SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

Grading System

Course Name:M.TECH(MWM)

Scheme of Examination w.e.f. 2016-17

Semester/Year : I SEM/I YEAR

S. No.	Subject Code	Subject Name	Maximum Marks Allotted						Hours/ Week			Credit	Total Marks
			Theory			Practical							
			End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	Assignment / Quiz	L	T	P		
1	MTMW-101	ADVANCED MATHEMATICS	100	30	20	-	-	-	3	1	-	4	150
2	MTMW -102	MICROCONTROLLER SYSTEM DESIGN	100	30	20	-	-	-	3	1	-	4	150
3	MTMW -103	EMT THEORY	100	30	20	-	-	-	3	1	-	4	150
4	MTMW -104	ADVANCED MICROWAVE DEVICES	100	30	20	-	-	-	3	1	-	4	150
5	MTMW -105	ANTENNA ENGINEERING	100	30	20	-	-	-	3	1	-	4	150
6	MTMW -106	LAB-I(102,103)	-	-	-	50	50	-	-	-	4	2	100
7	MTMW -107	LAB-II(104,105)	-	-	-	50	50	-	-	-	4	2	100
8	MTMW -108	COMPERHENSHIV VIVA-I	-	-	-	50	-	-	-	-	-	-	50
TOTAL			500	150	100	150	100	-	15	5	8	24	1000

L: Lecture T:Tutorial P:Practical

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

Grading System
Course Name: M.TECH(MWM)
Scheme of Examination w.e.f. 2016-17
Semester/Year :II SEM/I YEAR

S. No.	Subject Code	Subject Name	Maximum Marks Allotted						Hours/ Week			Credit	Total Marks
			Theory			Practical							
			End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	Assignment / Quiz	L	T	P		
1	MTMW -201	INFORMATION THEROY & CODING	100	30	20	-	-	-	3	1	-	4	150
2	MTMW -202	DSP APPLICATION	100	30	20	-	-	-	3	1	-	4	150
3	MTMW -203	ADVANCED COMMUNICATION SYSYTEM	100	30	20	-	-	-	3	1	-	4	150
4	MTMW -204	MICROWAVE MESURMENT	100	30	20	-	-	-	3	1	-	4	150
5	MTMW -205	REASEARCH METHODOLOGY	100	30	20	-	-	-	3	1	-	4	150
6	MTMW -206	LAB-III(201)	-	-	-	50	50	-	-	-	4	2	100
7	MTMW -207	LAB-IV(202)	-	-	-	50	50	-	-	-	4	2	100
8	MTMW -208	COMPERHENSHIV VIVA-II	-	-	-	50	-	-	-	-	-	-	50
TOTAL			500	150	100	150	100	-	15	5	8	24	1000

L: Lecture **T:Tutorial** **P:Practical**

Grading System
Course Name: M.TECH(MWM)
Scheme of Examination w.e.f. 2016-17
Semester/Year : III SEM/II YEAR

S. No.	Subject Code	Subject Name	Maximum Marks Allotted						Hours/ Week			Credit	Total Marks
			Theory			Practical							
			End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	Assignment / Quiz	L	T	P		
1	MTMW -DP(1)	DESSERTATION (PHASE-I)	-	-	-	100	100	-	-	-	-	12	200
TOTAL			-	-	-	100	100	-	-	-	-	12	200

L: Lecture T:Tutorial P:Practical

Grading System
Course Name: M.TECH(MWM)
Scheme of Examination w.e.f. 2016-17
Semester/Year : IV SEM/II YEAR

S. No.	Subject Code	Subject Name	Maximum Marks Allotted						Hours/ Week			Credit	Total Marks
			Theory			Practical							
			End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	Assignment / Quiz	L	T	P		
1	MTMW -DP(II)	DESSERTATION (PHASE-II)	-	-	-	150	150	-	-	-	-	12	300
TOTAL			-	-	-	150	150	-	-	-	-	12	300

L: Lecture T:Tutorial P:Practical

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MTMW 101-ADVANCED COMPUTATIONAL MATHEMATICS

Unit 1

Linear Algebra: Linear transformation, vector spaces, hash function, Hermite polynomial, Heavisite's unit function and error function. Elementary concepts of Modular mathematics

Unit 2

Solution of Partial Differential Equation (PDE) by separation of variable method,numerical solution of PDE (Laplace, Poisson's, Parabolic) using finite difference methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.

Unit 3

Probability, compound probability and discrete random variable. Binomial, Normal and Poisson's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

Unit 4

Stochastic process, Markov process transition probability transition probability matrix,just and higher order Markov process, Application of Eigen value problems in 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)

Unit 5

Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.

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, TMH.
4. Advance Engg Mathematics, O' Neil, Cengage (Thomson)
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

MTMW–102 MICRO CONTROLLER SYSTEM DESIGN

Unit 1
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.

Unit2
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.

Unit3
Software development Modular approach, integrated software development environment, Object oriented interfacing and programming, Recursion and debugging.

Unit 4
ATMEL 89C51 / 52 and PIC micro-Controllers- Case studies.
Design and application of Micro-Controller in Data acquisition, Embedded controllers, Process control etc.

Unit 5
DSP Processor architecture and sample design using TI – DSP.

Reference Books:

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.

MTMW – 103 EMT Theory

Unit 1
Introduction & review of Electromagnetic Field theory, boundary value problems.

Unit 2
Time varying fields, Maxwell's equation, source concepts, Duality equivalence principle, induction theorem, reciprocity theorem, Green's function & applications.

Unit 3
Plane wave function, Plane waves, Rectangular waveguides Models, Cylindrical wave function, circular guide modes, Coaxial Line modes.

Unit 4
Spherical wave function; Wave transformation.

Reference Books:

1. Plonsey & Collin; Principle & Application of EM Fields
2. R. F. Harrington; Time Harmonic EM Fields
3. Collins; Fields Theory of Guided Waves
4. Ramo & Whinnery; Fields & Waves in Modren Radio.

MTMW –104 Advanced Microwave Devices

Unit 1

Electrostatic electron optics Analogy with physical optics, Electrostatic lens fields paraxial ray equation, general lens properties aberrations, magnetic lenses focusing action, magnetic fields equation of motion of paraxial electron defects. General equation of motion in the combined electric and magnetic fields.

Unit 2

Electron Microscope Structures, relation of resolving power, Klystrons bunching. Principle cavity Resonators, mechanism of energy interchange, Klystron amplifiers, Reflex Klystron Oscillator, Power Relation, Magnetron Structural forms, Multicavity Magnetrons their Resonant properties electron behavior in crossed magnetic and electric fields, different case. Output characteristics of magnetrons strapping, Carncintrons.

Unit 3

Traveling Wave Tube, Backward Oscillators, Characteristics and performance of other Microwave tubes, Principle & Theory of MASERs & LASERs, Varactor diodes operations, Paramagnetic amplifier, Manley-Rowe equation, Tunnel diode theory, Use as an amplifier, Mounting Micro strip.

Unit 4

P-I-N diodes, Oscillators, Semiconductor devices at Microwave frequency. Gunn effect devices theory, Power transfer, efficiency, mounting, integrated circuits, micro strip transmission lines, Monolithic circuits.

Reference Books:

1. Vacuum Tubes; Spagenberg
2. Theory & Application of Microwave Tubes; Bronwell Beam
3. Microwave Semiconductor Devices; Shurner
4. Microwave Electrons. Slater

MTMW –105 Antenna Engineering

Unit 1

Review of e.m. waves, fields solution in free space, generalized plane wave representation of spherical and other waves, radiation conditions at infinity, elementary current and aperture element sources, Equivalence theorems, antenna impedance, mutual impendence calculation between wire antennas and aperture antenna in infinite conductor plane.

Unit 2

Relationship between radiation pattern and source current distributions, Radiation pattern and aperture field distribution, Diploes, helical and rhombus antennas.

Unit 3

Antenna arrays, mathematical theory of uniform and non-uniform arrays. Beam width, SLL, gain of long arrays. Planar arrays, change in element radiation pattern in array environment. Trade off between SLL and beam width, design by Tsebycheff and other methods, optimum Taylor's distribution.

Unit 4

Aperture antenna analysis, box and horn antenna, reflector antennas, parabolic and cassagrain antenna design. Corrugated horns, Lens antennas – dielectric and metallic.

Unit 5

Antenna bandwidth considerations, broadband antennas. Electronically scanned arrays, design considerations feed systems. Strip line antennas, design and applications.

Reference Books:

1. Antenna Engineering – Krans

2. Electromagnetic Fields & Radiating Systems – Jordan & Balmaini

MTMW – 201 INFORMATION THEORY AND CODING

Unit 1

Introduction to uncertainty, information, entropy and its properties, entropy of binary memory less source and its extension to discrete memory less source, coding theorem, data compression, prefix coding, HUFFMAN coding, Lempel-Ziv Coding

Unit 2

Discrete memory less channels, Binary symmetric channel, mutual information & its properties, channel capacity, channel coding theorem, and its application to BSC, Shannon's theorem on channel capacity, capacity of channel of infinite bandwidth, Bandwidth signal to noise Trade off, Practical communication system in light of shannon's theorem, Fading Channel.

Unit 3

Group and field of Binary system Galois field and its construction in GF (2) and its basic properties, vector spaces and matrices in GF(2), Linear Block Codes, Systematic codes, and its encoding circuits, syndrome and error detection ,minimum distance, error detecting and correcting capabilities of block code, Decoding circuits, Probability of undetected error for linear block code in BSC ,Hamming code and their applications.

Unit 4

Cyclic codes and its basic properties, Generator & parity check matrix of cyclic codes, encoding & decoding circuits, syndrome computation & error detection, cyclic Hamming codes.

Unit 5

Introduction to BCH codes, its encoding & decoding, error location & correction.
Introduction to convolution codes, its construction & viterbi algorithm for maximum likelihood decoding.

Reference Books:

2 Digital Communication by Haykins Simon Wiley Publ.

3 Error control Coding: Theory and Application, by Shu Lin and Cosstlello,PHI
4 Modern analog and Digital Communication system, by B.P. Lathi

5 Digital Communication by Sklar, Pearson Education

6 Principal of Communication system by Taub & Schilling, TMH

7 Error Correcting Codes by Peterson W., MIT Press

8 Digital Communication by Carson,MGH

9 Digital Communication by Proakis,TMH

MTMW– 202 DSP Application

Unit 1

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.

Unit 2

Review of Z Transform – Properties, ROC, Stability, Causality, Criterion. Inverse Z Transform, Recursive and Non Recursive systems, Realization of discrete time system.

Unit 3

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.

Unit 4

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.

Unit5

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 principles 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

MTMW– 203 ADVANCED COMMUNICATION SYSTEM

UNIT -1

Review of basic communication theoretical concept, Digital Modulation Techniques, On-Off Keying: Frequency shift keying, Phase shift keying, Quadrature Phase shift keying,. Frequency Multiple access; Demand assigned multiple access, Code Division Multiple access.

UNIT -2

Noise & Communication System, Error Rate in Binary Transmission, Optimum decision levels information capacity of PCM systems; Noise, Power & Spectral representation of noise Random signals & noise through linear systems, Matched Filter Detection, Narrow band noise representation, Signal-to-noise ratio in FM & AM, AM detector spectral analysis, Thermal noise consideration & other types of the noise encountered in communication.

UNIT-3

Statistical communication theory in digital communication, Statistical decision theory signal vectors, Multiple sample detector optimum, Binary transmission, M-array transmission additive white Gaussian noise channel, Matched filter detection signal constellation and probability of error calculation, Binary signals M-array orthogonal signals.

UNIT -4

Mobile communication, Introduction, Spread spectrum, Direct sequence spread spectrum, Cellular systems, Access contracts SDMA, FDMA, TDMA, CDMA systems architecture, Radio interface, Protocols, Wireless LAN, Wireless ATM, Mobile Network Layer, Mobile transport layer.

Reference Books:

1. Mobile Communication By Jochen Schiller
2. Digital Communication By Taub & Schiller
3. Modulation, Coding By Swartz & Noise.

MTMW – 204 MICROWAVE MEASUREMENTS

Unit 1

Microwave detectors, detector characteristics, law of detection, detector mounts, tuning arrangements of probes. Slotted line, effect of penetration of probe, measurement of VSWR and transmission line impedance, measurement of detection law, effect of detection law on VSWR measurement, techniques of high VSWR measurement, VSWR meter.

Unit 2

Measurement of impedance, S – parameter of networks, Smith chart, reflecto meter and network analysis. Measurement of high, medium and low microwave power, Bolometers, Power bridges and calorie meters.

Unit 3

Measurement of microwave frequency, standard resonating cavities, electronic method of measurement, Microwave counters, comparison of various methods.

Unit 4

Microwave components – attenuator, Phase shifters wave-guide joints, directional couplers, matching screw wave-guide excitation connectors and cables.

Unit 5

Antenna measurement – antenna pattern, antenna impedance, near field and far field errors, anechoic chambers, Antenna Range.

Reference Books:

1. A.K. Maini – Microwave & Radar, Khanna Publisher

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MTMW– 205 RESEARCH METHODOLOGY

Unit 1

Foundations of Research: Meaning, Objectives, Motivation, Utility. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process. Problem Identification & Formulation – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance

Assignment 1: Identify Research Problem based on Trends

Unit 2

Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.

Assignment 2: Identify Research methodology for Research Problem identified

Unit 3

Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association.

Assignment3: Propose a method for Data Analysis on Research problem identified

Unit 4

Importance of Literature Review. Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish ? Ethical issues related to publishing, Plagiarism and Self-Plagiarism. Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline.

Assignment 4: Write paper on Literature Review of your research Problem

Unit 5

Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism. Documentation of Research work, Synopsis, Presentations, Writing Research papers on experimentation results, proposed methods, thesis formats

Assignment 5: Write Synopsis for proposed Research Problem

Reference Books:

1. Business Research Methods – Donald Cooper & Pamela Schindler, TMGH, 9th edition
2. Business Research Methods – Alan Bryman & Emma Bell, Oxford University Press.
3. Research Methodology – C.R.Kothari
4. Select references from the Internet.