C.U.SHAH UNIVERSITY – WADHWANCITY

FACULTY OF: -Technology and Engineering (Diploma Engineering)
DEPARTMENT OF: -Electronics and Communication Engineering
SEMESTER: - VI   **CODE**: -2TE06VLD1
NAME – VLSI Design (VLD)

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			
											Internal		University	
		Th	Tu	Pr	To		Sessional Exam		University Exam		Pr	TW	Pr	Total
							Marks	Hours	Marks	Hours				
2TE06VLD1	VLSI Design (VLD)	04	00	04	08	06	30	1.5	70	3.0	--	20	30	150

Objectives:-

- This course provides information about the basic introduction of VLSI with short & sweet analysis and Programming. The students will acquire the basic knowledge of VLSI & programming through VHDL for design.

Prerequisites: -

- Basic concepts of ICs & their Programming.

Course Outlines:-

Sr. No.	Course Contents	Hours
1	**Introduction to VLSI Design:** Overview of design Methodologies & Detail of Y Chart - VLSI Design Flow - Design Hierarchy - Concepts of Regularity, Modularity, and locality – VLSI Design Styles	04
2	**Fabrication of MOSFET:** Introduction, Fabrication Process flow: Basic steps, C-MOS n-Well Process, Layout Design rules, full custom mask layout design.	04
3	**MOS Transistor:** Introduction to Structure and operation of MOSFET transistor - Structure and operation of MOSFET transistor - The MOS system under external bias - MOSFET current –voltage Characteristics - MOSFET capacitances	08
4	**MOS inverters: Static characteristics:** Introduction, Resistive load Inverter, Inverter with n-type MOSFET load(Enhancement & Depletion type MOSFET load), CMOS Inverter	08
5	**MOS inverters Switching characteristics and Interconnect Effects:** Introduction, delay-time definitions, calculation of delay times, inverter design with delay constraints, switching power dissipation of CMOS Inverters.	06
6	**Combinational MOS Logic circuits:** Introduction, MOS logic circuits with Depletion NMOS Loads, CMOS logic circuits, Complex logic circuits, CMOS Transmission Gates (TGs)	06
7	**Sequential MOS Logic circuits:** Introduction, Behaviour of Bistable elements, The SR latch circuit, Clocked latch &Flip-flop circuit, CMOS D-latch & Edge-triggered flip-flop	08

8	**Introduction to VHDL:** Introduction to VHDL Programming methodology (Data Flow, Structural and Behavioral) – Develop VHDL Programs related Basic Logic Gates – Develop VHDL programs related Basic Arithmetic operations (Adder and Subtractor)	**08**
9	**VHDL Programming:** Develop VHDL Programs related Combinational Circuits - Multiplexer, Demultiplexer, Encoder and Decoder, Develop VHDL Programs related Sequential Circuits – SR, D Latch, T, JK Flip flop.	**08**

Learning Outcomes:-

The Students should be able to acquire different learning outcomes in all three domains to demonstrate following course outcomes

- Gain the Basic knowledge of VLSI
- Understand CMOS circuits
- Develop simple VHDL Programs
- Implement & Test basic Digital Logic

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

Books Recommended:-

1. "CMOS Digital Integrated Circuits" **Sung Mo Kang,** TMH\
2. "VHDL design" **J Bhaskar** Pearson
3. "VLSI design" **A. A. Raj and T. Latha,** PHI
4. "VHDL Programming by Example" **Perry Douglas L**, MGH
5. "Introduction to VLSI circuits and systems" **P. Uyemura**, Wiley India
6. "CMOS VLSI Design" **Weste, Harris, Banerjee**, Pearson

C.U.SHAH UNIVERSITY – WADHWANCITY

FACULTY OF: -Technology and Engineering (Diploma Engineering)
DEPARTMENT OF: -Electronics and Communication Engineering
SEMESTER: - VI   **CODE**:- 2TE06EMS1
NAME – Embedded Systems (EMS)

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			Total
											Internal		University	
		Th	Tu	Pr	To		Sessional Exam		University Exam		Pr	TW	Pr	
							Marks	Hours	Marks	Hours				
2TE06EMS1	Embedded Systems (EMS)	04	00	02	06	05	30	1.5	70	3.0	--	20	30	150

Objectives:-
- This course provides information about the different types of Embedded Systems and its interfacing. The students will learn the interfacing and programming used in the embedded systems.

Prerequisites: -
- Basic concepts of Microprocessor, Microcontroller and their Interfacing.

Course Outlines:-

Sr. No.	Course Contents	Hours
1	**Introduction to Embedded systems:** An embedded system, processor in the system, other hardware units, software embedded into a system, examples of embedded systems, embedded systems – on-chip (SOC) and in VLSI circuit.	08
2	**ARM Processor:** The Acorn RISC machine, Architectural inheritance, The ARM programmer's model, ARM development tools, ARM instruction set: Data processing instructions, Data transfer instructions, Control flow instructions, Conditional execution, ARM Condition codes, Software interrupt (SWI), Multiply instructions, Writing simple assembly language programs for ARM, ARM organization and implementation: 3-stage pipeline ARM organization, 5-stage pipeline ARM organization, ARM instruction execution.ARM implementation.	16
3	**Processor and Memory organisation**: Structural units in a processor, processor selection for an embedded system, memory devices and selection for an embedded system, allocation of memory to program segments and blocks and memory map of a system, direct memory access, interfacing processor, memories and I/O devices.	09
4	**Devices and buses for device networks:** I/O devices, timer and counting devices, serial communication using I^2C, CAN and advanced I/O between the networked multiple devices, Host system communication between the networked I/O multiple devices using ISA, PCI, PCI-X and advanced buses.	09

5	**Real Time Operating Systems:** Operating system services: Goals, Structures, Kernel, Process management, Memory management, Device management, File system organization and implementation, I/O subsystem, , Real-Time and embedded system operating systems, Interrupt Routines in RTOS environment, RTOS task scheduling models, Performance metric in scheduling models, OS security issue, mobile OS.	**14**

Learning Outcomes:

After the successful completion of the course, students will be able to

- Understand basics of embedded systems.
- Programming of ARM processor in assembly
- Understand an applications of ARM processors / microcontrollers
- Understand basics of RTOS.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

Books Recommended:

1. Embedded Systems Architecture, Programming and Design, **Raj Kamal**, McGraw Hill Publications, 2nd Edition.
2. ARM System on Chip Architecture, **Steve Furber**, Pearson Education.
3. ARM System Developer's Guide, Designing and Optimizing System Software, **Andrew N. Sloss, Dominic Symes and Chris Wright**, Morgan Kaufmann Publishers.
4. Computer as Components: Principles of Embedded Computing System Design, **Wayne Wolf**, Morgan Kaufmann Publishers.

C.U.SHAH UNIVERSITY – WADHWANCITY

FACULTY OF: -Technology and Engineering (Diploma Engineering)
DEPARTMENT OF: -Electronics and Communication Engineering
SEMESTER: - VI   **CODE**:- 2TE06DCN1
NAME – Data Communications & Networking (DCN)

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							Total
							Theory				Practical (Marks)			
											Internal		University	
		Th	Tu	Pr	To		Sessional Exam		University Exam		Pr	TW	Pr	
							Marks	Hours	Marks	Hours				
2TE06DCN1	Data Communications & Networking (DCN)	04	00	02	06	05	30	1.5	70	3.0	--	20	30	150

Objectives:-

- Computer Network has seen an exponential growth over the years. Not only that, but there are different technologies with their variations. This scenario demands the need for more skilled technicians for operation, maintenance and servicing of computer network systems. This course gives the opportunity to the students to learn the fundamentals of these technologies which they will find in the workplace. Hence this course is designed to maintain various types of computer networks.

Prerequisites:-

- The course content should be taught and with the aim to develop different types of skills So that students are able to acquire following competency:
  Maintain Computer Network systems

Course Outlines:-

Sr. No.	Course Contents	Hours
1	**Hardware Structure Of Networks**:- Advantages of computer networks, Applications of computer networks: Business applications, home applications, Point-to-point networks and broadcast networks, Network topologies: Star, Ring, Bus, Mesh, Tree, Network categories: LAN, WAN, MAN	12
2	**Reference Models:-** Definition of Protocol, The OSI Reference Model: Principles applied to determine the layers, Brief functional description of each of the seven layers (Physical layer, Data link layer, Network layer, Transport layer, Session layer, Presentation layer, Application layer), The TCP/IP Reference Model: Brief functional description of each of the layers (Host-to-network layer, Internet layer, Transport layer, Application layer), Comparison of the OSI and TCP/IP Reference Models.	08
3	**LAN Technologies:-** Transmission Media: Unguided, Guided media, Network devices: Network, Adapters, Hubs, Switches, Routers, Access points, Gateways, Connectors, Servers: File, Print, Mail, Proxy, and Web.	10
4	**TCP/IP And Internet:**-	10

	Internet architecture: Internet addresses, gateway addressing, network and broadcast addressing, dotted decimal notation, loopback addressing, weakness in addressing, Datagram: IP datagram format, UDP frame format, IPv6, TCP: Introduction, frame format, connection establishment and Termination	
5	**Introduction To High Speed Networking Technologies:-** Cable modem system, Digital Subscriber Line technology: HDSL and ADSL, Fast Ethernet, Gigabit Ethernet, FDDI and CDDI	**08**
6	**Internet Applications:-** Domain Name System: Introduction, mapping to IP addresses, World Wide Web: Web browser, HTML, web servers, Electronic Mail: Functions of E-mail system, User agent, Message format, Mail Protocols (SMTP, POP3), Intranet, Wireless networks, Home networks.	**12**

Learning Outcomes:-
- The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.
  - i. Identify different standards of computer network systems.
  - ii. Maintain & Troubleshoot Computer systems.
  - iii. Test the functionality of various layers of OSI/TCP Model.
  - iv. Test the functionality of various Topologies.

Teaching & Learning Methodology:
- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

Books Recommended:-

1. Computer networks, **A. S. Tanenbaum,** PHI
2. Networks for Computer scientists and Engineers, **Y. Zheng and S. Akhtar**, Oxford
3. Data Communication & Networking, **Forouzen**, TMH
4. Data Communication & Computer Networks, **Brijindra Singh**, PHI

FACULTY OF: - Technology & Engineering (Diploma Engineering)
DEPARTMENT OF: - Electronics & Communication Engineering
SEMESTER:- VI   **CODE**:- 2TE06STC1
NAME – Satellite Communication (STC)

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Schemes (Hours)				Credits	Evaluation Schemes							
							Theory				Practical (Marks)			Total
											Internal		University	
		Th	Tu	Pr	To		Sessional Exam		University Exam		Pr	TW	Pr	
							Marks	Hours	Marks	Hours				
2TE06STC1	Satellite Communication (STC)	04	00	02	06	05	30	1.5	70	3.0	---	20	30	150

Objectives:

- To impart the knowledge of the basic principles of satellite, satellite communication systems, space segment, earth station.

Perquisites:

- Basic knowledge of electromagnetic wave propagation and characteristics, communications theory and electronics systems.

Course Outlines: -

Sr. No.	Course Contents	Hrs
1	**Introduction:** Introduction, Frequency Allocations for Satellite Services, Polar Orbiting Satellites, INTELSAT, U.S. Domsats, Polar Orbiting Satellites	4
2	**Orbits and Launching Methods:** Introduction, Kepler's First Law, Kepler's Second Law, Kepler's Third Law, Definitions of Terms for Earth-Orbiting Satellites, Orbital Elements, Apogee and Perigee Heights, Orbit Perturbations: Effects of a non-spherical earth, Atmospheric drag.	9
3	**The Geostationary Orbit:** Introduction, Antenna Look Angles, The Polar Mount Antenna, Limits of Visibility, Near Geostationary Orbits, Earth Eclipse of Satellite, Sun Transit Outage, Launching Orbits	6
4	**The Space Segment:** Introduction, The Power Supply, Attitude Control: Spinning satellite stabilization, Momentum wheel stabilization, Station Keeping, Thermal Control, TT&C Subsystem, Transponders: The wideband receiver, The input demultiplexer, The power amplifier, The Antenna Subsystem	8
5	**The Earth Segment:** Introduction, Receive-Only Home TV Systems: The outdoor unit, The indoor unit for analog (FM) TV, Master Antenna TV System, Community Antenna TV System, Transmit-Receive Earth Stations	6

6	**The Space Link:** Introduction, Equivalent Isotropic Radiated Power, Transmission Losses, The Link-Power Budget Equation, System Noise, Carrier-to-Noise Ratio, The Uplink, Downlink, Combined Uplink and Downlink C/N Ratio.	10
7	**Satellite Access:** Introduction, Single access, Pre assigned FDMA, Demand-Assigned FDMA, SPADE System. Bandwidth-limited a Power-limited TWT amplifier operation, FDMA downlink analysis. TDMA: Reference Burst; Preamble and Postamble, Carrier recovery, Network synchronization, unique word detection, Code-Division Multiple Access: Direct-sequence spread spectrum, The code signal $c(t)$, Acquisition and tracking, Spectrum spreading and dispreading, CDMA throughput.	12
8	**Satellite Mobile and Specialized Services:** Introduction, Satellite Mobile Services, VSATs, Radarsat, Global Positioning Satellite System, Orbcomm, Iridium.	5

Learning Outcome: -

This course provides an introduction to Satellite communications theory, and the science of mechanics towards the provision of communications and other services using Earth-orbiting satellites. Students completing this course will be able to:

- Identify the fundamentals of orbital mechanics, the characteristics of common orbits used by Communications and other satellites, and be able to discuss launch methods and technologies.
- Understand the radio propagation channel for Earth station to satellite and satellite to satellite Communications links and the basics of designing antenna systems to accommodate the needs of a particular satellite system.
- Be able to calculate an accurate link budget for a satellite or other wireless communications link.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

Books Recommended:-

1 Satellite Communication, by Dennis Roddy, 4th Edition, Tata McGraw Hill
2 Satellite Communication, by Timothy Pratt, Charles Bostian, Jeremy Allnutt, Willey Student edition, second edition
3 Communication Satellite systems, by James Martyn, Prentice Hall
4 Satellite communication by Wilbur L. Pritchard &Josheph a. Sciulli - PHI

FACULTY OF: - Technology & Engineering (Diploma Engineering)
DEPARTMENT OF: - Electronics & Communication Engineering
SEMESTER: - VI   **CODE**: - 2TE06MMC1
NAME – Multimedia Communication (MMC)

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Schemes (Hours)				Credits	Evaluation Schemes							
							Theory				Practical (Marks)			Total
											Internal		University	
		Th	Tu	Pr	To		Sessional Exam		University Exam		Pr	TW	Pr	
							Marks	Hours	Marks	Hours				
2TE06MMC1	Multimedia Communication (MMC)	04	00	02	06	05	30	1.5	70	3.0	---	20	30	150

Objectives:-

- The objective of Multimedia Communication is to make students Attentive about how multimedia will works and to identify different standards for multimedia communication. Choose required networks standards and file formats for multimedia communication.

Prerequisite:-

- Students should have strong understandings of basics of analog and digital communication. The basic concepts of digital circuits and fundamental knowledge of audio and video must be clear.

Course Outline:-

Sr. No.	Course Content	Hours
1	**Satellite communication:** Introduction to satellite communication: Kepler's three laws of satellite motion in Orbits, Satellite Orbits: LEO,MEO and GEO, Basics of space craft: Power systems, Attitude and orbit control system, Telemetry tracking and Command, Communication subsystem, Spacecraft antenna, Earth station and receivers: Block diagram of an earth station, Direct broadcast satellites DTH receivers	12
2	**Integrated Services Digital Networks:** Concepts , standards, protocol architecture, Transmission channels , Signaling: user level, network level, ISDN services: videotext, E-mail, digital facsimile, teletext, database access, Interworking, Broadband ISDN	10
3	**Multimedia:** Introduction to multimedia, Multimedia, Multimedia Communication Model, Elements of Multimedia Systems, User and, Network requirements. Applications of Multimedia in various grounds, Education, Media, Home, Marketing etc, Storage medium, Representation medium, Transmission medium, Independent media, Combination of media, Integration, data characteristics, Transmission types i.e. asynchronous, synchronous	12

4	**Multimedia Communication Techniques and Standards** Basic concept of sound, Computer Representation of sound, Audio formats, MP3 ,MP4, Concept of Images, Image types – captured images and stored images, Image formats JPEG, .BMP,.GIF, Concept of Video, Video formats, Multimedia processing for communication: digital media, signal processing elements, digital audio file formats, digital image file formats, digital video file formats, Distributed Multimedia application ITV, VOD , MPEG approach to multimedia standardization	**14**
5	**Multimedia Communications Across Networks:** Storage requirements for Audio/ Video, Data compression techniques, Run Length, Arithmetic, Huffman, JPEG standard (Image encoding), MPEG standard (Audio/Video encoding), audio and video transmission across IP network, Multimedia across DSLs, VODSL architecture, voice services, Multimedia across ADSL, Multimedia Across Wireless, Speech transmission in GSM, Video across GSM, Mobile ATM, wireless multimedia, Data transmission using MPEG-2 and DVB, Broadband Multimedia Satellite systems, Digital television infrastructure for interactive multimedia Service.	**12**

Learning Outcomes:

After the successful completion of the course, students will be able to

- Understand basics of multimedia communication and its standards
- Troubleshoot the any multimedia appliances
- Accurately locate the probable fault in any multimedia communication system.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

Books Recommended:

1. Multimedia Parekh- TMH.
2. Multimedia Computing and Applications Ralf Steinmetz (Pearson).
3. Multimedia and Computer Graphics D. P. Mukharjee.
4. "Telecommunication Switching Systems And Networks" Viswanathan, Thiagarajan   PHI Learning, New Delhi, latest edition
5. "Electronic Communications" Roddy, Dennis Coolen John, Pearson Education, New Delhi, latest edition
6. "Satellite Communications" Pratt, Bostian, Allnutt, Wiley, India, New Delhi, latest edition

FACULTY OF: -Technology and Engineering (Diploma Engineering)
DEPARTMENT OF: -Electronics and Communication Engineering
SEMESTER: - VI   **CODE**: -2TE06PRA1
NAME – Project (PRA)

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							Total
							Theory				Practical (Marks)			
											Internal		University	
		Th	Tu	Pr	To		Sessional Exam		University Exam		Pr	TW	Pr	
							Marks	Hours	Marks	Hours				
2TE06PRA1	**Project (PRA)**	00	00	10	10	05	---	---	---	---	---	100	100	200
	Viva Voce	00	00	00	00	03	---	---	---	---	---	---	100	100

Objectives:-

- This course provide an opportunity to the students for applying the knowledge and technical skills acquired by identifying real life problem of the industries /research organization / society as a whole and providing its innovative solution with implementation , which is economically and technologically viable

Prerequisites: -

The Project is to be selected by the students and the problem is to be identified for providing solution under the mentoring of the institute Guide and the Industry mentor to develop following competencies…
- Co-creation & Interpersonal abilities
- Design & Troubleshooting
- Programming/simulation/ debugging skills
- Developing PCB design/soldering skills
- Analysis Test and Troubleshooting skills
- PCB fabrication/soldering skills
- Modeling skill
- Documentation & Presentation skill

Course Outlines:-

Sr. No.	Guideline for Project
1	**Project Searching**:- Information gathering through websites and media, Identification of Industry/ research organization, Visiting Industry/research organization, Creating awareness about the industrial premises, personnel, processes and products, Review of literature.
2	**Problem Definition & Submissions**:- Defining problem in consultation with institute guide & industry mentor, Preparing problem

	definition statement in the prescribed format of C U Shah Uni. and submit in soft and hard copy.
3	**Design Solution:-** Block Diagram of project, Draw & Develop circuit diagram using circuit design softwares /tools, Development of algorithm and flowchart if applicable.
4	**Hardware/software simulation and partial Implementation** :- PCB Layout preparation using software tools, Circuit simulation, Partial implementation using Breadboard or General purpose PCB, Test and troubleshoot hardware if applicable.
5	**Create PCB/Write Program Codes:-** Physical creation of Printed Circuit Board, Verification of Component ratings and specifications Program development in Assembly/high level language.
6	**Component Mounting and soldering/rectification of syntax errors:-** Continuity test for PCB tracks 2.2 Mounting and Soldering component on PCB, Execute program modules and debugging for syntax errors
7	**Software Testing and Loading/Hardware Test** Debug system modules for logical errors, Test program as a whole after linking modules to main program, Test program and load on chip/on system, Test hardware circuit if software is not there in scope of project
8	**Final Implementation** Execute loaded program on actual hardware and observe response, Test hardware behavior for all possible inputs to the circuit, Troubleshoot hardware/software for unexpected/faulty behavior, Correct Hardware/software and execute the program until getting desired/expected response.
9	**Model design** Design model and, Create list of requirement for implementation of model, fabricate and construct model, Connect circuit responses to model and test model for its working.
10	**Documentation & final Presentation** Prepare project report as per C U Shah Uni. Guideline, Prepare PPT and present as per Schedule, Demonstrate with model*

Learning Outcomes:-

At the end of the course, student will able to

- Create familiarity with the industry personnel & industrial environment as well as processes.
- Survey the related literature.
- Define the problem and the objectives of the project.
- Suggest various design alternatives and justification of the selection of the design methodology for the problem solution along with design specifications.
- Modeling and analysis of the proposed solution.
- Simulate, Design and debugging of the circuit
- Partial Implementation of the proposed solution
- Develop program logic of the proposed solution
- Locate the problem and troubleshoot.
- Work in team cohesively & effectively
- Prepare project report having organized documentation.

- Prepare & deliver presentation.
- Enhance awareness for latest technologies and tools
- Visualize the roadmap of the further development.

Activities Suggested:-
- Prepare and submit project definition document in prescribed format.
- Visit industry regularly.
- Get help from innovative council/research organization for design solution.
- Report regarding stage wise progress to institute guide/industry mentor regularly.
- Continuous practicing of latest circuit design and simulation tools/software.
- Create actual PCB in laboratory from layout
- Component mounting and soldering practice
- Continuous test and debugging of software using various tools for error free compact solution.
- Study of intellectual property rights for patenting the project.

Magazines/ Learning Websites Suggested:-
- Planet Analog
- Elector electronics.
- Electronic design
- EDA Tech Forum
- Electronics project manuals
- http://www.electronicsproject.org
- http://www.circuiteasy.com
- http://www.electronics-project-design.com
- http://www.electronicsschematic.com

Note:-
- In Training student must have to submit report to his/her HOD.
- Faculty should get Feedback and should visit the Industry.