PEOPLE'S UNIVERSITY, BHOPAL

PROGRAMME: M Tech (Digital Communication)

SEM: I

Subject Title	Subject Code
ADVANCED MATHMATICS	MTH 181

Unit	Contents *(Theory)*
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.
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.
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/ FC FS)
IV	Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.
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.

Reference Books:

1.Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, Wiley Easten Edd.
3. Applied Numerical Methods with MATLAB by Steven C chapra, Tata Mc Graw Hill.
4. Introductory Methods of Numerical Analysis by S.S. Shastry,
5. Introduction of Numerical Analysis by Forberg
6. Numerical Solution of Differential Equation by M. K. Jain
7. Numerical Mathematical Analysis By James B. Scarborogh
8. Fourier Transforms by J. N. Sheddon
9. Fuzzy Logic in Engineering by T. J. Ross
10. Fuzzy Sets Theory & its Applications by H. J. Zimmersoms

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PROGRAMME: M Tech (Digital Communication)

SEM: I

Subject Title	Subject Code
DSP & ITS APPLICATIONS	MTDC-102

Unit	Contents (Theory)
I	**Review of Discrete time signals:** sequences, representation. Discrete time systems: linear, time in variant, LTI systems, properties, and constant coefficients difference equations. Frequency Domain representation of discrete time signals and systems.
II	**Review of Z Transform** – Properties, ROC. Stability, Causality, Criterion. Inverse Z Transform, Recursive and Non Recursive systems, Realization of discrete time system.
III	**DFT:** Properties, Linear and Circular convolution, Discrete Cosine Transform, Relationship between DFT and DCT. Computation of DFT: FFT/Decimation in Time and Decimation in Frequency.
IV	**FIR and IIR systems:** Basic structure of FIR and IIR, Bilinear Transformation, Design of Discrete time IIR filter-Butterworth, Chebychev, Inverse Chebychev, Elliptic etc. Design of FIR filters by windowing – Rectangular, Bartlett, Hann, Hamming, Kaiser, Window filter, Design method relationship of Kaiser to other window. Application of MATLAB for Design of Digital filter. Effect of Finite register length in filter Design.
V	**Discrete time Random signals:** Discrete time random process, Averages, Spectrum Representation of finite energy signals, response of linear systems to random signals. Power spectrum estimation: Basic principals of spectrum estimation, estimate of auto con variance, power spectrum cross con variance and cross spectrum. Advance signal processing technique and transforms: multi rate signal processing- down sampling/up sampling, introduction to discrete Hilberts Transform, Wavelet Transform, Haar Transform etc.

Reference Books:

1. Discreate time signal Processing by Opperenheim & Schaffer PHI 2nd Edition
2. Digital Signal Processing using MATLAB by S.Mitra
3 Digital Signal Processing By Proakis Pearson Education
4. Theory & application of Digital Signal Processing by L.R.Rabiner & B. Gold PHI

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PROGRAMME: M Tech (Digital Communication) **SEM: I**

Subject Title	Subject Code
ADVANCED DIGITAL COMMUNICATION	MTDC-103

Unit	Contents *(Theory)*
I	Review of probability and Stochastic Processes.
II	Characterization of Communication Signal and System. Geometric Representation of Signals and its use in communication.
III	Optimum receiver for Additive White Gaussian Noise, BER calculation.
IV	Carrier and symbol synchronization, signal design for Band Limited Channels.
V	Communication through Band limited Channel, concept of parallel transmission, Multi channel and multi carrier CDMA system, fading multi-path channel, OFDM, Future trends.

Reference Books:

Proakis J.J.,D Wozencraft J.M. and Jacobs I.M., Principles of Communication Engineering, John Wiley.
Carison A., Communication System, 3rd ., McGraw Hill.
Van Trees H.L., Detection Estimation and Modulation Theory, Vol. 1., Wiley.
Blahut R.F., Digital transmission of Information, Addison Wesley.
Benedetto S., Biglieri E. and Castellari V., Digital Transmission Theory, Prentice Hall.

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PROGRAMME: M Tech (Digital Communication) SEM: I

Subject Title	Subject Code
MODERN TELEPHONE SWITCHING SYSTEM	MTDC-104

Unit	Contents *(Theory)*
I	**Electronic space Division switching:** Stored program control (SPC), switching matrices, multistage switching, enhance services photonic switching.
II	**Time Division switching :-** Time division space, and time switching, multiplexed switching, combination switching, T -S, T -S- T, switching n-stage combination switching, PBX switching, PBX networking, digital PBX.
III	**Traffic Engg. :-** Traffic load, Grade of service, ErJang's formulas, blocking modeling switching systems, Blocking model.
IV	**Subscriber Loop, Dialing Systems :-** Switching hierarchy & routing, Transmission plan, numbering plan, charging plan, signaling technique.
V	**Local Access Techniques :-** Digital subscriber lines, DSL, ADSL etc, WLL, FIL." wireless for local telephone services.

References:

1 Telecomm. Switching systems & networks- Thaigrajan PHI

2. Comm, System - Taub & Schilling, Mc Graw Hill

3. Telecomm. & the Computers - James Martin - PHI

4. The Issential Guide to Telecomm - Pearson Educah - Annabelz Dodd.

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PROGRAMME: M Tech (Digital Communication) SEM: I

Subject Title	Subject Code
MICRO CONTROLLER SYSTEM	MTDC-105

Unit	Contents *(Theory)*
I	Review of 8-Bit and 16-bit microprocessor, support chips and interfacing techniques, single chip micro-computers, architecture, program and data memory, ports, input Output interfacing and programming,
II	Single chip micro controllers- INTEL 8051/ 8751, MOTOROLA 68HC0/68HC11 architecture, instruction set and programming, Memory mapping. addressing modes, Registers, expanded modes. Interrupt handling timing and serial I / O.
III	Software development Modular approach, integrated software development environment, Object oriented interfacing and programming. Recursion and debugging.
IV	ATMEL 89C51 / 52 and PIC micro-Controllers- Case studies. Design and application of Micro-Controller in Data acquisition, Embedded controllers, Processcontrol etc.
V	DSP Processor architecture and sample design using TI – DSP.

References:

1. Embedded Systems 8051 By Majidi & Majidi
2. Design With Micro-Controllers By John P. Peatman Tmh
3. Embedded Micro-Computers System By Jonathan W. Valvano
4. Data Manuals – Intel Motorola

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PROGRAMME: M Tech (Digital Communication) **SEM: I**

Subject Title	Subject Code
LAB-1	MTDC-106

With help of MATLAB programming solve the problem related to DSP & its Applications and Advance digital communication

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PROGRAMME: M Tech (Digital Communication) SEM: I

Subject Title	Subject Code
LAB -II	MTDC-107

With help of Microcontroller assembly programming solve the problem related to microcontroller system

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