PROGRAMME GUIDE

MASTER OF TECHNOLOGY (DIGITAL COMMUNICATION)

(M. Tech DIGITAL COMMUNICATION)

***Scheme of Examination (CBCS/ELECTIVE)**
***Detailed Structure of Syllabus**

DR. C.V. RAMAN UNIVERSITY

KARGI ROAD, KOTA, BILASPUR, CHATTISGARH(C.G.)
PHONE:07753-253737, Fax: 07753-253728
Website: www.cvru.ac

MASTER OF TECHNOLOGY

Duration: 24 Months (2 Years)

Eligibility: BE / B.Tech in a Related Field with Qualified Marks

COURSE STRUCTURE OF M-TECH IN :- DIGITAL COMMUNICATION SEMESTER Ist														
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits	
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution	
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks					
Theory Group														
6TMDC101	Core-1	Ad Mathematics	100	50	17	20	07	30	15	2	1	0	3	
6TMDC102	Core-2	Embedded Technology in Communication System	100	50	17	20	07	30	15	2	1	0	3	
6TMDC103	Core-3	Communication Hardware Design Using VHDL	100	50	17	20	07	30	15	2	1	0	3	
6TMDC104	Core-4	Microwave & Radar Engineering	100	50	17	20	07	30	15	2	1	0	3	
6TMDC105	Core-5	Data Communication & Computer Network	100	50	17	20	07	30	15	2	1	0	3	
6TMDC106	Program Elective-1	**Audit Course-I** 1.English for research paper writing 2.Pedagogy studies 1.Stress management by Yoga	-	-	-	-	-	-	-	-	-	-	-	
Practical Group				Term End Practical Exam				Sessional						
6TMDC107	Core Lab-1	LAB-I	50	25	12			25	12	-	-	1	1	
6TMDC108	Core Lab-2	LAB-II	50	25	12			25	12	-	-	1	1	
Grand Total			600							10	5	2	17	

Minimum Passing Marks are equivalent to Grade D

L- Lectures T- Tutorials P- Practical

Major- Term End Theory / Practical Exam

Minor- Pre University Test

Sessional weightage – Attendance 50%,

Three Class Tests/ Lab Performance Assignment 50%

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Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Theory Group													
6TMDC201	Core-6	Advance Digital Signal Processing	100	50	17	20	07	30	15	2	1	0	3
6TMDC202	Core-7	Optical Communication	100	50	17	20	07	30	15	2	1	0	3
6TMDC203	Core-8	Modern Digital Communication Techniques	100	50	17	20	07	30	15	2	1	0	3
6TMDC204	Core-9	Secure Communication	100	50	17	20	07	30	15	2	1	0	3
6TMDC205	Core-10	Wireless Adhoc & Sensor Network	100	50	17	20	07	30	15	2	1	0	3
6TMDC206	Program Elective-2	**Audit Course-II** 1. Disaster management 2. Personality Development through life enlightenment skills 3. Value addition	-	-	-	-	-	-	-	-	-	-	-
Practical Group				Term End Practical Exam				Sessional					
6TMDC207	Core Lab-3	LAB III	50	25	12			25	12	-	-	1	1
6TMDC208	Core Lab-4	LAB IV	50	25	12			25	12	-	-	1	1
Grand Total			600							10	5	2	17

Minimum Passing Marks are equivalent to Grade D **L- Lectures T- Tutorials P- Practical**

Major- Term End Theory / Practical Exam

Minor- Pre University Test

Sessional weightage – Attendance 50%, Three Class Tests/ Lab Performance Assignment 50%

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COURSE STRUCTURE OF M-TECH IN :- DIGITAL COMMUNICATION SEMESTER IIIrd														
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits	
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution	
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks					
Theory Group														
***	Program Elective – III	**6 TMDC301 (A)** Satellite Communication **6 TMDC301 (B)** Optical Instrumentation & Measurement **6 TMDC301 (C)** Ultra Wide Band Communication	100	50	17	20	07	30	15	2	1	0	3	
***	Program Elective – IV	**6 TMDC302 (A)** Advance Mobile Communication **6 TMDC302 (B)** Global Tracking & Positioning System **6 TMDC302 (C)** Broad Band Communication Techniques	100	50	17	20	07	30	15	2	1	0	3	
Practical Group				Term End Practical Exam				Sessional						
6TMDC303	Seminar	Seminar	100	50	25	-	-	50	25	-	-	1	1	
6TMDC304	Dissertation	Dissertation Part-I	200	120	60	-	-	80	40	-	-	10	10	
Grand Total			500							4	2	11	17	

Minimum Passing Marks are equivalent to Grade D **L- Lectures T- Tutorials P- Practical**

Major- Term End Theory / Practical Exam

Minor- Pre University Test

Sessional weightage – Attendance 50%, Three Class Tests/ Lab Performance Assignment 50%

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COURSE STRUCTURE OF M-TECH IN :- DIGITAL COMMUNICATION SEMESTER IVth														
Course Details				External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Type	Course Title	Total Marks	Major		Minor		Sessional ***		L	T	P	Subject wise Distribution
				Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks				
Practical Group				Term End Practical Exam				Sessional					
6TMDC401	**Dissertation**	Dissertation Part-II	500	300	150			200	100	-	-	**17**	17
Grand Total			**500**							**-**	**-**	**17**	**17**

Minimum Passing Marks are equivalent to Grade D

L- Lectures T- Tutorials P- Practical

Major- Term End Theory / Practical Exam

Minor- Pre University Test

Sessional weightage – Attendance 50%,

Three Class Tests/ Lab Performance Assignment 50%

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SEMESTER- 1st
Course: M. Tech Digital Communication
SUBJECT: Ad Mathematics

Subject Code:
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

To provide the student with the concept and the understanding of basics in partial differential equations and transform. The objective of this course is to fulfil the needs of Engineers to understand the Applications of probability, stochastic process, Queuing system, fuzzy sets and reliability Techniques in order to acquire Mathematical knowledge and to Solving a wide range of Practical Problems.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Solution of Partial Differential Equation (PDE) by separation of variable method, Numerical solution of PDE (Laplace, Poisson's, Parabola) using finite difference Methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – II	Probability, compound probability and discrete random variable. Binomial, Normal, Poisson's distribution. Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Stochastic process, Markov process transition probability transition probability matrix, Just and higher order Markov process, Markov chain. Queuing system, transient and Steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FCFS)	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their Application.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Introduction and definition of reliability, derivation of reliability functions, Failure rate, Hazard rate, mean time t future & their relations, concepts of fault tolerant analysis, Elementary idea about decision theory and goal programming.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

Knowledge in the technical, methodology of solving Partial Differential Equations. A basic understanding in the Transforms which are useful in solving engineering problems. The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concept of Applications of probability, stochastic process, Queuing system, fuzzy sets and reliability.

Reference Books:

•Higher Engineering Mathematics B.V. Ramana Tata Mc Hill
•Advance Engineering Mathematics Ervin Kreszig Wiley Easten Edd
•Applied Numerical Methods with MATLAB Steven C Chapra TMH

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SEMESTER- 1st | **Subject Code: 6TMDC102**
Course: M. Tech Digital Communication | **Theory Max. Marks: 50**
SUBJECT: Embedded Technology in Communication System | **Theory Min. Marks: 17**

COURSE OBJECTIVE:

- To make students familiar with the basic blocks of microcontroller device and embedded system in general
- To provide comprehensive knowledge of the architecture, features and interfacing with 8051 microcontrollers.
- To use assembly and high-level languages to interface the microcontrollers to various applications
- To understand the various real time operating system and inter-process communication.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	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	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	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.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Multiple Processes in an Application - Data sharing by multiple tasks and routines- Inter Process Communication ,Introduction to book loader,embedded file system,embedded database ,data stucture	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	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	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Case Study: Study of VX works-- Case Studies of programming with RTOS - Case study /design using ARM processor/PIC microcontroller--	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

- To understand Microcontroller 8051 its architecture and its instruction set.
- Gain knowledge about Counter/timer and interrupts in 8051 Microcontroller and Programming concepts.
- Students will be able to do serial communication programming and gain knowledge of serial communication.
- Students will be able to understand interfacing Microcontrollers & processors with devices.

Text Books:

- Ajay V. Deshmukh , " Microcontrollers -Theory and Applications", Tata Mc Graw Hill Publications.
- Rajkamal; "Embedded Systems Architecture; Programming and Design"; Tata McGraw Hill Publications.

Reference Books:

- Programming and Customizing the 8051 microcontroller, 1st Edition; by: Predko, Myke; McGraw Hill International
- 8051 microcontroller: Architecture, Programming & Applications, 1st Edition; by: Ayala, Kenneth J
- Real-Time Systems Design and Analysis: An Engineer's Handbook: Phillip A Laplante
- VxWorks Programmers guide

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Embedded Project Design Engineer	Able to design projects using 80196 microcontroller and get the concept of RTOS task scdeulling.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 1st **Subject Code: 6TMDC103**
Course: M. Tech Digital Communication **Theory Max. Marks: 50**
SUBJECT: Communication Hardware Design Using VHDL **Theory Min. Marks: 17**

COURSE OBJECTIVE:

•To understand the IC design aspects, basic fabrication steps.
•To study the design rules & representation of circuits at lower level of abstraction.
•To understand the layout design of few combinational and sequential circuits.
•To study one of the HDL (hardware description language) for front end design.
•To study internal structure of programmable logic devices

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Digital Hardware, Design Process, Design of Digital Hardware, Programmable Logic devices (PLA, PAL, CPLD, FPGA).	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Introduction, Hardware Modeling Languages, Abstract Models, compilation and behavioral optimization, perspectives	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Multiplexes, Decoders, Encoders, Code Converters, Arithmetic Comparison Circuit, VHDL for Combinational Circuits: Assignment Statement, Selected Signal Assignment, Conditional Signal Assignment, Generate Statement, Concurrent and Sequential Statement assignment statement, Process Statement, Case Statement. Flip-Flops, Registers and Counters.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Basic Design Steps, State assignment problem, Mealy State Model, Design of FSM, Asynchronous Behavior, Analysis of Asynchronous Circuits, State Reduction, State Assignment Problem	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – V	Design of FSK Modulator , Simulation of FSK Modulator , Design of FSK Demodulator , Simulation of FSK Demodulator, Design and Simulation of Filters	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

•Students are expected to understand CMOS fabrication details.
•Students are expected to understand schematic, layout of combinational circuits.
•Students are expected to understand schematic, layout of sequential circuits.
•Students are expected to understand VHDL programming concepts.

Text Books:

•Fundamentals of Digital Logic with VHDL Design: Brown Vranesic, TMH Publication.
•Synthesis and Optimization of Digital Circuits: Giovanni De Micheli, TMH Publication

Reference Books:

•Circuit Design with VHDL Prdroni PHI Publication
•VHDL Primer-Bhaskar-PHI Publication

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Design Verification Engineer	Able to design FSK Demodulator, modulator and understand different hardware languages.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 1st
Course: M. Tech Digital Communication
SUBJECT: Microwave and Radar Communication

Subject Code:
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

- Learn about wave propagation through waveguide
- Learn about transmission in rectangular waveguide
- Learn about microwave tubes
- Learn about transferred electron device.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Microwave Waveguide Components: Attenuators, phase shifters, matched loads, detectors and mounts, slotted-sections, E-plane tee, H-plane tee, hybrid tees, directional douplers, tuners, circulators and isolators; Signal generators: Fixed frequency, sweep frequency and synthesized frequency oscillators; Microwave in process control instrumentation	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Noise sources and noise meters used in microwave measurements; Frequency meters and VSWR meters; Measurements of frequency, attenuation, VSWR and impedance; Cavity measurements: Q -factor, bandwidth; Cavity and Waveguide methods; Measurements of power Calorimetric and Microwave bridges; Principles of time domain and frequency domain reflectometry, spectrum analyser and network analyser; Measurement of Scattering parameters of passive and active devices.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Microwave Transistor; Microwave Tunnel Diode; Varacter Diode; Schottky Diode; MESFET: Principle of operation, equivalent circuit, cut off frequency, power frequency limitations; Charge Coupled Devices (CCD); Transferred Electron Devices: Gunn Diode, LSA Diode, modes of operation, Microwave Generation and Amplification; Avalanche Effect Devices: Read diode,carrier current and external current; IMPATT diodes. Klystron: Velocity modulation process, bunching process, output power and beam loadin g; Reflex Klystron: power output and efficiency; Traveling Wave Tubes; Magnetron	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	MTI Radar, Transmitter And Receiver: Oscillator amplifier, mixer, displays, duplexer, matched filter, receiver, correla:tion, detection, constant falls alarm rate, receiver, protector, selectivity, time control., Introduction , Operation of MTI Radar , MTI Receiver With Delay Line , Cnceler Range Gated, Doppler Filter, Digital Signal Processing, MTI For A Moving Platform , Limitations of MTI Platform	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Introduction, Switched cardiod homing system, four course radio range, omnidirectional ranges, tactical air navigation, instrument landing aids, ground controlled approach, radio altimeter, microwave landing system, advantages of MLS.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

By the end of the course the student will be able to:

- Understand the reason why TEM wave are impossible in a Waveguide.
- Understand the working of Microwave Tubes.
- Understand the different modes of operation of Gunn Diodes.
- Understand microwave components such as Tee Junction and Directional Couplers.
- Understand designing and transformation of Microwave Filters.

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Text Books:

•Introduction to radar system. MERRICC, I-SKOC, NIK, TMH.
•Microwave Devices & Circuits Liao, Samuel Y. PHI

Reference Books:

•Passive Rf & Microwave Integrated Circuits Maloratsky, Leo G, Elsevier
•Recent Advances In Microwaves & Lightwaves-E.K. Sharma New Age

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Microwave Engineer	Able to design MTI radar and microwave devices.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 1st **Subject Code: 6TMDC105**
Course: M. Tech Digital Communication **Theory Max. Marks: 50**
SUBJECT: Data Communication & Computer Network **Theory Min. Marks: 17**

COURSE OBJECTIVE:
•To understand the concepts of Synchronous & Asynchronous Transmission.
•To learn Data Link Control.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Review of synchronous and asynchronous transmission, circuit switching, message switching, packet switching and their comparison, various detector techniques, parity check, vertical and longitudinal redundancy check and CRC code and their error detecting capabilities. RS-232 C and X.21 standards, modern operation, null model.	Classroom teaching ICT tools, MOOCS, Swayam and Google classroom
Unit – II	Data link control, point-to-point and multi-point links, flow control, sliding window protocol, various ARQ technique for eroor control and their comparison and performance analysis, HDLC as a bit oriented link control protocol	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Virtual circuit and datagram, routing algorithm, dijkstera and Bellman ford least cost, algorithm, various routing protocol, congestion control technique, deadlock and its avoidance	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Various topologies and medium access control schemes such as contention, polling, token parsing and performance analysis, various IEEE standards for LAN, UBS LANs, FDDI.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Introduction to WAN packet switching technologies such as ATM and Frame relay. Introduction to TCP / IP protocols	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:
•Able to understand the concepts of data link control.
•Student gains knowledge of communication network

Text Books:
•Data And Computer Communication By W. Stalling Phi.
•Computer Networks Y Tanenebaum Phi.

Reference Books:

•Telecommunication Network, Protocols, Modelings And Analysis By M. Schwartz.
•Local Area Network By Keiser Tmh.

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Able to understand the concepts of communication networks and IEEE standard.	GOAL-4(quality Education)	

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SEMESTER- 1st **Subject Code: 6TMDC106**

Course: M. Tech Digital Communication

SUBJECT: English paper for Research Writing

COURSE OBJECTIVE:

•Understand that how to improve your writing skills and level of readability.
•Learn about what to write in each section.
•Understand the skills needed when writing a title.
•Ensure the good quality of paper at very first-time submission.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – II	Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - VI	Useful phrases, how to ensure paper is as good as it could possibly be the first-time submission.	Classroom teaching, ICT Based and individual presentation and Google classroom

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Able to understand the concept of writing research paper	GOAL-4(quality Education)	

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SEMESTER- 1st **Subject Code: 6TMDC106**

Course: M. Tech Digital Communication

SUBJECT: Pedagogy Studies

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction and Methodology: • Aims and rationale, Policy background, Conceptual framework and terminology • Theories of learning, Curriculum, Teacher education. • Conceptual framework, Research questions. • Overview of methodology and Searching.	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom,
Unit – II	• Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. • Curriculum, Teacher education.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	• Evidence on the effectiveness of pedagogical practices • Methodology for the in depth stage: quality assessment of included studies. • How can teacher education (curriculum and practicum) and the school Curriculum and guidance materials best support effective pedagogy? • Theory of change. • Strength and nature of the body of evidence for effective pedagogical practices. • Pedagogic theory and pedagogical approaches. • Teachers' attitudes and beliefs and Pedagogic strategies.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	• Professional development: alignment with classroom practices and follow up • support • Peer support. • Support from the head teacher and the community. • Curriculum and assessment • Barriers to learning: limited resources and large class sizes.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Research gaps and future directions • Research design • Contexts. • Pedagogy. • Teacher education. • Curriculum and assessment. • Dissemination and research impact.	Classroom teaching, ICT Based and individual presentation and Google classroom

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Able to understand the concept of research gap and future scope	GOAL-4(quality Education)	

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SEMESTER- 1st **Subject Code: 6TMDC106**

Course: M. Tech Digital Communication

SUBJECT: Stress Management by Yoga

COURSE OBJECTIVE:

•To achieve overall health of body and mind.
•To overcome stress.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Definitions of Eight parts of yog. (Ashtanga)	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – II	Yam and Niyam. Do`s and Don't's in life. i) Ahinsa, satya, astheya, bramhacharya and aparigraha ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Asan and Pranayam i) Various yog poses and their benefits for mind & body ii) Regularization of breathing techniques and its effects-Types of pranayam.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

Students will be able to:

•Develop healthy mind in a healthy body thus improving social health also
•Improve efficiency

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Understand the benefits of yoga for body and mind		

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KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 1st | **Subject Code: 6TMDC107**
Course: M. Tech Digital Communication | **Practical Max. Marks: 25**
SUBJECT: Embedded Technology in Communication System Lab-I | **Practical Min. Marks: 12**

List of experiments to be performed:

1. Create, compile and test a program to print a string a message on standard output device
2. Create a program to print powers of 2 from 2^0 to 2^{12}
3. Write a program the continuously reads Port A and provides output to port B
4. 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
5. Create a program that will turn on an LED when falling edge occur on external interrupt 0 and turn it off when rising edge occur on external interrupt 1
6. Create a programme that will demonstrate how watchdog timer resets the processor if programme hangs up to infinite loop
7. 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
8. Create a simulated engine speed monitor that will light a LED if the motor speed drops below 200rpm and another LED if motor speed exceeds 500 rpm and light another LED if motor speed between 200 to 500 rpm
9. Create a programme to output the ASCII character G every 50 msec via USART at 9600 baud rates
10. Write a microcontroller 8051 program to add two floating-point numbers.
11. Write a microcontroller 8051 program to multiply two floating-point numbers.
12. Write a microcontroller 8051 program that generates 2kHz square wave on pin P1.0, 2.5 kHz on pin P1.2 and 25 Hz on pin P1.3.
13. Write a microcontroller 8051 program for counter 1 in mode 2 to count the pulses and display the state o the TL1 count on P2. Assume that the clock pulses are fed to pin T1.
14. Write a microcontroller 8051 program to transfer word "COMMUNICATION" serially at 4800 baud and one stop bit, to the com port of PC continuously.
15. Write a microcontroller 8051 program to receive bytes of data serially, and put them in P1. Set the baud rate at 2400 baud, 8-bit data, and 1 stop bit. Assume crystal frequency to be 11.0592 MHz.

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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SEMESTER- 1st **Subject Code: 6TMDC108**
Course: M. Tech Digital Communication **Practical Max. Marks: 25**
SUBJECT: Communication Hardware Design Using VHDL Lab-II **Practical Min. Marks: 12**

List of Experiments (to be performed at least 10 experiments)

1) To design and simulate the basic gates
2) Designing of the combinational blocks
a) Mux b) Encoders c) Decoders
3) Designing and simulation of Code converters
4) Designing, simulation and implementation 9-bit parity generator/checker
5) Designing, simulation and implementation Flip-Flops
6) Designing and simulation of Registers
7) Designing and simulation of Counters
8) FSM modeling (Design Sequence Detector "101")
9) Designing, simulation and implementation of ROM
10)Designing, simulation and implementation of RAM
11)Designing, simulation and implementation of FIFO
12)Design, simulation and implementation of ALU
13)Designing and simulation of Filter
14)Designing and simulation of FSK modulator and Demodulator
15) Designing and simulation of PN generator.

List of Equipment's/Machine Required:

1) Computer System with Pentium 4 processor, 256MB Ram
2) EDA tools:
1) FPGA implementation kit
2) CPLD implementation kit
3) Xilinx project nevigator 5.2
4) Active HDL 6.2
5) Modelsim

Recommended Books:

1) Fundamentals of Digital Logic with VHDL Design: Brown Vranesic, TMH Publication.
2) Circuit Design with VHDL Prdroni PHI Publication
3) VHDL Primer Bhaskar PHI Publication

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SEMESTER- 2nd | **Subject Code:6TMDC201**
Course: M. Tech Digital Communication | **Theory Max.: Marks: 50**
SUBJECT: Advanced Digital Signal Processing | **Theory Min.: Marks: 17**

COURSE OBJECTIVE:

•To study the basic mathematical techniques needed for analysis of discrete time signals and systems.
•To study the various digital filter design techniques.
•To study the multirate digital signal processing techniques

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Discrete Random Processes, Expectations, Variance, Co-Variance, Scalar Product, Energy of Discrete Signals- Parseval's Theorem , Wiener Khintchine Relation- Power Spectral Density- Periodogram- Sample, Autocorrelation- Sum Decomposition Theorem, Spectral Factorization Theorem- Discrete Random Signal Processing By Linear Systems-Simulation Of Noise- Low Pass Filtering of White Noise...	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Non-Parametric Methods –Co-Relation Method- Co-Variance Estimator- Performance Analysis Of Estimators- Unbiased, Consistent Estimators – Periodogram Estimator-Barlett Spectrum Estimation- Welch Estimation – Model Based Approach-Ar,Ma,Arma Signal Modeling –Parameter Estimation Using Yule –Walker Method	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	FIR Adaptive Filters- Newton's Steepest Decent Method-Adaptive Filter Based On Steepest Decent Method- Widrow Hoff LMS –Adaptive Algorithm-Adaptive Channel Equalization-Adaptive Echo Chancellor- Adaptive Noise Cancellation-RLS Adaptive Filters-Exponentially Weighted RLS Sliding Window RLS –Simplified IIR LMS Adaptive Filter.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Mathematical Description Of Change Of Sampling Rate-Introduction And Decimation- Continuous Time Model – Direct Digital Domain Approach – Decimation By An Integer Factor – Interpolation By An Integer Factor- Single And Multistage Realization- Ploy Phase Realization- Application To Sub Band Coding – Wavelet Transform And Filter Bank Implementation of Wavelet Expansion of Signals.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Introduction To Programmable Dsps, Multiplier And Multiplier Accumulator (MAC), Modified Bus Structures And Memory Access Schemes In P- Dsps. Multiple Access Memory. Multi Ported Memory. VLIW Architecture , Pipelining , Special Addressing Modes In P-Dsps, On-Chip Peripherals. Architecture Of TMS320C50X, TMS320C50X Assembly Language Instructions & Programming. Introduction About Other DSP Processors..	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

•Synthesize discrete time signals from analog signals.
•Use time domain and frequency domain analysis tools.
•Apply forward and reverse transformations.
•Visualize various applications of DSP and explore further possibilities.
•Design various filters.

Text Books:

•Monson H. Hayes, "Statistical Digital Signal Processing and Modeling", John Wiley and Sons, Inc. New York, 1996.
•Sopocles J. Orfanidis, "Optimum Signal Processing", Mc Graw Hill, 1990

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Reference Books:

•John G. Prokias , Dimitris G. Manolakis , " Digital Signal Processing" , Prentice Hall of India, 1995.
•B. V enkataramani , M. Bhaskar, " Digital Signal Processor – Architecture , Programming & Applications" Tata Mc Graw Hill 2003.
•K. Padmnabhan, S. Awasthi, R. Vijayrajeshwaran, " A Practical Approach to Digital Signal Processing "

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Design Engineer of Digital Signal Processor	Able to Synthesize discrete time signals from analog signals	GOAL-4(quality Education)	

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SEMESTER- 2nd
Course: M. Tech Digital Communication
SUBJECT: Optical Communication

Subject Code: 6TMDC202
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

- To understand the concepts of Optical communication
- To learn about optical transmitters and receivers
- To know about the operations of LED, LASER, PIN diode, Avalanche Photo diode
- To get the knowledge about SONET/SDH

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Light Wave Generation Systems, System Components , Optical Fibers, SI,GI-Fibers, Modes, Dispersion in Fibers, Limitations Due To Dispersion, Fiber Loss, Non-Linear Effects, Dispersion Shifted And Dispersion Flattened Fibers	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Basic Concepts, LED's Structures Spectral Distribution, Semiconductor Lasers, Gain Coefficients, Modes, SLM And STM Operation, Transmitter Design, Receiver PIN And APD Diodes Design , Noise Sensitivity And Degradation, Receiver Amplifier Design	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	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. **FIBRE OPTIC NETWORK TOPOLOGY**- Fibre optic network topology & principles, LAN, MAN, CSMA, CDMA, FDDI networking. Multiplexing methods in fibre optic networks. Fibre optic CATV network systems. Concepts of WDM. Principles of soliton wave propagation through optical fibres. Principles of coherent communication in optical fibres..	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Basic Concepts , Semiconductor Laser Amplifiers, Raman - And Brillouin-Fiber Amplifiers, Erbium Doped – Fiber Amplifiers, Pumping Phenomenon, Lan And Cascaded In –Line Amplifiers. Fiber Optic Network- Architecture , Management And Future Of Fiber Optic Network.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Limitations, Post- And Pre- Compensation Techniques, Equalizing Filters , Fiber Based Gratings, Broad Band Compersation , Soliton Communication System, Fiber Soliton, Soliton Based Communication System Design , High Capacity And WDM Soliton System. Isolators , Circulator And Attenuator , Optical Switches And Modules	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

- Able to understand the concepts of optical fiber communication.
- Student gains knowledge how optical signal is transmitted and received
- Student gets an insight into SONET/SDH networks
- Students gain the knowledge about LED,LASER, PIN diode and Avalanche Photo Diode

Text Books:

- G.P. Agrawal, "Fiber Optic Communication Systems", 2nd Edition, John Wiley & Sons. New-York, 1997
- Optical Fiber Communication Keiser,gerd Mgh

Reference Books:

- An Embedded Software Primer David E. Simon Pearson Education
- G. Keiser, "Optical Fiber Communication", - Systems and Components, Narosa Publications, New Delhi, 2000.-

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Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Fiber Optics Engineer	Able to understand the concepts of fiber optics network topologies and optical switches and modules.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 2nd **Subject Code: 6TMDC203**
Course: M. Tech Digital Communication **Theory Max. Marks: 50**
SUBJECT: Modern Digital Communication Techniques **Theory Min. Marks: 17**

COURSE OBJECTIVE:

- To understand the concepts of Digital Modulations.
- To learn about Coherent And Non-Coherent Communication With Waveforms.
- To know about the operations of Band Limited Channels.
- To get the knowledge about Coded digital communication

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Functional Architecture Coded And-Encoded Digital Communication-System Architecture, Types of Networks And Services , Performance Criterion And Link Budgets.-.	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	PSD , DTA Pulse Stream, M-Ary Markov Source, Convolutionally Coded Modulation, Continuous Phase Modulation (CPM) , Scalar And Vector Communications Over Memory Less Channel , Scalar Receiver, BER Performance , Detection Criterion.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Optical Receiver In WGN, MF Receiver, Matrix Generation, Colored GN, Whitening Approach , Inphase And Quadrature Phase Modem, Non - Coherent Receivers, Random Phase Channel, Optimum And Suboptimum M-FSK, Performance Of Non- Coherent Receivers In Random Phase Channel, Optimum Receivers In Rayleigh And Rician Channels, M-Ary Symbol Error Probability	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Optimum Pulse Shape Design, Optimum Demodulations Of Digital Signals In The Presence of ISI And AWGN , Equalization Techniques, Diminishing And Detection – Q Modulation , QAM , QPSK, QBM, CPM , FSK, MSK.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Architecture , Interfacing , Detailing, Synchronization , Block Coded Digital Communication System , Performance , Types of Binary Block Codes , Shanon Channel Coding Theorem , Linear Block Codes, Conventional Coded Digital Communication System, Representation of Convolution Codes, Decoding , Pro blems of Decreasing Errors, Sequencing And Threshold Decoding.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

- Able to understand the concepts of Digital Modulations.
- Student gains knowledge of Coherent And Non-Coherent Communication With Waveforms.
- Student gets an insight into Band Limited Channels.
- Students gain the knowledge about Coded digital communication..

Text Books:

- M.K. Simon , S.M. Hinedi and W.C. Lindsey, " Digital Communication Techniques" : Signaling and detection, Prentice Hall India, New Delhi, 1995.
- Simon Haykin, " Digital Communicat ions" , John Wiley and sons , 1998

Reference Books:

- Wayne Tomasi, "Advanced Electronic Communication Systems", 4th-Edition, Oxford -University Press,1998.-
- B.P. Lathi, " Modern Digital and Analog Communication Systems" 3rd-edition Oxford -University Press ,1998.-

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
Design Engineer in TV Broadcasting	Able to understand the concepts of Digital Modulations	GOAL-4(quality Education)	

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SEMESTER- 2nd
Course: M. Tech Digital Communication
SUBJECT: Secure Communication

Subject Code: 6TMDC204
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

•To emphasize students the importance of modular arithmetic, and some algorithms required in cryptography
•To make students understand the symmetric and asymmetric cryptosystem.
•To provide a broad overview of the requirements of authentication, digital signature, algorithms to achieve this aim.
•To teach the students about IP-level security, its architecture and about the threats to computer system and its countermeasures
•To get students idea about general requirements for web security and focus on two standard schemes for web commerce
•SSL/TLS and SET

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction, Conventional Encryption model, Stenography, Data Encryption, Standard block cipher, Encryption algorithms, confidentially key distribution.	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman key Exchange, Elliptic curve cryptology, message authentification and Hash function, Hash and Mac algorithms, Digital signatures.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	IP Security Overview, IP Security Architecture, authentification Header, Security payload, Security associations, Key Management	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Web security requirement, secure sockets layer, transport layer security, secure electronic transaction, dual signature.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Intruders, Viruses, Worms, Firewall design, Trusted systems, antivirus techniques, digital immune systems	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

•The students will be able to calculate gcd, discrete logarithm, exponents etc. on the basis of discrete mathematics used in cryptography.
•The students will be able apply the knowledge of symmetric and asymmetric ciphers for encryption and decryption.
•The students will be able to understand the practical use of authentication and various algorithms for producing hash and MAC.
•The students will be able to see the need of IP Security, malicious software's, their countermeasures and also briefly understand the use of Firewall
•The students will be able to see the need of IP Security, malicious software's, their countermeasures and also briefly understand the use of Firewall

Text Books:

•William Stallings," Cryptography and Network Security", 2nd Edition, Prentice hall of India, New Delhi, 1999
•Baidwin R and Rivest.R, "The RC5-CBC, TC5-CBC-PAD and RC5-CT5 algorithms, RFC2040'

Reference Books:

•Cryptography & Network Security W. Stallings PHI
•Applied Cryptography Schneier, Bruce John Wiley

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Able to understand hash and mac algorithms and digital signature.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 2nd | **Subject Code: 6TMDC205**
Course: M. Tech Digital Communication | **Theory Max. Marks: 50**
SUBJECT: Wireless Adhoc & Sensor Networks | **Theory Min. Marks : 17**

COURSE OBJECTIVE:

•To emphasize students the importance of Adhoc Network.
•To make students understand the multicast routing & security.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Ad hoc Wireless Networks – What is an Ad Hoc Network? Heterogeneity in Mobile Devices –Wireless Sensor Networks – Traffic Profiles – Types of Ad hoc Mobile Communications – Types of Mobile Host Movements – Challenges Facing Ad hoc Mobile Networks – Ad hoc wireless Internet .Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks – Classifications of Routing Protocols – Table–Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV) – Wireless Routing Protocol (WRP) – Cluster Switch Gateway Routing (CSGR) – Source–Initiated On–Demand Approaches – Ad hoc On–Demand Distance Vector Routing (AODV) – Dynamic Source Routing (DSR) –Temporally Ordered Routing Algorithm (TORA) – Signal Stability Routing (SSR) –Location–Aided Routing (LAR) – Power–Aware Routing (PAR) – Zone Routing Protocol(ZRP).	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Issues in Designing a Multicast Routing Protocol – Operation of Multicast RoutingProtocols – An Architecture Reference Model for Multicast Routing Protocols – Classifications of Multicast Routing Protocols – Tree–Based Multicast Routing Protocols– Mesh–Based Multicast Routing Protocols – Summary of Tree and Mesh based Protocols – Energy–Efficient Multicasting – Multicasting with Quality of Service Guarantees Application – Dependent Multicast Routing – Comparisons of Multicast Routing Protocols - Design Goals of a Transport Layer Protocol for Adhoc Wireless Networks –Classification of Transport Layer Solutions – TCP over Ad hoc Wireless Networks- Security in Ad Hoc Wireless Networks – Network Security Requirements – Issues and Challenges in Security Provisioning – Network Security Attacks – Key Management – Secure Routing in Ad hoc Wireless Networks	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Issues and Challenges in Providing QoS in Ad hoc Wireless Networks – Classifications of QoS Solutions – MAC Layer Solutions – Network Layer Solutions – QoS Frameworks for Ad hoc Wireless Networks Energy Management in Ad hoc Wireless Networks –Introduction – Need for Energy Management in Ad hoc Wireless Networks – Classification of Energy Management Schemes – Battery Management Schemes – Transmission Power Management Schemes – System Power Management Schemes..	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Single node architecture – Hardware components, energy consumption of sensor nodes, Network architecture – Sensor network scenarios, types of sources and sinks, single hop versus multi-hop networks, multiple sinks and sources, design principles, Development of wireless sensor networks, physical layer and transceiver design consideration in wireless sensor networks, Energy usage profile, choice of modulation, Power Management – MAC protocols fundamentals of wireless MAC protocols, low duty cycle protocols and wakeup concepts, contention-based protocols, Schedule-based protocols - SMAC, BMAC, Traffic adaptive medium access protocol (TRAMA), Link Layer protocols – fundamentals task and requirements, error control, framing, link management..	Classroom teaching, ICT Based and individual presentation and Google classroom

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Unit - V	Gossiping and agent-based uni-cast forwarding, Energy-efficient unicast, Broadcast andmulticast, geographic routing, mobile nodes, Data-centric routing – SPIN, Directed Diffusion, Energy aware routing, Gradient-based routing – COUGAR, ACQUIRE, Hierarchical Routing – LEACH, PEGASIS, Location Based Routing – GAF, GEAR, Data aggregation – Various aggregation techniques. Introduction to TinyOS – NesC, Interfaces, modules, configuration, Programming in TinyOS using NesC, Emulator TOSSIM.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

•The students will be able to understand sensor network.
•The students will be able apply the knowledge of QOS & energy management

Text Books:

•C. Siva Ram Murthy and B. S. Manoj, "AdHoc Wireless Networks Architectures
•C. K. Toh, "Ad Hoc Mobile Wireless Networks Protocols and Systems", Prentice
•Charles E. Perkins, "Ad Hoc Networking", Addison Wesley, 2000

Reference Books:

•Kazem Sohraby, Daniel Minoli and Taieb Znati, "Wireless Sensor Networks
•Feng Zhao, Leonidas Guibas, "Wireless Sensor Networks: an information

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Able to calculate Adhoc networks,	GOAL-4(quality Education)	

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SEMESTER- 2nd **Subject Code: 6TMDC206**

Course: M. Tech Digital Communication

SUBJECT: Disaster Management

COURSE OBJECTIVE:

Students will be able to:

•Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.

•Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

•Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

•Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – II	Repercussions Of Disasters And Hazards: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War And Conflicts.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Disaster Prone Areas In India Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics Disaster Preparedness and Management Preparedness: Monitoring of Phenomena Triggering A Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Risk Assessment Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation In Risk Assessment. Strategies for Survival.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Disaster Mitigation Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India. Dissemination and research impact.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

•To get a working knowledge in illustrious Sanskrit, the scientific language in the world

•Learning of Sanskrit to improve brain functioning

•Learning of Sanskrit to develop the logic in mathematics, science & other subjects

•Enhancing the memory power

•The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Understand the concept of risk assessment	GOAL-4(quality Education)	

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SEMESTER- 2nd **Subject Code: 6TMDC206**

Course: M. Tech Digital Communication

SUBJECT: Personality Development through life enlightenment skills

COURSE OBJECTIVE:

•To learn to achieve the highest goal happily.
•To become a person with stable mind, pleasing personality and determination.
•To awaken wisdom in students.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Neetisatakam-Holistic development of personality • Verses- 19,20,21,22 (wisdom) • Verses- 29,31,32 (pride & heroism) • Verses- 26,28,63,65 (virtue) • Verses- 52,53,59 (dont's) • Verses- 71,73,75,78 (do's)	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – II	• Approach to day to day work and duties. • Shrimad Bhagwad Geeta : Chapter 2-Verses 41, 47,48, • Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35, • Chapter 18-Verses 45, 46, 48	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	• Statements of basic knowledge. • Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68 • Chapter 12 -Verses 13, 14, 15, 16,17, 18 • Personality of Role model. Shrimad Bhagwad Geeta: • Chapter2-Verses 17, Chapter 3-Verses 36,37,42, • Chapter 4-Verses 18, 38,39 • Chapter18 – Verses 37,38,63	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

Students will be able to
•Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
•The person who has studied Geeta will lead the nation and mankind to peace and prosperity
•Study of Neetishatakam will help in developing versatile personality of students.

Suggested reading:

1."Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication
2.Department), Kolkata
3.Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath,
4.Rashtriya Sanskrit Sansthanam, New Delhi.

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Understand the concept of day to day work & duty.	GOAL-4(quality Education)	

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SEMESTER- 2nd **Subject Code: 6TMDC206**

Course: M. Tech Digital Communication

SUBJECT: Value Education

COURSE OBJECTIVE:

Students will be able to

•Understand value of education and self- development.

•Imbibe good values in students.

•Let the should know about the importance of character.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	• Values and self-development –Social values and individual attitudes. • Work ethics, Indian vision of humanism. • Moral and non- moral valuation. Standards and principles. • Value judgements	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – II	• Importance of cultivation of values. • Sense of duty. Devotion, Self-reliance. Confidence, • Concentration. Truthfulness, Cleanliness. • Honesty, Humanity. Power of faith, National Unity. • Patriotism Love for nature, Discipline	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	• Personality and Behaviour Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. • Punctuality, Love and Kindness. • Avoid fault Thinking. • Free from anger, Dignity of labour. • Universal brotherhood and religious tolerance. • True friendship. • Happiness Vs suffering, love for truth. • Aware of self-destructive habits. • Association and Cooperation. • Doing best for saving nature.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	• Character and Competence –Holy books vs Blind faith. • Self-management and Good health. • Science of reincarnation. • Equality, Nonviolence, Humility, Role of Women. • All religions and same message. • Mind your Mind, Self-control. • Honesty, Studying effectively	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

Students will be able to:

- Knowledge of self-development.
- Learn the importance of Human values.
- Developing the overall personality.

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Understand the concept of work ethics	GOAL-4(quality Education)	

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SEMESTER- 2nd
Course: M. Tech Digital Communication
SUBJECT: Advance Digital Signal Processing Lab - III

Subject Code: 6TMDC207
Practical Max. Marks: 25
Practical Min. Marks: 12

List of Practical

1. 1.To Generate the following waveforms a: Unitstep Sequence
2. Ramp Sequence
3. Exponential Sequence
4. Sine Sequence
5. Sine Sequence
6. 2.Program for linear convolution
7. Program of computing circular convolution.
8. Program for computing cross correlation of the given sequence.
9. Program for design of Butter worth LPF.
10. 6 Program for the design of FIR, LP, HP, BP and BS Filters using Rectangular Window.
11. Program for estimating PSD of Two sinusoid Plus noise.
12. Program for Drawn Sampling a Sinusoidal sequence by a faster M.
13. Cancellation of echo produced on the telephone base band channel (Simulation).
14. Program for the solution of normal equation using Levinson-Durbin Algorithms.
15. Study of DSP Processor. (Texas Instrument)
16. To observe the effect of interpolation and decimation on the spectrum of a signal (DSP Works Software)
17. To Generate and amplitude modulation Signal and observe the presence of sideband in its spectrum. (DSP works software)
18. To Demonstrate Spectral Leakage.
19. Program for partial fraction decomposition of a rational transfer function.

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. DSP_{works} Signal grneration and Analysis Software.
3. TMS 320C6** service starter Kits with Code composer Studio.

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SEMESTER- 2nd
Course: M. Tech Digital Communication
SUBJECT: Optical Communication Lab - IV

Subject Code: 6TMDC208
Practical Max. Marks: 25
Practical Min. Marks: 12

Experiments to be performed

1. To measure bending loss of a fiber.
2. To propagation or attenuation loss in a fiber.
3. To obtain amplitude modulation and to transmit the same over fiber optic cable and to demodulate the same at the receiver end.
4. To determine the numerical aperture of a fiber.
5. To measure various types of losses, occur in an optical fiber.
6. To study the AC characteristics of intensity modulation of laser and fiber optic system.
7. To measure optical power of a laser diode Vs. forward current.
8. To monitor photo diode current Vs. laser optical output.
9. Demonstration of voice transmission through optical fiber using FM.
10. Communication between two computers using RS232 interface via optical fiber.
11. To measure plastic fiber patch cord loss for various lengths of fiber.
12. To study voice transmission through fiber optic cable using PWM.
13. To transmit and receive text files over fiber optic cable.
14. To transmit, receive and observe digital signals over fiber optic cable.
15. To measure rise time, fall time, pulse width distortion of a laser and to determine transmission delay.

List of Equipments/Machine Required

Fiber optic trainer kit, optical fiber, Splicing unit, Data Acquisition card for optical signal, O/E & E/O Converter, CRO.

Recommended Books

1. Fundamentals of Optical Fiber Communication – Sathish Kumar, PHI

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SEMESTER- 3rd
Course: M. Tech Digital Communication
SUBJECT: Satellite Communication

Subject Code: 6TMDC301
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

- To gain the knowledge about the Geo synchronous orbit, use of satellite
- To get the knowledge about of link design and the different parameters.
- To provide comprehensive knowledge about multiple access techniques.
- To have the knowledge about communication satellite subsystem.
- To know about the earth station requirements.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Growth of satellite communication, Keplar's laws,Newton's Gravitational Law, Different orbits of-satellite,-Frequency-Coordination-and-regulatory-services, Look angle, orbital disturbances, Launch vehicles and-propulsion-mechanism,-orbital-effects-on communication system performance.	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Satellite subsystems, Station keeping,-attitude-control,-stabilization-techniques, atmospheric losses, satellite link design, C/N ratio of the-link,-G/T-of-earth-station,-overall-system temperature. SATELLITE TRANSPONDER: Transponder model, transponder channelization, frequency plans and processing transponders.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Telephone channel, Analog FM Transmission, Satellite-Television signal, Digital signals, Digital modulation, error control coding, satellite access: FDMA – TDMA – CDMA	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Different types of earth stations: TVRO – SMATV – CATV – Transmit - receiver earth stations-antennas – tracking systems – terrestrial interface – Test methods – different types of interferences – interference specifications and protection ratio.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Intelsat series – INSAT series – satellite navigation and the global positioning system, VSAT, mobile satellite services, IMMERSAT, DTH, Email, Video conferencing – Internet connectivity.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

- Students get the knowledge about Geo synchronous orbit and satellite..
- Obtain the knowledge about the link design and multiple access techniques
- Gets the knowledge about satellite working of different subsystem of satellite.
- Students gain the idea about the requirement of earth station

Text Books:

- Dennis Roddy," Satellite Communication", Third Edition, McGraw Hill , 2001.
- Wilbur L. Pritchard, Henri G.Suyderhoud, Robert A. Nelson," Satellite Communication Systems Engineering", Second Edition, Pearson Education, 1993.

Reference Books:

- Timothy Pratt, Charles Bostian , Jeremy Allnutt, " Satellite Communications", Second--Edition-,-JohnWiley & Sons., 2003
- Bruce R.Elbert, "The Satellite Communication Applications Handbook", Second Edition,-Artech--HouseInc, Boston London, 2004.
- Brij N. Agrawal, " Design of Geosynchronous Sapcecraft", Prentice Hall Inc.1986.

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•M.Richharia,"-Satellite-Communication-Systems--Design-Principles",-Second-Edition,-Macmillan-PressLtd, 1999.
•Tri T. Ha, " Digital Communications ", Second Edition , Mc Graw Hill Publishing Edition, 1990.

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Get the knowledge about satellite link design and earth segment.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 3rd
Course: M. Tech Digital Communication
SUBJECT: Optical Instrumentation & Measurement

Subject Code: 6TMDC301
Theory Max. Marks: 50
Theory Min. Marks: 17

COURSE OBJECTIVE:

•To gain the knowledge about the optical instrument.
•To get the knowledge about fiber optics comonents
•To provide comprehensive knowledge about multiple access techniques.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Optical Time Domain Reflector, Optical low Coherence Reflect meter, Optical spectrum Analyzer Optical power and energy meter, Monochrometer, CCD, Ellipsometer, transducer, Lock in Amplifier, Box car Average.	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Direction Couplers, beam splitters, switches, modulations, connectors, couplers, polarizer, polarization controllers, amplifiers, fiber laser, reflector, wavelength filters, polarizing beam splitter, wavelength division multiplexes, fiber optic isolator etc.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Pressure, temperature, strain, Magnetic & Electric field sensors based on characteristics like intensity, phase, polarization, frequency and wavelength of light wave	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Single Mode Fiber: Attenuation, Refractive Index Profile (RIP), Mode Field Diameter, Equivalent step Index (EXI) Profile, Mode Cut off Wave length and the Single Mode operating regime, Dispersion, Birefringenence Measurement, Measurement of the Propagation constant of fiber mode.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Multimode Fiber: Refractive Index Profile, Geometric Measurement, Numerical Aperture, Total Attenuation, Scattering Loss and differential mode loss, Non destructive loss Measurement (OTDR), Transmission Bandwidth and dispersion, Bandwidth of Jointed fiber, Differential Mode Delay (DMD).	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

•Students get the knowledge about fiber optics sensors.
•Obtain the knowledge about the fiber optics measurement.

Text Books:
•Optical Fiber Communication by S. Senior
•Fiber Optics Measurement by A. Ghatak, M.R. Shenoy.
•Fundamental of Fiber Optics in Telecommunication & Sensors Systems

Reference Books:

•Introduction to Fiber Optics by A. Ghatak and Tyagrajan
•Optical Fiber Sensors System and Application By B. Culshaw.

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Get the knowledge about optical fibers sensors.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 3rd **Subject Code: 6TMDC301**
Course: M. Tech Digital Communication **Theory Max. Marks: 50**
SUBJECT: Ultra-Wideband Communication System **Theory Min. Marks: 17**

COURSE OBJECTIVE:

•To gain the knowledge about the UWB signals
•To get the knowledge about signal processing techniques for UWB.
•To provide comprehensive knowledge about UWB antenna.

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Introduction – Power spectral density – Pulse shape – Pulse trains – Spectral masks Multipath –Penetration characteristics – Spatial and spectral capacities – Speed of data transmission – Gaussian waveforms – Designing waveforms for specific spectral masks Practical constraints and effects of imperfections...	Classroom teaching ICT tools ,MOOCS,swayam and Google classroom
Unit – II	Effects of a lossy medium on a UWB transmitted signal – Time domain analysis – Frequency domain techniques – A simplified UWB multipath channel model – Path loss model – Two-ray UWB propagation model – Frequency domain autoregressive model.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	UWB modulation methods – Pulse trains – UWB transmitter/receiver – Multiple access techniques in UWB – Capacity of UWB systems – Comparison of UWB with other wideband communication systems – Interference and coexistence of UWB with other systems – Hermite pulses – Orthogonal prolate spheroidal wave functions – Wavelet packets in UWB PSM – Applications of UWB communication systems.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Antenna fundamentals – Antenna radiation for UWB signals – Conventional antennas and Impulse antennas for UWB systems – Beam forming for UWB signals – Radar UWB array systems –Wireless positioning and location – GPS techniques – Positioning techniques – Time resolution issues – UWB positioning and communications	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	UWB standardization in wireless personal area networks – DS-UWB proposal – MB-OFDM UWB proposal – IEEE proposals for UWB channel models – UWB ad-hoc and sensor networks – MIMO and Space-time coding for UWB systems – Self interference in high data rate UWB communication– Coexistence of DS-UWB with WIMAX	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:
•Students get the knowledge about UWB communication standard.
•Obtain the knowledge about the UWB antenna sensor.

Text Books:
•M. Ghavami, L. B. Michael and R. Kohno, "Ultra-Wideband signals and systems in Communication Engineering", 2nd Edition, John Wiley & Sons, NY, USA,

Reference Books:
•Jeffrey H. Reed, "An Introduction to Ultra-Wideband Communication systems", Prentice Hall Inc., NJ, USA, 2012

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Get the knowledge about UWB signals & UWB waveforms	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 3rd **Subject Code: 6TMDC302**
Course: M. Tech Digital Communication **Theory Max. Marks: 50**
SUBJECT: Advanced Mobile Communication **Theory Min. Marks: 17**

COURSE OBJECTIVE:

- To give students brief history of the evolution of mobile communications throughout the world
- To give knowledge of cellular concepts and its designing aspects.
- To give students a detailed overview of GSM, its architecture, interfaces, frames etc.
- To familiarize students about advanced modulation techniques used in mobile communications
- To teach students about the practical limitations on the performance of wireless communication systems

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	History & Evolution of Mobile Radio Systems. Types of Mobile Wireless Services / Systems-Cellular, WLL, Paging, Satellite Systems, Standards, Future Trends In Personal Wireless Systems.	Classroom teaching ICT tools, MOOCS, Swayam and Google classroom
Unit – II	Cellular Concept and Frequency Reuse, Multiple Schemes, Channel Assignment and Handoff, Interference and System Capacity, Trunking and Erlang Capacity Calculations	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	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.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	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.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – V	Multiple access techniques –FDMA, TDMA and CDMA Systems, Operational Systems, Wireless Networking, Design Issues in Personal Wireless Systems.	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

- Students will have idea about the growth in mobile communications that gives rise to technological improvements.
- Students will be able to visualize the use of frequency reuse to increase the system's capacity and also other designing aspects.
- Students will be able to understand the architecture of the GSM and mechanism to support mobility of the GSM terminals.
- Students will see how modulation techniques are used to transport the message signal via a radio channel with best possible quality with minimum radio spectrum.
- Students will be able to understand various transmission problems and their counter measures.

Text Books:

- K.Feher "Wireless digital Communication " PHI New Delhi1995
- T.S. Rappaport, " Wireless Digital Communication: Principles and Practices" PHI NJ 1996.

Reference Books:

- W.CY. Lee, " Mobile Communications Engineering: Theory and appliocations, 2nd edition" MC-Graw Hill New York 1990
- Schiller " Mobile communications" Peason Education Asia Ltd. 2000.

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
BTS installation Engineer and Opertion & Maintainance Engineer	Able to visualize the use of frequency reuse to increase the systems capacity and also other designing aspects.	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 3rd **Subject Code: 6TMDC302**
Course: M. Tech Digital Communication **Theory Max. Marks: 50**
SUBJECT: Global Tracking & Positioning System **Theory Min. Marks: 17**

COURSE OBJECTIVE:

- To gain the knowledge about the Geo synchronous orbit.
- To get the knowledge about of orbits and reference systems.
- To provide comprehensive knowledge about GPS measurements.
- To have the knowledge about processing techniques.
- To know about GPS applications

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	Satellites, Introduction to Tracking and GPS System, Applications of Satellite and GPS for 3D position, Velocity, determination as function of time, Interdisciplinary applications (e.g., Crystal dynamics, gravity field mapping, reference frame, atmospheric occultation) Basic concepts of GPS. Space segment, Control segment, user segment, History of GPS constellation, GPS measurement characteristics, selective availability (AS), ant spoofing (AS).	Classroom teaching ICT tools, MOOCS, Swayam and Google classroom
Unit – II	Basics of Satellite orbits and reference systems-Two-body problem, orbit elements, timer system and timer transfer using GPS, coordinate systems, GPS Orbit design, orbit determination problem, tracking networks, GPS force and measurement models for orbit determination, orbit broadcast ephemeris, precise GPS ephemeris. Tracking problem	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	GPS Observable-Measurement types(C/A Code,P-code,L1 and L2 frequencies for navigation, pseudo ranges),atmospheric delays (tropospheric and ionospheric) data format (RINEX), data combination(narrow/wide lane combinations, ionosphere-free combinations, single, double, triple differences), undifferenced models, carrier phase Vs Integrated Doppler, integer biases, cycle slips, clock error.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Pseudo range and carrier phase processing, ambiguity removal, Least square methods for state parameter determination, relation positioning, dilution of precision..	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – V	Surveying, Geophysics, Geodsey, airborne GPS, Ground-transportation, Spaceborne GPS orbit determination, attitude control, meteorological and climate research using GPS	Classroom teaching, ICT Based and individual presentation and Google classroom

COURSE OUTCOME:

- Students get the knowledge about Geo synchronous orbit.
- Obtain the knowledge about orbits and reference systems.
- Gets the knowledge about GPS measurements and processing techniques.
- Students gain the idea about GPS applications.

Text Books:

- B.Hoffman - Wellenhof,H.Lichtenegger and J.Collins,"GPS: Theory and Practice ".4th revised edition, Springer, New york,1997
- B.Parkinson,J.Spilker,Jr.(Eds),"GPS:Theory and Applications",Vol.I & Vol.II,AIAA,370 L'Enfant PromenadeSW,Washington,DC20024,1996

Reference Books:

- A.Kleusberg and P.Teunisen(Eds),GPS for Geodesy,Springer-Verlag,Berlin,1996
- A.Leick,"GPS Satellite Surveying",2nd edition, John Wiley & Sons,NewYork,1995

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Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Get the knowledge about Geo synchronous orbit and knowledge about GPS measurements and processing techniques	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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SEMESTER- 3rd
Course: M. Tech Digital Communication
SUBJECT: Broadband Communication

Subject Code: 6TMDC302
Theory Max. Marks:50
Theory Min. Marks:17

COURSE OBJECTIVE:

- To gain the knowledge about broadband communication frame relays.
- To get the knowledge about of ISDN
- To provide comprehensive knowledge about ISDN interface and Functions.
- To have the knowledge about B-ISDN Services.
- To know about ATM

Syllabus:

Unit	Unit wise course contents	Methodology Adopted
Unit – I	X.25, Frame relay, X.25 v/s Frame relaying, Frame mode protocol architecture, Frame relay and Frame switching, Frame mode call control, Call control protocol, DLCI, Bearer capability, Link layer core parameters, LAPF	Classroom teaching ICT tools, MOOCS, Swayam and Google classroom
Unit – II	Integration of Transmission and Switching, Analog and Digital switching, Principles of ISDN, User interface, Architecture, ISDN standards, I-series recommendations.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – III	Transmission structure, User network interface, ISDN protocol architecture, ISDN connections, Addressing, Interlocking, B-ISDN architecture and standards.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit – IV	Conversational, Messaging, Retrieval, Distribution, Business and Residential requirements. B-ISDN protocols User plane, Control plane. Physical layer, Line coding, Transmission structure, SONET- Requirement, Signal Hierarchy, System Hierarchy.	Classroom teaching, ICT Based and individual presentation and Google classroom
Unit - V	Overview, Virtual channels, Virtual paths, VP and VC switching, ATM Cells, Header format, Generic flow control, Header error control, Transmission of ATM cells, Adaptation layer, AAL services and protocols. ATM switching – ATM switching building blocks, ATM cell processing in a Switch, Matrix type switch, Input, Output buffering, Central buffering, Performance aspects of buffering switching networks.	Classroom teaching, ICT Based and individual presentation and Google classroom

Course outcomes:

- Students get the knowledge about broadband communication frame relays
- Obtain the knowledge about ISDN
- Gets the knowledge about ISDN interface and Functions
- Students gain the idea about B-ISDN Services and ATM

Text Books:

- ISDN and Broadband ISDN with Frame Relay and ATM William Stallings, Prentice-Hall, 4th edition
- Understanding SONET/SDH and ATM, Kartalapoulos PHI Publication

Reference Books:

- Atm Networks Kasera, Sumit T Mh--
- Isdn And Broadband Isdn With Frame Relay And Atm ,-W.stallings-P. E. A.
- Broadband Bible, Gaskin, James E. Wiley

Job opportunity	Employability skill developed	Local/National/UNDP Goal Achieved	Entrepreneurship Opportunity
	Get the knowledge about broadband communication frame relays	GOAL-4(quality Education) GOAL-9(industry, innovation and structure)	

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