Fundamentals: **CO2**

Cellular Concept and Frequency Reuse, Multiple Schemes, Channel Assignment And Handoff, Interference and System Capacity, Trunking and Erlang Capacity Calculations**.**

Unit- III: Mobile Radio Propagation: **CO3**

Radio Wave Propagation Issues In Personal Wireless Systems, Propagation Models, Multipath Fading and Base Band Impulse Respond Models, Parameters of Mobile Multipath Channels, Antenna Systems in Mobile Radio.

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Unit-IV : Modulation And Signal Processing: **CO4**

Analog And Digital Modulation Techniques- Performance Of Various Modulation Techniques, Spectral Efficiency, Error Rate, Power Amplification, Equalizing Rake Receiver Concepts, Diversity And Space Time Processing, Speech Coding Channel Coding.

Unit-V : System Example and Design Issues: **CO5**

Multiple access techniques –FDMA, TDMA and CDMA Systems, Operational Systems, Wireless Networking, Design Issues In Personal Wireless Systems.

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Wireless digital Communication	K.Feher		PHI New Delhi1995.
2	Wireless Digital Communication: Principles and Practices	T.S. Rappaport		PHI NJ 1996

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Mobile Communications Engineering: Theory and applications	W.CY. Lee	2nd edition	MCGraw Hill New York 1990
2	Mobile communications	Schiller		Peason Education Asia Ltd. 2000.

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SCHEME OF EXAMINATION AND SYLLABUS

2nd Semester M. Tech. Electronics & Telecommunication (Communication)

Subject Code:- ET222203	**Digital Communication Receivers**	**L = 3**	**T = 1**	**P = 0**	**Credits = 4**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**20**	**140**	**3 Hours**

Course Objective	**Course Outcomes**
The objective is to make the students understand and conceptualize the basics of Digital Communication Receivers. The aim is to impart skills to students for designing the microwave receiver.	On successful completion of the course, the student will be able to: **CO1:-**Outline the features of digital communication receiver. **CO2:-** To understand the methods of coherent and non coherent detection **CO3:-** To understand the procedure of waveform coding. **CO4:-** To understand the channel coding for digital data. **CO5:-** Learn to design the microwave receiver.

UNIT-I :Detection of Binary Signal in Gaussian Noise: **CO1**

Detection of Binary signal in Gaussian Noise: Maximum Likelihood Receiver Structure, The Matched Filter, Correlation Realization of Matched Filter, Optimum error performance, Error performance of Binary Signaling**.**

UNIT-II: Coherent and Noncoherent Detection: **CO2**

Coherent Detection: Coherent Detection of PSK, Sampled Matched Filter, Coherent Detection of Multiphase Shift Keying, Coherent Detection of FSK. Noncoherent Detection: Detection of Differential PSK, Binary Differential PSK example, Noncoherent Detection of FSK, Required Tone Spacing for Noncoherent Orthogonal FSK.

UNIT-III: Waveform Coding: **CO3**

Waveform Coding and Structured Sequences: Antipodal and Orthogonal Signals, M-ary Signaling, Waveform Coding. Error-Detecting and Correcting Capability: Weight and Distance of Binary vectors, Minimum Distance of a Linear code, Error Detection and Correction, Convolutional Encoding, Reed-Solomon Codes.

UNIT-IV: Channel Coding: **CO4**

Adaptive Predictions: Forward Prediction, Synthesis/Analysis Coding, Block Coding: Vector Quantizing, Transform Coding: Quantization for Transform Coding, Subband Coding, Source coding for Digital Data.

UNIT-V: Microwave Receivers: **CO5**

Block Diagram of a Digital Transceiver, Bandwidth-Efficient Digital Radio System: 8-phase 8-PSK System, Quadrature Amplitude Modulated M=16-state Radio System, Filtering Requirement in Digital Radio System, Radio System Performance Design Guidelines, Performance characteristics of Typical M-ary PSK and QAM Microwave System.

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Digital Communications	Bernard Sklar	2nd	Pearson Education, 2001
2	Digital Communication Microwave Applications	Kamilo Feher		PHI, 1987

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Digital Communication	Prokis		John G. Tata McGraw Hill
2	Digital Communication Technique Signal Design & Detection	Simon, ,Hinedi,Sami M & Lindsey, William C.Marvin K		PHI

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SCHEME OF EXAMINATION AND SYLLABUS

2nd Semester M. Tech. Electronics & Telecommunication (Communication)

Subject Code:- ET222204	Embedded Technology in Communication System	**L = 3**	**T = 1**	**P = 0**	**Credits = 4**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**20**	**140**	**3 Hours**

Course Objective	**Course Outcomes**
The objective is to make the students understand and conceptualize the basics of **Embedded system and microcontrollers** . The aim is to impart skills to students for developing and design embedded system in real time environment with advance microcontroller.	On successful completion of the course, the student will be able to: **CO1:-**Outline the features of basics of microcontroller. **CO2:-** Design structure of Embedded system.. **CO3:-** learn Inter-process Communication and Synchronization of Processes using tasks and threads. **CO4:-** Design the structure of Real Time Operating Systems. **CO5:** Solving case study problems using ARM and PIC microcontroller..

UNIT- I: Microcontrollers: **CO1**

Brief review of the 8 bit microcontroller 8051 - Programming , CPU Block diagram, Memory Organization, SFR s ,Ports and Interfacing -Introduction to a 16 bit micro controller 80186 High Speed Input, High Speed Output, Interrupts, ADC, PWM, Timers, Watch Dog Timer, Serial Port, I/O Port **[5Hrs]**

UNIT–II: Introduction to Embedded Systems: **CO2**

Characteristics of Embedded systems , Software embedded into a system .-General ideas of Processor and Memory organization - Processor and memory selection ,Interfacing to Memory and I/O devices- Devices and Buses- Device Drivers and Interrupt Servicing mechanisms **[5Hrs]**

UNIT – III: Inter-process Communication and Synchronization of Processes ,Tasks and Threads: **CO3**
Multiple Processes in an Application - Data sharing by multiple tasks and routines- Inter Process Communication. **[5Hrs]**

UNIT – IV: Real Time Operating Systems: **CO4**

Operating System Services, I/O Subsystems - Network Operating Systems - Real Time and Embedded System Operating systems. Interrupt routines in RTOS Environments - RTOS Task Scheduling models , Interrupt Latency and response Times - Standardisation of RTOS - Ideas of Embedded Linux **[5Hrs]**

UNIT – V: Case study : **CO5**

Case Study: Case Studies of programming with RTOS - Case study /design using ARM processor/PIC microcontroller **[5Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Microcontrollers -Theory and Applications	Ajay V. Deshmukh	Second	Tata Mc Graw Hill Publications
2	Embedded Systems Architecture; Programming and Design	Rajkamal	Second	Tata McGraw Hill Publications

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Programming and Customizing the 8051 microcontroller	Predko, Myke	1st	McGraw Hill International
2	8051 microcontroller: Architecture, Programming & Applications	Ayala, Kenneth J	Fourth	Penram International Publishing
3	Real-Time Systems	Jane Liu	1st	PH 2000

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SCHEME OF EXAMINATION AND SYLLABUS

2nd Semester M.Tech. Electronics &Telecommunication (Communication)

Subject Code:- ET222223	**Optical communication System**	**L = 3**	**T = 1**	**P = 0**	**Credits = 4**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**20**	**140**	**3 Hours**

Course Objective	**Course Outcomes**
The objective is to make the students understand and conceptualize the basics and Advance of **Optical communication System**. The aim is to impart skills to students for designing and analysising optical devices and network.	On successful completion of the course, the student will be able to: **CO1:-**Able to understand theconcept of Fiber Optic Guides. **CO2:-**Student gains knowledge how optical transmitters and receivers are work. **CO3:-**Design and understand structure of Light Wave System. **CO4:-**learn the concept of optical of Amplifiers. **CO5:-**Learn the structure of optical Dispersion compensation.

UNIT- I Fiber Optic Guides: **CO1**

Light Wave Generation Systems, System Components , Optical Fibers, SI,GIFibers,Modes, Dispersion in Fibers, Limitations Due To Dispersion, Fiber Loss, Non-Linear Effects,Dispersion Shifted And Dispersion Flattened Fibers.[5Hrs]

UNIT–II Optical Transmitters And Receivers: **CO2**

Basic Concepts, LED's Structures Spectral Distribution,Semiconductor Lasers, Gain Coefficients, Modes, SLM AndSTM Operation, Transmitter Design,Receiver PIN And APD Diodes Design , Noise Sensitivity And Degradation,Receiver AmplifierDesign. **[5Hrs]**

UNIT – III Light Wave System: **CO3**

Coherent, Homodyne And Heterodyne Keying Formats, BER In Synchronous –And Asynchronous- Receivers, Sensitivity Degradation, System Performance, Multichannel, WDM,Multiple Access Networks, WDM Components, TDM, Subcarrier And Code Division Multiplexing. **[5Hrs]**

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UNIT – IV Amplifiers: **CO4**

Basic Concepts , Semiconductor Laser Amplifiers, Raman - And Brillouin- FiberAmplifiers, Erbium Doped – Fiber Amplifiers, Pumping Phenomenon, Lan And Cascaded In –LineAmplifiers. Fiber Optic Network- Architecture , Management And Future Of Fiber Optic Network. **[5Hrs]**

UNIT – V: Dispersion compensation: **CO5**

Limitations, Post- And Pre- Compensation Techniques, EqualizingFilters , Fiber Based Gratings, Broad Band Compersation , Soliton Communication System, FiberSoliton, Soliton Based Communication System Design , High Capacity And WDM Soliton System.Isolators , Circulator And Attenuator , Optical Switches And Modules. **[5Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Fiber Optic Communication Systems	G.P. Agrawal	2nd Edition	John Wiley & Sons. New-York, 1997
2	Optical Fiber Communacation	Keiser,gerd	4th Edition	MGH, 2008

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Optical Communication System	Franz and Jain	-	Narosa Publications, New Delhi, 1995
2	Optical Fiber Communication	G. Keiser	-	Narosa Publications, New Delhi, 2000.

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SCHEME OF EXAMINATION AND SYLLABUS

2nd Semester M.Tech. Electronics &Telecommunication (Communication)

Subject Code :- ET222291	Embedded Technology in Communication Systems Lab	**L = 0**	**T = 0**	**P = 2**	**Credits = 2**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**Lab Periods**
	75	**00**	**75**	**150**	**10**

Course Objective	**Course Outcomes**
The objective is to make the students understand and conceptualize the basics of **Embedded system and microcontrollers** . The aim is to impart skills to students for developing and design embedded system in real time environment with advance microcontroller.	On successful completion of the course, the student will be able to: **CO1:-**experiment the features of output device of microcontroller 8051. **CO2:-** Design structure of Embedded system.. **CO3:-** learn Inter-process Communication and Synchronization of Processes using tasks and threads. **CO4:-** Design the structure of Real Time embedded system. **CO5:** Solving case study problems using 8051 microcontroller

List of experiments to be performed:

(i) Create ,compile and test a program to print a string a message on standard output device — CO1

(ii) Create a program to print powers of 2 from 20 to 212 — CO2

(iii) Write a program that continuously reads Port A and provides output to port B — CO3

(iv) Use External Hard ware Interrupt to print a message to the standard output devices each time an interrupt occurs . Also print number of time interrupt occur — CO3

(v) Create a program that will turn on an LED when falling edge occur on external interrupt 0 and turn it off when rising edge occour on external interrupt 1 — CO3

(vi) Create a programme that will demonstrate how watchdog timer resets the processor if programme hangs up to infinite loop — CO4

(vii) Create a programme that will read the data on all 8 bits of port B swap the nibble of data and send it to port A — CO3

(viii) Create a simulated engine speed monitor that will light a LED if the motor speed drops below 200rpm and another LED if motor speed exceed 500 rpm and light another LED if motor speed between 200 to 500 rpm — CO4

(ix) Create a programme to output the ASCII character G every 50 msec via USART at 9600 baud rate — CO5

(x) Write a microcontroller 8051 program to add two floating-point numbers. — CO5

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Recommended Books:

1. Embedded C Programming and the Microchip by PIC Barneet , Cox ,O'cull Thomson publication 2 Embedded system by Raj Kamal TMH List of

Equipments/Machine Required:

1. MATLAB Software with Simulink
2. Emulation software with Cross C complier

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SCHEME OF EXAMINATION AND SYLLABUS

2nd Semester M.Tech. Electronics &Telecommunication (Communication)

Subject Code :- ET222292	Signal Processing Lab	**L = 0**	**T = 0**	**P = 2**	**Credits = 2**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**Lab Periods**
	75	**00**	**75**	**150**	**10**

Course Objective	**Course Outcomes**
The objective is to make the students understand and conceptualize the basics of digital signal p[rocessing experiments. the aim is to impart skills to students for designing the system using signal processor..	On successful completion of the course, the student will be able to: **CO1:-**Outline the features of digital signal processor using generation of different wave forms. **CO2:-** To understand the methods of convolution different types **CO3:-** To understand the procedure of waveform coding. **CO4:-** To understand the Cancellation of echo produced. **CO5:-** Learn to design solution of normal equation using Levinson-Durbin Algorithms.

List of Practical

1. To Generate the following waveforms
   a: Unitstep Sequence
   b. Ramp Sequence
   c. Exponcial Sequence
   d. Sine Sequence
   e. Sine Sequence — CO1
2. Program for linear convolution — CO2
3. Program of computing circular convolution. — CO2
4. Program for computing cross correlation of the given sequence. — CO3
5. Program for design of Butter worth LPF. — CO3
6. Program for the design of FIR, LP, HP, BP and BS Filters using Rectangular Window. — CO3
7. Program for estimating PSD of Two sinusoid Plus noise. — CO3
8. Program for Drawn Sampling a Sinusoidal sequence by a faster M. — CO3

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9. Cancellation of echo produced on the telephone base band channel (Simulation). CO4
10. Program for the solution of normal equation using Levinson-Durbin Algorithms. CO5

Recommended Books:

1. DSP – S Salivaliaran, A Vallavraj, C,TATA MECGRAW HILL.
2. Digital Signal Processors - Architehure, Programming and Application- B Venkatramani, M Bhaskar, TATA MECGRAW HILL.
3. dsp – a Handson approach – Charles schuler, Mahesh chugani, TATA MECGRAW HILL

List of Equipments/Machine Required :

1. MATLAB Software with DSP Toolbox.
2. DSPworks Signal grneration and Analysis Software.
3. TMS 320C6** service starter Kits with Code composer Studio.