SARVEPALLI RADHAKRISHNAN UNIVERSITY,BHOPAL

GradingSystem
Course Name:M.TECH(VLSI)
Scheme of Examination w.e.f.2016-17
Semester/Year: I SEM/IYEAR

S. N o.	Subject Code	Subject Name	Maximum Marks Allotted						Hours/ Week			Credit	Total Marks
			Theory			Practical							
			End Sem.	Mid Sem	Quiz,Assi gnment	End Sem	Lab work	Assignment /Quiz	L	T	P		
1	MTVD-101	ADVANCEDMATHEMATICS	100	30	20	-	-	-	3	1	-	4	150
2	MTVD-102	MICROCONTROLLER SYSTEMDESIGN	100	30	20	-	-	-	3	1	-	4	150
3	MTVD-103	DSPAPPLICATION	100	30	20	-	-	-	3	1	-	4	150
4	MTVD -104	VLSIDESIGN	100	30	20	-	-	-	3	1	-	4	150
5	MTVD -105	EMBEDDED SYSTEM	100	30	20	-	-	-	3	1	-	4	150
6	MTVD -106	LAB-I(102,103)	-	-	-	50	50	-	-	-	4	2	100
7	MTVD -107	LAB-II(104,105)	-	-	-	50	50	-	-	-	4	2	100
8	MTVD -108	COMPERHENSHIVVIVA-I	-	-	-	50	-	-	-	-	-	-	50
		TOTAL	500	150	100	150	100	-	15	5	8	24	1000

L: Lecture   T:Tutorial   P:Practical

GradingSystem
Course Name:M.TECH(VLSI)
Scheme of Examination w.e.f.2016-17
Semester/Year : IISEM/IYEAR

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	MTVD -201	VLSITECHNOLOGY	100	30	20	-	-	-	3	1	-	4	150
2	MTVD -202	RTOS	100	30	20	-	-	-	3	1	-	4	150
3	MTVD -203	VLSITEST&TESTABILITY	100	30	20	-	-	-	3	1	-	4	150
4	MTVD -204	DATA COMMUNICATION&COMP	100	30	20	-	-	-	3	1	-	4	150
5	MTVD -205	REASEARCHMETHODOLOGY	100	30	20	-	-	-	3	1	-	4	150
6	MTVD -206	LAB-III(201)	-	-	-	50	50	-	-	-	4	2	100
7	MTVD -207	LAB-IV(202)	-	-	-	50	50	-	-	-	4	2	100
8	MTVD -208	COMPERHENSHIVVIVA-II	-	-	-	50	-	-	-	-	-	-	50
		TOTAL	500	150	100	150	100	-	15	5	8	24	1000

L: Lecture   T:Tutorial   P:Practical

SARVEPALLI RADHAKRISHNAN   UNIVERSITY,BHOPAL

GradingSystem
Course Name:M.TECH(VLSI)
Scheme of Examination w.e.f.2016-17
Semester/Year: IIISEM/IIYEAR

S. N o.	Subject Code	Subject Name	Maximum Marks Allotted						Hours/ Week			Credit	Total Marks
			Theory			Practical							
			End Sem.	Mid Sem	Quiz,Assi gnment	End Sem	Lab work	Assignment /Quiz	L	T	P		
1	MTVD -DP(1)	DESSERTATION (PHASE-I)	-	-	-	100	100	-	-	-	-	12	200
		TOTAL	-	-	-	100	100	-	-	-	-	12	200

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

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GradingSystem
Course Name:M.TECH(VLSI)
Scheme of Examination w.e.f.2016-17
Semester/Year: IVSEM/IIYEAR

S.No.	Subject Code	Subject Name	Maximum Marks Allotted						Hours/Week			Credit	Total Marks
			Theory			Practical			L	T	P		
			End Sem.	Mid Sem	Quiz,Assignment	End Sem	Lab work	Assignment/Quiz					
1	MTVD -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.)

MTVD 101-ADVANCED COMPUTATIONAL MATHEMATICS

Unit 1
Linear Algebra: Linear transformation, vector spaces, hash function, Hermite polynomial, Heaviside'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

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MTVD –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.

Unit 2
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.

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MTVD –103 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.

Unit 5

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

MTVD –104 VLSI Design

Unit1

Introduction: Basic concept of integrated circuits and manufacturing, Design fundamental for digital CMOS circuits, Design Abstraction and circuit Validation.

Unit 2

CMOS circuit and Logic Design: CMOS Logic gate design, Basic Physical design, CMOS Logic structure, I /O Structure, Power and Delay consideration.

Unit 3

System Design: CMOS Chip Design, standard cells, Programmable gate array, Design Capture, Simulation and Verification.

Unit 4

Subsystem Design: Data Operation, CMOS Sub System Design, Memory and Control Strategies, PLA and ROM Implementation.

Unit 5

CAD system and Algorithms: CAD systems, Layout Analysis, Placement and Routing Algorithms, Timing Analysis, Optimization, Logic Synthesis and Simulation, Testability Issues.

Reference Books:

1. Principal Of Cmos Design: A System Prospective By Waste And Eshraghin
2. Vlsi Design: System On Silicon, Pearson Education
3 Vlsi Technology By Sze S.M.Tmh
4 Basic Vlsi Design, System And Circuits By Pucknil D.A. Phi 5 Vhdl Primer By Bhaskar Star Galax Pub

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MTVD –105 Embedded System

Unit 1

Introduction to Linux Operating System. Shell Programming, Review of C-Programming and Data Structures.

Unit 2

Overview of Embedded Systems – Sequential and Concurrent Models – Processor Solutions and Types – Types of Memory – Data Representation Formats – Usage of C in Embedded Systems – Programmers view of CPU – IO programming models – Concurrent Software Design – Scheduling – Memory Management – Mixing C & Assembly.

Unit 3

Embedded System Design Issues , Challenges & Trends in Embedded Systems, Assemblers, Compilers, Linkers, Loaders, Debuggers , Profilers & Test Coverage Tools , Utilities like make, ranlib, objcopy & objdump etc.

Unit 4

Writing device drivers, Writing Time & Space Sensitive Programs, Programming in C for 8051, 68HC11 and 80196 microcontrollers.

Reference Books:

1. David E. Simon, An Embedded Software Primer, Pearson Education.
2. Michel Barr, Programming Embedded Systems in C & C++, Shroff Publishers & Distributors Pvt. Ltd.
3. Frank Vahid and Tony Givargis, Embedded System Design: A Unified Hardware/Software Introduction, John Wiley & Sons, 2002.
4. Daniel W. Lewis, Fundamentals of Embedded Software: Where C and Assembly Meet, Prentice Hall, 2002.
5. Jane Liu, Real-time Systems, Prentice Hall, 2000.

MTVD – 201 VLSI Technology

Unit 1

Overview of Semiconductor Processing: Electronic grade silicon preparation, Crystal growth, Czochralski process,wafer-preparation, slicing, Marking, polishing, evaluation. Basic wafer fabrication operations, wafer sort, clean room construction and maintenance.

Unit 2

Oxidation: Objectives, Silicon dioxide layer uses, Thermal oxidation mechanism and methods, Kinetics of oxidation, Deal Grove model, Oxidation processes, post oxidation evaluation.

Unit 3

Basic Patterning: Overview of Photo-masking process, Ten step process, Basicphotoresist chemistry, comparison of positive and negative photoresists, X-ray lithography, Electron beam exposure system.

Unit 4

Doping: Definition of a junction, Formation of doped region and junction by diffusion, diffusion process steps, deposition, drive-in-oxidation, Ion implantation- concept and system, implant damage, Comparison of diffusion and ion-implantation techniques.

Unit 5

Deposition: Chemical Vapor Deposition (CVD), CVD Process steps, CVD System types, Low-Pressure CVD (LPCVD), Plasma-enhanced CVD (PECVD), Vapor Phase Epitaxy (VPE), Molecular Beam Epitaxy (MBE), Metal organic CVD (MOCVD), SOS (Silicon on Sapphire) and SOI (silicon on Insulator). Brief Introduction to Metallization.

 Reference Books:
1.   S.M. Sze, VLSI Technology, McGraw-Hill, 2nd Ed.
2.   S. K. Gandhi, VLSI Fabrication Principles, Wiley
3.   W. R. Runyan, Silicon Semiconductor Technology, McGraw-Hill.

MTVD – 202 Real Time Operating System

Unit 1

Introduction to OS, Process Management & Inter Process Communication. Memory management, I/O subsystem, File System Organization.

Unit 2

(a) Real Time Systems Concepts: Foreground/Background Systems, Critical Section of Code, Resource, Shared resource, Multitasking, task, context switch, Kernel, Schedules, Preemptive & amp; Non-Preemptive Kernel, various scheduling methods.
(b) Real Time Scheduling. Real-Time task scheduling :Clock driven, Event-driven, Scheduling of real-time task on a uniprocessor. Rate Monotonic Analysis (RMA), Earliest Deadline First (EDF),Scheduling with limited priority levels

Unit 3

Kernel structure, Task scheduling, Task management, Resource sharing among tasks, Priority inversion problem, Priority inheritance protocol
An overview of scheduling in multiprocessor and distributed systems

Unit 4

Performance Metrics of RTOS, Programming in VxWorks, or COS-II Overview of C/OS-II Overview of some other commercial embedded operating systems: PSOS, VRTX, RT Linux, WinCE. Benchmarking real-time operating systems.

Unit 5

Commercial real-time operating systems: Unix as areal-time operating system, Windows as a real-time operating system, Extensions to Unix : Host target approach, Preemption points, Fully preemptable kernel

Reference Books:
1. Jean J. Labrosse, MicroC/OS-II, The Real Time Kernel
2. VxWorks details from Internet.
3. C/OS-II Manuals
4. David E. Simon, An Embedded Software Primer, Pearson Education
5. Dr. Rajib Mall, Real time Systems, Theory and practices, Pearson Education.

MTVD – 203 VLSI TEST AND TESTABILITY

Unit 1
Introduction to Testing Process:
CMOS Testing, Reliability, Failures & Faults, Levels of Testing, Test economics, Elementary Testing Concepts, System and Field Testing, Burn in boards.

Unit 2
Logic Simulation & Fault modelling: Delay Models, Event driven simulation, general fault simulation, fault detection and redundancy, fault equivalence and fault dominance. Stuck-at faults, bridging faults, transistor faults, delay faults etc. Fault detection using Boolean Difference, Path Sensitization. Fault Collapsing

Unit 3
Test generation for combinational & sequential circuits: D-algorithm, PODEM, SPOOF. Automatic Test Pattern Generation. Primitive and Propagation Cubes. Fanout Oriented Test Generation. Controllability and Observability. Testing of sequential circuits as iterative combinational circuits, state table verification, random testing.

Unit 4
Design for testability: Ad-hoc methods, Full scan & Partial scan design. Boundary scans. Testability analysis.

Unit 5
Built-in self-test & IDDQ testing: RAM BIST, Logic BIST Random and weighted random pattern testability BIST Pattern generator and response analyzer Scan-based BIST architecture Test point insertion for improving random testability. IDDQ testing, IDDQ test patterns, IDDQ measurement Case studies, Design for IDDQ testability

Reference Books:

6.	Parag K. Lala, *Fault Tolerant and Fault Testable Hardware Design*, BS Publication.

7.	N. Weste and K. Eshraghian, *Principles of CMOS VLSI design,* Addison-Wesley.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MTVD – 204 DATA COMMUNICATION AND COMPUTER NETWORK

Unit 1
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.

Unit 2
Data link control, point-to-point and multi-point links, flow control, sliding window protocol, various ARQ technique for error control and their comparison and performance analysis, HDLC as a bit oriented link control protocol.

Unit 3
Communication Network:- Virtual circuit and datagram, routing algorithm, dijkstera and Bellman ford least cost, algorithm, various routing protocol, congestion control technique, deadlock and its avoidance.

Unit 4
Local Area network:- Various topologies and medium access control schemes such as contention, polling, token parsing and performance analysis, various IEEE standards for LAN, UBS LANs, FDDI.

Unit 5
Introduction to WAN packet switching technologies such as ATM and Frame relay. Introduction to TCP / IP protocols.

Reference Books:

1. Data And Computer Communication By W. Stalling Phi
2. Computer Networks Y Tanenebaum Phi
3. Telecommunication Network, Protocols, Modelings and Analysis By M. Schwartz
4. Local Area Network By Keiser Tmh

MTVD – 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.