C21_ CURRICULUM

DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

OFFERED BY

STATE BOARD OF TECHNICAL EDUCATION & TRAINING,

TELANGANA: HYDERABAD

V SEMESTER

Sl No	Course Code	Course Name	Teaching Scheme				Credits	Examination Scheme						
			Instruction Periods per week			Total Period per semester		Continuous internal evaluation			Semester end examination			
			L	T	P			Mid Sem 1	Mid Sem 2	Internal evaluation	Max Marks	Min Marks	Total Marks	Min marks for Passing including internal
1	ME-501	Industrial Management and Entrepreneurship	4	1	0	75	3	20	20	20	40	14	100	35
2	EC-502	Industrial Electronics	4	1	0	75	3	20	20	20	40	14	100	35
3	EC-503	Data Communication and Computer Networks	4	1	0	75	3	20	20	20	40	14	100	35
4	EC-574	Mobile Communication & Optical Fibre Communication	4	1	0	75	3	20	20	20	40	14	100	35
	EC-584	Basics of VLSI Circuits	4	1	0	75	3	20	20	20	40	14	100	35
5	EC-575	Cyber Physical Systems and Internet of Things	4	1	0	75	3	20	20	20	40	14	100	35
	EC-585	Digital Circuit Design using Verilog HDL	4	1	0	75	3	20	20	20	40	14	100	35
6	EC-506	Industrial Electronics Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
7	CS-517	Computer Hardware and Networking Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	EC-508	LabVIEW	1	0	2	45	1.5	20	20	20	40	20	100	50
9	EC-509	Digital Circuit Design using Verilog HDL Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	EC-510	Project Work	1	0	2	45	1.5	20	20	20	40	20	100	50
11	EC-511	Skill Upgradation	0	0	8	120	2.5	0	0	Rubrics			--	-
	Activities: student performance is to be assessed through Rubrics													

ME-501 - INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP

Course title	Industrial Management and Entrepreneurship	Course code	ME-501
Semester	V	Course group	Core
Teaching scheme in periods (L:T:P)	4:1:0	Credits	3
Methodology	Lecture+ Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Prerequisites: Knowledge of Basic Sciences.

COURSE OUTCOMES

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

Course Outcomes	
CO1	Understand the principles and functions of management and Outline Organization structure& organizational behavior
CO2	Understand the Functions of Production Management
CO3	Analyse the functions of Materials Management.
CO4	Compare Marketing, sales & Feasibility study.
CO5	Know the use of ISO 9000 & T.Q.M
CO6	Understand Industrial legislation & safety and role of entrepreneur and entrepreneurial development

Blue Print of Marks for SEE:

<table>
<tr><th colspan="2" rowspan="2">Units</th><th rowspan="2">No of periods</th><th colspan="3">Questions to be set for SEE</th><th rowspan="2">Remarks</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td rowspan="2">Part-A</td><td>1.Principles and functions of management and organisation structure and behaviour</td><td>13</td><td rowspan="6">Q4</td><td colspan="2">Q1</td><td>Q9(a)</td><td>Q13(a)</td><td></td></tr>
<tr><td>2.Production management</td><td>12</td><td></td></tr>
<tr><td rowspan="2">Part-B</td><td>3.Materials management</td><td>13</td><td colspan="2">Q2</td><td>Q10(a)</td><td>Q14(a)</td><td></td></tr>
<tr><td>4.Marketing, sales & feasibility study</td><td>12</td><td></td></tr>
<tr><td rowspan="2">Part-C</td><td>5.Introduction to ISO 9000 & T.Q.M</td><td>13</td><td rowspan="2">Q3</td><td>Q5
Q6</td><td>Q9(b)
Q11(a)
Q11(b)</td><td>Q13(b)
Q15(a)
Q15(b)</td><td></td></tr>
<tr><td>6.Industrial legislation & safety and Entrepreneurial development</td><td>12</td><td>Q7
Q8</td><td>Q10(b)
Q12(a)
Q12(b)</td><td>Q14(b)
Q16(a)
Q16(b)</td><td></td></tr>
<tr><td colspan="2">TOTAL</td><td>75</td><td colspan="3">08</td><td>08</td><td>08</td><td></td></tr>
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COURSE CONTENT

1. **Principles and functions of management and organisation structure and behaviour**
   Definitions of Industry, Commerce and Business, Evolution of management theories, Principles of Scientific Management, functions of management, Difference between administration and management, Role of industry, Types of ownership – Sole proprietorship, Partnership, Private limited, public limited company, Industrial Cooperatives, Philosophy, types of Organizations, Line and Staff and functional organizations, Advantages, limitations, departments in a large-scale industry, Effective organization, Motivation, different theories of motivation, leadership styles.

2. **Production management**
   Production, planning and control, relation with other departments, need for planning and its advantages, Routing, scheduling, dispatching, PERT and CPM, simple problems.

3. **Materials management**
   Materials in industry, inventory control model, ABC Analysis, Safety stock, re-order level, Economic ordering quantity, Stores layout, stores equipment, Stores records, purchasing procedures, purchase records, Bin card, Cardex.

4. **Marketing, sales & feasibility study**
   Sellers and Buyers markets, Marketing, Sales, Market conditions, monopoly, oligopoly, perfect competition, Cost -Elements of Cost, Contribution, Break even analysis, Market Survey, Product and production Analysis, Materials input, Manpower, Location, Economic and Technical Evaluation, preparation of Feasibility study reports.

5. **Introduction to ISO 9000 & T.Q.M**
   Concept of quality, Definition of the terms quality policy, quality management, quality systems, quality control and quality assurance, Elements of quality systems: Management responsibility, Quality system, contract review, design control, document control, purchasing, purchaser– supplied product, product identification and traceability, process control, Inspection and testing. Definition and Principles of quality assurance, Know the necessity of International standards –ISO- Evolution, Meaning, importance, Various standards under ISO, ISO 9000 series of standards-Features, series, Constituents, Advantages, Draw backs and beneficiaries (Whom does ISO 9000 help). **5-S** principles-concept of zero defects. TQM-Meaning, Characteristics.

6. **Industrial legislation & safety and Entrepreneurial development**
   Employer – Employee relations, Trade, Union Settlement of disputes, collective bargaining, Welfare activities, Total Welfare concept, rights and responsibilities of Employers and employees, Salient features of Indian Factories Act, Importance of Safety at work places, Hazards, causes of accidents, Entrepreneur and entrepreneurship -Concept, definition, role, expectation, Entrepreneurship Vs Management, promotion of S.S.I. Self –employment schemes, Product selection, site selection, Institutional support needed, financial assistance programs. Start up Scheme- Importance, Features and Eligibility for startup registration, Benefits

REFERENCE BOOKS

1. Industrial engineering and management by O.P Khanna.
2. Production management by Buffa
3. Industrial Engineering & Management Science by TR Banga
4. Engineering Economics and management science by Banga & Sharma
5. Personnel management by Flippo
6. Entrepreneurship by NITTTR Chennai.

ELECTRONIC RESOURCES

1. https://nptel.ac.in/courses/
2. https://www.slideshare.net/
3. https://en.wikipedia.org/wiki/
4. http://ndl.ethernet.edu.et/bitstream/

SUGGESTED STUDENT ACTIVITIES

1. Identify any 5 industries with different types of ownerships.
2. Prepare an organizational structure of institution
3. Make a survey on marketing a product.
4. Prepare a list of ISO 9000 series as well as latest quality standards
5. Prepare sign boards representing safety measures.
6. Role play as an entrepreneur

SUGGESTED LEARNING OUTCOMES

Upon completion of the course the student shall be able to

1. Understand the principles and functions of management and Outline Organization structure& organizational behavior

1.1 Define industry, commerce (Trade) and business.
1.2 Know the need for management.
1.3 Understand the evolution of management
1.4 Explain the principles of scientific management.
1.5 Understand functions of Management.
1.6 Differentiate between management and administration.
1.7 Understand types of ownerships
1.8 Differentiate types of ownerships.
1.9 Understand salient features of joint stock companies.
1.10 Understand the philosophy and need of organization structure of an industry.
1.11 Understand the line, staff and Functional organizations.
1.12 List the advantages and limitations of line, staff and functional organizations.
1.13 List different departments in a large scale industry.
1.14 Explain the factors of effective organization.
1.15 Understand organizational behaviour.
1.16 Explain job analysis.
1.17 State motivation theories.
1.18 State Maslow ‘s Hierarchy of needs.
1.19 List out different leadership models.
1.20 Explain the trait theory and behavior theory of leadership

2. Understand the Functions of Production Management

2.1 Differentiate production, planning and control.
2.2 Relate the production department with other departments.
2.3 State the need for planning and its advantages.
2.4 Explain the stages of Production, planning and control.

2.5 Explain routing methods.
2.6 Explain scheduling methods.
2.7 Explain dispatching.
2.8 Draw PERT/CPM networks.
2.9 Identify the critical path
2.10 Problems on PERT & CPM.

3 Analyze the functions of Materials Management

.

3.1 State the importance of material management.
3.2 Objectives and functions of material management.
3.3 Derive expression of EOQ for inventory control.
3.4 Explain ABC analysis.
3.5 Define safety stock, Buffer stock
3.6 Define reorder level.
3.7 Functions of stores department, duties of store keeper
3.8 Explain stores layout,
3.9 Explain the stores records.
3.10 Describe Cardex method.
3.11 Objectives and functions of purchasing department
3.12 Explain purchasing procedures.
3.13 List out purchase records.
3.14 Describe the stores equipments

.

4 Compare Marketing, sales & Feasibility study.

4.1 Explain marketing functions.
4.2 Explain Sales function.
4.3 List out marketing conditions.
4.4 Differentiate Sellers and Buyers 'market.
4.5 Differentiate monopoly, oligopoly, and perfect competition.
4.6 Steps in conducting market and demand surveys.
4.7 Advantages and disadvantages of market and demand surveys
4.8 Differentiate product and production analysis.
4.9 Identify the input materials, i.e. Bill of materials
4.10 Explain the concept of cost..
4.11 Explain break-even analysis..
4.12 Evaluate Economic and Technical factors.
4.13 Preparation of feasibility study.
4.14 List out different products currently in demand with market or industry.

5 Know the use of ISO 9000 & T.Q.M

5.1 Understand the concept of quality.
5.2 Know the quality systems and elements of quality systems.
5.3 Know the principles of quality Assurance.

5.4 Know the evolution of ISO standards.
5.5 Discuss ISO standards and ISO 9000 series of quality systems.
5.6 State the constituents of ISO 9000 series of standards for quality systems.
5.7 Benefits and Drawbacks of ISO 9000 series of standards.
5.8 List out the beneficiaries of ISO 9000.
5.9 Understand 5-S principles and ZERO DEFECT
5.10 Know TQM concept and elements.

6 Understand Industrial legislation & safety and role of entrepreneur and entrepreneurial development

6.1 Describe employer and employee relations.
6.2 Objectives, functions, advantages and disadvantages of Trade Unions.
6.3 Explain Causes and settlements of industrial disputes..
6.4 List out Welfare activities..
6.5 List out the rights and responsibilities of employees and employers.
6.6 List out the salient features of Indian Factories Act.
6.7 Explain the importance of safety at Work place.
6.8 List out the important provisions related to safety.
6.9 Explain hazard and accident.
6.10 Explain the causes of accidents..
6.11 Define the word entrepreneur..
6.12 Difference between entrepreneurship and management.
6.13 Explain, expectations, role and qualities of an entrepreneur..
6.14 Determine the role of entrepreneurs in promoting Small Scale Industries.
6.15 Describe the details of self-employment schemes.
6.16 Explain the method of product selection.
6.17 Explain the method of site selection.
6.18 List the financial assistance programs.
6.19 List out the organizations that help an entrepreneur
6.20 Importance of Start-ups
6.21 Different Start-up schemes
6.22 Features and Eligibility for startup registration
6.23 Benefits of Start-ups

COURSE OUTCOMES		**CL**	**Linked POs**	**Teaching Periods**
CO1	Understand the principles and functions of management and Outline Organization structure& organizational behavior	R, U, A	5,6,7	13
CO2	Understand the Functions of Production Management	R, U, A	2,5,6	12
CO3	Analyse the functions of Materials Management.	U, A	1,6,7	13
CO4	Compare Marketing, sales & Feasibility study.	U, A	1,6,7,	12
CO5	Know the use of ISO 9000 & T.Q.M	U, A	1,6,7	13
CO6	Understand Industrial legislation & safety and role of entrepreneur and entrepreneurial development	R, U, A	1,6,7	12
			Total Periods	**75**

Legends: R = Remember; U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

CO-PO Attainment Matrix:

COURSE OUTCOMES	PROGRAM OUTCOMES						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					2	3	1
CO2		2			1	3	
CO3	1					2	3
CO4	1					3	2
CO5	2					3	1
CO6	1					2	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Lowly Addressed**.**

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Principles and functions of management and organisation structure and behaviour	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Production management	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Materials management	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Marketing, sales & feasibility study	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Legend	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

MID SEM-I Model Paper

ME-501-INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP

Time: 1 hr Max. Marks:20

PART-A **4x1=4Marks**

NOTE: 1) Answer all questions and each carries **one** mark.

2) Answers should be brief and straight to the point and shall not be exceed three simple sentences.

1. Define Industry.
2. Write any two qualities of a leader.
3. What do you mean by Planning?
4. What does CPM Stands for.?

PART-B **2X3M=6 Marks**

NOTE: 1) Answer all questions and each carries **three** mark.

2) Answers should be comprehensive and the criterion for valuation is the content but not length of the answer.

5.(a) what is administration

OR

5.(b) List out theories of motivation.

6.(a) what is the need for planning.

OR

6.(b) what is routing?

PART-C **2X5M=10 Marks**

NOTE: 1) Answer all questions and each carries **five** mark.

2) Answers should be comprehensive and the criterion for valuation is the content but not length of the answer.

7.(a) Explain the principles of scientific management

OR

7.(b) a) Compare between PERT AND CPM.

b) Explain about Scheduling and Dispatching.

8.(a) Draw the project network of the given project and identify all paths through it. Find the critical path, TL and T_E on the network.

Activity	Optimistic Time(a)	Most likely Time (m)	Pessimistic Time (b)
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-5	2	6	10
5-6	3	6	15

OR

8.(b) State the ERG theory of motivation.

MID SEM-II

Model Paper:: ME-501

INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP

Time: 1 hr Max. Marks:20

PART-A **4x1=4Marks**

NOTE: 1) Answer all questions and each carries **one** mark.

2) Answers should be brief and straight to the point and shall not be exceed three simple sentences.

1. Write the formula to calculate EOQ?
2. What is Buffer Stock?
3. What Is feasibility study?
4. What is Breakeven Point?

PART-B **2X3M=6 Marks**

NOTE: 1) Answer all questions and each carries **three** mark.

2) Answers should be comprehensive and the criterion for valuation is the content but not length of the answer.

5.(a) List the advantages of ABC analysis.

OR

5.(b) State the functions of Material Management.

6.(a) List out the element of cost ?

OR

6.(b) what is buyer's market and seller's market.

PART-C **2X5M=10 Marks**

NOTE: 1) Answer all questions and each carries **five** mark.

2) Answers should be comprehensive and the criterion for valuation is the content but not length of the answer.

7.(a) Explain the functions of Purchase management.

OR

7.(b) Explain various records used in stores.

.

8.(a) What is Break Even analysis? Illustrate graphically the concept of Break even point.

OR

8.(b) Differentiate product and product analysis.

BOARD DIPLOMA EXAMINATION, (C-21)
SEE-MODEL PAPER ME-501
DME– V SEMESTER EXAMINATION
INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP

Time: 2 Hours **Max. Marks:** 40

PART-A 8 X 1 = 8

Instructions: 1. Answer **ALL** questions.
2. Each question carries **ONE** mark.

1. Define Trade.
2. What is a bin card
3. List two benefits of ISO 9000 certification.
4. Define a Network.
5. Define quality control.
6. What is ISO.
7. What is the purpose of Trade unions.
8. Define an entrepreneur.

PART-B 4 X 3 = 12

Instructions: 1. Answer **ALL** questions.
2. Each question carries **THREE** marks.

9. (a) State any three differences between share and debenture.

OR

9. (b)What are the 5-S principles.
10. (a) List any thre advantages of ABC analysis.

OR

10. (b) Mention three qualities required for a good entrepreneur .
11. (a) List the benefeciaries of ISO 9000

OR

11. (b)State the features of ISO 9000.
12. (a) What are the expectations of an entrepreneur

OR

12. (b) Explain the significance of collective bargaining.

PART-C 4 X 5 = 20

Instructions: 1. Answer **ALL** questions.
2. Each question carries **FIVE** marks.

13. (a) Explain the principles of Scientific management stated by F.W. Taylor

OR

13(b) What is quality system? Explain various elements of quality systems.

14 (a) Explain ABC analysis in inventory control with graph.

OR

14(b) Explain the factors influencing the site selection for a plant location.

15 (a) What is TQM? Write the principles or elements of TQM.

OR

15(b) Explain the importance of certification of confirmation to ISO 9000 and the procedure of obtaining it ?

16(a) List out the three rights and responsibilities of Employees.

OR

16(b) State Indian electricity rules with regard to safety

EC-502 - INDUSTRIAL ELECTRONICS

Course Title	Industrial Electronics	Course Code	EC-502
Semester	V	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Hours	75
CIE	60 Marks	SEE	40 Marks

Pre requisites:

This course requires the knowledge of electronic devices and semiconductor devices operation

Course Outcomes: After Completion of the course the student will be able to attain the following outcomes

CO	Learning Outcome	Outcome Level	Periods
CO1 :	Understanding the working of choppers, inverters and cycloconverters	1,2,10	14
CO2 :	Special applications of thyristors	1,2,5,6,7	12
CO3 :	Transducers &Ultrasonics	1,2,9	12
CO4 :	Explain different welding techniques	1,2,5,7	12
CO5 :	Use the concepts of PLC& SCADA for industrial applications	1,2,5	13
CO6 :	Develop an understanding of control systems	1,2,3,7	12

Suggested Learning Outcomes:

1. **Understand the working of choppers, inverters and cycloconverters**

Duration: 14 Periods (L: 10– T:4)

Principle of chopper-chopper control strategies-constant frequency chopper-variable frequency chopper-stepup chopper-chopper circuit configurations-first quadrant(typeA)chopper-second quadrant(typeB) chopper-twoquadrant type A chopper-two quadrant type B chopper-Four quadrant chopper-applications-inverters-need of inverter-types of inverters-series inverter-parallel inverter-single phase inverter-three phase inverter(180^0)-pulse width modulated inverters-applications-cyclo converters-classification-single phase step down cycloconverter-single phase stepupcycloconverter-applications

2.0 Know the special applications of thyristors Duration:12 Periods (L: 10– T:2)

Special applications of thyristors-need of UPS-working principle ,construction, advantages and applications of UPS- need of SMPS-working principle ,construction, advantages and applications of SMPS-High voltage dc transmission- classification of high voltage dc transmission-construction and working of bipolar hvdc system-construction and working of control of hvdc converters-static switches-construction and working principle of single phase ac switches-construction and working principle of single phase DC switches-design of static switches-static circuit breakers- construction and working principle of dc circuit breakers-solid state relays-construction and working principle of dc solid state relays-construction and working principle of ac solid state relays.

3.0 Transducers &Ultrasonics Duration:12 Periods (L: 10– T:2)

Classification of transducers on the basis of principle of operation and applications- Working principle, construction and applications of strain gauge- Working principle, construction and applications of potentiometric transducer- Working principle, construction of capacitive and inductive transducers- Important applications of transducers- Working principle, construction and applications of LVDT- Working principle and construction of Piezo electric transducer- Uses for the Piezo electric transducer- Working principle of RTD & Thermocouple transducer- Important applications of above transducers- Application of transducer in Accelerometer, servomotors, and Tacho-generators-Methods of generating ultrasonic waves-Draw and explain pulsed-echo ultrasonic flaw detector- Principle of MEMS devices- Their uses in modern smart phones and other devices.

4.0 Industrial Heating &Welding

Duration:12 Periods (L: 10– T:2)

Industrial heating methods- Principle of induction heating- Applications of induction heating- HF power source for induction heating - Principle of dielectric heating- Electrodes used in dielectric heating & method of coupling to RF generator- Applications of dielectric heating. Welding- types of Electrical welding- Principle of resistive welding- Circuit of AC resistive welding - Applications of resistive welding- Other welding Techniques.

5.0 PLCs & Programming Duration:13 Periods (L: 10– T:3)

Need for PLC- principle of PLCs- advantages and disadvantages of PLC's- functional block diagram of PLC- Ladder diagrams and sequence listing- ladder diagram for OR, AND, XOR logic and PLC code-importance of PLC timers with examples- importance of PLC counters

with examples- features of popular PLCs like Siemens , Allenbradly- applications of PLCS- importance of SCADA- typical SCADA system- applications of SCADA.

6.0 Control Engineering **Duration:12 Periods (L:10– T:2)**

Definition of the System and Control system and its classification- Basic block diagram of control system-Open loop control system with examples-Merits and demerits of open loop control-Closed loop system with the help of a block diagram- Examples for closed loop system-Comparison of Open and closed loop control systems- Transfer function-block diagram reduction techniques- simple problems on reduction techniques.

Suggested Learning Outcomes

Upon completion of this course a student should be able to

1.0 Understand the working of choppers, inverters and cycloconverters

1.1 Explain the principle of operation of chopper

1.2 Classify the different chopper control strategies

1.3 Explain above systems in detail

1.4 Explain the operation of step-up chopper with waveforms

1.5 Classify the different chopper circuit configurations

1.6 Explain above configurations in detail

1.7 Define inverters.

1.8 What is the need for an inverter?

1.9 Classify the types of inverters.

1.10 Draw and explain the operation of series inverter.

1.11 Draw and explain the operation of parallel inverter

1.12 Explain the operation of single phase bridge voltage source inverter with waveforms

1.13 Explain the operation of three phase 180 degree voltage source inverter with wave forms

1.14 Classify different pulse width modulated inverters

1.15 Define Cycloconverter

1.16 Classify Cycloconverters

1.17 Explain the operation of single phase stepdown Cycloconverter

1.18 Explain the operation of single phase stepupCycloconverter

2.0 Know the special applications of thyristors

2.1 Give special applications of thyristors.

2.2 What is the need of ups?

2.3 Draw and Explain the principle of operation of UPS.

2.4 What is the need for SMPS?

2.5 Draw and explain the principle of operation of SMPS..

2.6 Classification of high voltage dc transmission.

2.7 Draw and explain the principle of operation of bipolar hvdc system.

2.8 Draw and explain the principle of operation of control of hvdc converters.

2.9 Draw and Explain the construction and working principle of single phase ac switches.

2.10 Draw and Explain the construction and working principle of single phase dc switches.

2.11 Explain the design of static switches.

2.12 Draw and Explain the construction and working principle of dc circuit breakers

2.13 Classification of solid state relays

2.14 Draw and explain the dc solid state relays

2.15 Draw and explain the ac solid state relays.

3.0 Understand the working of transducers and Ultrasonics

3.1 Classify transducers on the basis of principle of operation and applications.

3.2 Explain the working principle, construction and applications of strain gauge.

3.3 Explain the working principle, construction and applications of potentiometric transducer.

3.4 Explain the working principle, construction of capacitive and inductive transducers.

3.5 Mention the 6 important applications of above transducers.

3.6 Explain the working principle, construction and applications of LVDT.

3.7 Explain the working principle and construction of Piezo electric transducer.

3.8 List any 3 uses for the Piezo electric transducer

3.9 Explain the working principle of RTD & Thermocouple transducer.

3.10 Mention any 6 important applications of above transducers.

3.11 Explain the application of transducer in Accelerometer, servomotors, and Tachogenerators.

3.12 Draw and explain pulsed-echo ultrasonic flaw detector

3.13 Explain the principle of MEMS devices

3.14 Mention their use in modern smart phones and other devices

4.0 Industrial Heating & welding

4.1 Classify industrial heating methods.

4.2 Explain the principle of induction heating.

4.3 List four applications of induction heating.

4.4 Draw the circuit of HF power source for induction heating and explain its working.

4.5 Explain the principle of dielectric heating.

4.6 Explain the electrodes used in dielectric heating & method of coupling to RF generator.

4.7 Mention the applications of dielectric heating.

4.8 Define welding.

4.9 List 4 types of Electrical welding

4.10 Explain the principle of resistive welding.

4.11 Draw the basic circuit of AC resistive welding and explain its working.

4.12 Mention applications of resistive welding.

4.13 Mention the applications of other welding Techniques.

5.0 Understand architecture of PLCs &SCADA Programming

5.1. Explain the need for PLC

5.2. Explain the basic principle of PLCs.

5.3. List out the advantages and disadvantages of PLC's.

5.4. Draw and explain the functional block diagram of PLC.

5.5. Explain the Ladder diagrams and sequence listing.

5.6. Draw ladder diagram for OR logic and write the PLC code.

5.7. Draw ladder diagram for AND logic and write the PLC code.

5.8. Draw ladder diagram for XOR logic and write the PLC code

5.9. Explain the importance of PLC timers with examples.

5.10. Explain the importance of PLC counters with examples.

5.11. List the features of popular PLCs like Siemens , Allenbradly .

5.12. List any 4 applications of PLCS in the industry.

5.13. Mention the importance of SCADA.

5.14. Explain a typical SCADA system.

5.15. List the applications of SCADA.

6.0 Control Engineering

6.1. Define system and Control system.

6.2. Classify control systems

6.3. Explain the basic block diagram of control system

6.4. Explain an open loop control system.

6.5. Give examples for open loop control system.

6.6. Give three merits and demerits of open loop control.

6.7. Explain the closed loop system with the help of a block diagram.

6.8. Give Examples for closed loop system

6.9. Compare Open loop and closed loop control systems.

6.10. Define Transfer function

6.11. Explain block diagram reduction techniques.

6.12. Solve simple problems using the above techniques.

Reference Books:

1. Power Electronics by P.C.Sen Tata McGraw-Hill Education
2. Industrial Electronics and Control by S.K.Bhattacharya, S.Chatterjee TTTI Chandigarh – TES
3. Industrial And Power Electronics (Paperback) By: G. K. Mithal (Author) | Khanna Publishers
4. Control Systems Engineering by I. J. Nagrath And M. Gopal New Age Publisher, New Delhi
5. PLCs &SCADA : Theory and Practice by Rajesh Mehra, Vikrant Vij- Laxmi Publications

Suggested E-Learning references

1. http://electrical4u.com/
2. www.nptel.ac.in
3. www.Techopedia.com
4. www.circuitdigest.com

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Explain the working principle of choppers, inverters, cycloconverters	R/U	1,2,10	14
CO2	Identify the use of choppers, rectifiers and inverters.	R/U	1,2,5,6,7	12
CO3	Apply sensor for various applications	R/U/A	1,2,9	12
CO4	Explain different welding techniques	R/U/A	1,2,5,7	12
CO5	Use the concepts of PLC& SCADA for industrial applications	R/U/A	1,2,5	13
CO6	Develop an understanding of control systems	R/U/A	1,2,3,7	12

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SEMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R(1 Mark)		U(3 Marks)	A(5 Marks)	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3	9(b)	13(b)	
			5, 6	11(a)	15(a)	
				11(b)	15(b)	
6	VI		7,8	10(b)	14(b)	
				12(a)	16(a)	
				12(b)	16(b)	
Total Questions		8		8	8	

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

EC-502, V SEMESTER, INDUSTRIAL ELECTRONICS

MID EXAM - I MODEL QUESTION PAPER

Time: 1 hour **Max. Marks: 20**

PART-A

Answer All questions. Each carries 1 mark. **4X1=4 Marks**

1. Classify the different chopper control strategies
2. Define inverters
3. what is the need of ups
4. Classification of solid state relays

PART-B

Note:Answer any TWO questions . Each carries 3marks. **2X3=6 Marks**

5 (a)Explain the operation of stepup chopper.

(OR)

5(b) Explain the operation of series inverter.

6(a)Explain the principle of operation of SMPS.

(OR)

6(b) Explain the AC solid state relays.

PART-C

Note:Answer any TWO questions . Each carries 5 marks. **2X5=10 Marks**

7 (a)Draw and explain the operation of series inverter.

(OR)

7(b) Draw and Explain the operation of single phase stepdown Cycloconverter.

8(a). Draw and Explain the construction and working principle of dc circuit breakers

(OR)

8(b).Explain the working of UPS with block diagram

EC-502 V SEMESTER

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD
EC-502 V SEMESTER, INDUSTRIAL ELECTRONICS
MID EXAM - II MODEL QUESTION PAPER

Time: 1 hour **Max. Marks:20**

PART-A

Answer <u>All</u> questions. Each carries 1 marks. **4X1=4 Marks**

1. Classify transducers on the basis of principle of operation
2. List any 3 uses for the Piezo electric transducer
3. Classify industrial heating methods
4. Define welding.

PART-B

Note:Answer any <u>TWO</u> questions . Each carries 3marks. **2X3=6 Marks**

5(a)Explain the principle of MEMS devices

(OR)

5(b) Explain the working principle of RTD

6(a) Explain the principle of resistive welding.

(OR)

6(b) Explain the principle of dielectric heating

PART-C

Note:Answer any <u>TWO</u> questions . Each carries 5 marks. **2X5=10 Marks**

7(a) Explain the working principle, construction of LVDT.

(OR)

7(b) Explain the working principle, construction of strain gauge.

8(a) Draw the circuit of HF power source for induction heating and explain its working.

(OR)

8(b) Draw the basic circuit of AC resistive welding and explain its working.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD
EC-502 V SEMESTER, INDUSTRIAL ELECTRONICS
SEMESTER END EXAMINATION MODEL QUESTION PAPER

Time: 2 hour **Max. Marks:40**

PART-A

Answer <u>All</u> questions. Each carries 1 marks. **8X1=8 Marks**

1. Mention any two applications of SMPS
2. List 4 types of Electrical welding.
3. List types of PLCs.
4. State the need for PLC.
5. List any two applications of PLCs in the industry.
6. List 2 applications of SCADA.
7. Define control system.
8. Define Transfer function.

PART-B

Answer any <u>four</u> questions.Each carries three marks marks **4X3=12Marks**

9 (a)Draw the Volt-ampere characteristics of Diac and Triac.

(OR)

9(b) Explain the basic principle of PLC..

10(a)Classify transducers on the basis of principle of operation and applications

(OR)

10(b) Classify control systems and give examples for each control system.

11 (a) Draw the ladder diagram for XOR logic and write the PLC code.

(OR)

11(b)Explain the importance of SCADA system.

12 (a) Compare Open loop and closed loop control systems.

(OR)

12 (b)Explain the basic block diagram of control system.

PART-C

Answer any four questions.Each carries 5 marks **4X5=20Marks**

13(a) Explain the working of online UPS with the help of block diagram.

(OR)

13 (b)Explain the importance of PLC timers with an example.

14(a)Explain the principle of resistive welding.

(OR)

14(b)Find the transfer function for the given block diagram.

15(a)Draw and explain the functional block diagram of PLC.

(OR)

15(b)Explain basic SCADA system.

16(a)Explain the closed loop system with the help of a block diagram

(OR)

16(b) Explain the open loop system with the help of a block diagram.

EC-503-DATA COMMUNICATION AND COMPUTER NETWORKS

Course Title	Data Communication and Computer Networks	Course Code	EC-503
Semester	V	Course Group	Core
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Hours	75
CIE	60 Marks	SEE	40 Marks

Pre requisites:

This course requires the Basics concepts of analog and digital communication, digital electronics and computers

Course outcomes:

CO1 :	Apply physical layer functionality to select suitable media
CO2 :	Apply MAC layer protocols for various topologies
CO3 :	Use network layer protocols
CO4 :	Use transport layer protocols
CO5 :	Apply knowledge in securing the network
CO6 :	Use application layer protocols

COURSE CONTENT

Upon completion of the course the student should be able to

UNIT 1 –

Basics of Data communication & OSI Layer

Duration: 15 Periods (L: 12– T:3)

Introduction-concepts of data communication- analog and digital data-computer network-OSI 7 Layered architecture-UTP- STP- Coaxial and Fiber optic cable - simplex, half-duplex and full-duplex communication-bandwidth and throughput-circuit switching-packet switching-message switching

UNIT2 :

LAN and DLL protocols **Duration:15 Periods (L: 12– T:3)**

Local area network-network topologies (Bus, Star, Ring)-Token ring network-Hub/Repeaters-bridges-routers-need for protocols-Ethernet frame format (IEEE 802.3)- flow control-error control- CSMA/CD-CSMA/CA-wireless LAN frame format (IEEE 802.11)-FDDI-Bluetooth-WAP.

UNIT3
IP addressing and Network layer protocols

Duration:15 Periods (L:12 – T:3)

Internet and Intranet- Internet protocol-connection oriented (virtual circuit) and connectionless (datagram) services-IPv4 addressing-classful and classless addressing-IPv6 addressing-router and routing-cut through & store-and-forward protocols-packet transfer mechanism using routers and IP address-architecture of ISP-PSTN Internet connectivity: Dial up access-leased line-DSL-ISDN-Dijkstra's algorithm- Bellman Ford algorithm

UNIT 4
WAN protocols **10 Periods (L: 8– T:2)**

WAN architecture-X.25, FRAME relay and ATM WAN Protocols- ARPA NET and WWW-TCP/IP-Address Resolution Protocol- port and sockets- gateways

UNIT 5

Understand Network security.

10 Periods (L: 8– T:2)

Network security-security devices, security services. Firewalls, Cryptography-Public key and private algorithm-Salient Features of I.T Act-Cyber Security offences and penalties

UNIT 6

Understand Web Applications. **10 Periods (L: 8– T:2)**

DNS server- email transfer-POP server-SMTP server-FTP- Web server-Web browser- HTTP commands-proxy server- hyperlinks-web browser architecture-remote login

Suggested Learning Outcomes
1.0 Basics of Data communication & OSI Layer

1.1 Define data communication

1.2 State the need for data communication networking.

1.3 Distinguish between analog and digital data.

1.4 Define computer network and state its use.

1.5 Draw the ISO: OSI 7 layer architecture and explain the function of each layer.

1.6 List the different types of physical transmission media.

1.7 Explain the use of UTP, STP, Coaxial and Fiber optic cable in networking.

1.8 Define simplex, half-duplex and full-duplex communication.

1.9 Define bandwidth and throughput of a physical medium.

1.10 List the three types of switching techniques used in networking.

1.11 Explain circuit switching, packet switching and message switching.

2.0 LAN and DLL protocols

2.1 Define Local area network and state its use.

2.2 Explain different network topologies (Bus, Star, Ring)

2.3 Compare the performances of the three topologies.

2.4 Explain the working of token ring network.

2.5 Explain the use of different networking devices such as repeater/hub, switch, bridge in constructing networks

2.6 Differentiate between repeater, switch and bridges.

2.7 State the need for protocols in computer networks.

2.8 State the need for framing in data link layer.

2.9 Explain the Ethernet frame format (IEEE 802.3).

2.10 State the need for flow control and error control protocols.

2.11 Explain CSMA/CD and CSMA/CA.

2.12 Explain the topology of wireless LAN and explain its frame format (IEEE 802.11).

2.13 Discuss FDDI and its properties.

2.14 Explain the Bluetooth technology.

2.15 Write the applications of WAP.

3.0 IP addressing and Network layer protocols

3.1 Define the terms Internet and Intranet.

3.2 Define internet protocol.

3.3 Distinguish between connection oriented (virtual circuit) and connectionless (datagram) services.

3.4 Classify the two types of Internet Protocol addressing IPv4 and IPv6 and state the need for IPv6.

3.5 Explain classful addressing and classless addressing in IPv4.

3.6 Describe Internet protocol version-6 (IPv6) addressing.

3.7 Explain the use of routers in networking

3.8 Explain the concept of routers and routing.

3.9 Explain the internal architecture of ISP.

3.10 Know about Dial up access, leased line, DSL, ISDN types of internet connectivity for an individual user/ organization.

3.11 Explain Cryptography

3.12 Explain Public and private algorithm

3.13 Explain Dijkstra's algorithm

3.14 Explain Bell man Ford algorithm

4.0 WAN protocols

4.1 Know about WAN architecture.

4.2 List the three commonly used WAN technologies.

4.3 Describe the working of X.25 WAN Protocol

4.4 Describe the FRAME relay WAN Protocol.

4.5 Explain ATM WAN Protocol.

4.6 Describe the ARPANET and WWW.

4.7 Explain different layers of TCP/IP.

4.8 Explain the features of TCP.

4.9 Compare OSI and TCP/IP model.

4.10 Explain Address Resolution Protocol (ARP).

4.11 Write the functions of port and sockets.

4.12 Describe the use of Gateways.

5.0 Network security

5.1 State the need for network security.

5.2 List various Network security services.

5.3 Define message confidentiality and message integrity

5.4 Define message authentication and entity authentication.

5.5 Explain key management, digital signature and firewalls in securing the networks.

5.6 List Salient Features of I.T Act

5.7 State need for Cyber security

5.8 State various security threats of network

5.9 List security Measures for threats.

6.0 Web Applications

6.1 Write the role of DNS server.

6.2 Explain DNS namespace.

6.3 Explain how email is transferred.

6.4 Discuss POP server and SMTP server.

6.5 Explain file transfer operation using FTP

6.6 Explain the working of Web server.

6.7 Explain the working of Web browser.

6.8 List HTTP commands.

6.9 Explain the purpose of proxy server.

6.10 Explain the use of hyperlinks.

6.11 Describe the web browser architecture.

6.12 Explain remote login.

Recommended Books

1. Computer Networks (4th Edition) by Andrew S. Tanenbaum
2. Network communication Technology by Ata Elahi Thomson
3. Data Communication and Networking by Godbole TMH
4. Data and Computer Communications: William Stallings 7th edition. PHI
5. Data Communication and Networking: BehrouzForouzan 3rd edition.TMH

Suggested E-Learning Resources

1. http://electrical4u.com/
2. www.electronics-tutorials.ws
3. www.nptel.ac.in
4. www.youtube.com

CO PO Mapping Matrix:

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Apply physical layer functionality to select suitable media (Physical layer)	R/U/A	1,2,5,6,7,9,10	15
CO2	Acquire knowledge of wired and wireless MAC protocols	R/U/A	1,2,3,4,9,10	15
CO3	Use network layer protocols	R/U/A	1,2,3,9,10	15
CO4	Use transport layer protocols	U/A	1,2,3,9,10	10
CO5	Apply knowledge in securing the network	R/U/A	1,2,3,4,5,7,9, 10	10
CO6	Use application layer protocols	R/U/A	1,2,3,4,9,10	10

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE					Remarks
		R(1 Mark)			U(3 Marks)	A(5 Marks)	
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
					12(a)	16(a)	
					12(b)	16(b)	
Total Questions		8			8	8	

EC-503

STATE BOARD DIPLOMA EXAMINATIONS , (C-21)

DECE V SEMESTER MID SEMESTER EXAMINATION – I

MODEL PAPER

DATA COMMUNICATION AND COMPUTER NETWORKS

Time: 1 hour **Max. Marks: 20**

PART-A

Instructions: 1.Answer<u>ALL</u> questions.

2.Each question carries ONE mark. 4X1=4 Marks

1.Define data communication
2. List the three types of switching techniques used in networking.
3. List different network topologies.

4.Define Local area network.

PART-B

Instructions: 1. Answer any TWO **questions.**

2.Each question carries THREE marks. 2X3=6 Marks

5(a). Distinguish between analog and digital data.

OR

5(b).Explain the use of Coaxial and Fiber optic cable in networking

OR

6(a). Differentiate between repeater, switch and bridges.

OR

6(b).Explain CSMA/CD.

PART-C

Instructions: 1.Answerany TWO **questions.** **2X5=10 Marks**

2.Each question carries FIVE marks.

7(a). Draw the ISO: OSI 7 layer architecture and explain the function of each layer

OR

7(b).Explain circuit switching, packet switching and message switching

8(a).Explain the topology of wireless LAN and explain its frame format

OR

8(b)Explain the Ethernet frame format

EC-503

STATE BOARD DIPLOMA EXAMINATIONS, (C-21)

DECE V SEMESTER MID SEMESTER EXAMINATION – II

MODEL PAPER

DATA COMMUNICATION AND COMPUTER NETWORKS

Time: 1 hour **Max. Marks: 20**

PART-A

Instructions: 1.Answer<u>ALL</u> questions.

2.Each question carries ONE mark. 4X1=4MARKS

1.Define the terms Internet and Intranet

2. Define internet protocol
3. List the three commonly used WAN technologies
4. Write the functions of port and sockets

PART-B

2X3=6 Marks

Instructions: 1.Answerany TWO **questions.**
2.Each question carries THREE marks.

5(a).Explain the use of routers in networking

OR

5(b).Explain the internal architecture of ISP

6(a).Explain the features of TCP

OR

6(b).Describe the use of Gateways

PART-C

2X5=10 Marks

Instructions: 1.Answerany TWO **questions.**
2.Each question carries FIVE marks.

7(a).Explain classful addressing and classless addressing in IPv4

OR

7(b). Explain about Dial up access and DSL types of internet connectivity for an individual user/ organization

8(a). Describe the FRAME relay WAN Protocol.

OR

8(b). Compare OSI and TCP/IP model.

EC-503

BOARD DIPLOMA EXAMINATIONS , (C-21)
DECE V SEMESTER EXAMINATION
MODEL PAPER
DATA COMMUNICATION AND COMPUTER NETWORKS

Time: 2 hours **Max. Marks: 40**

PART-A

Instructions: 1.Answer<u>ALL</u> questions.

2.Each question carries ONE mark. **8X1=8 Marks**

1. State the need for data communication networking.
2. Classify the two types of Internet Protocol addressing
3. Write the role of DNS server.
4. Define internet protocol
5. Define message authentication and entity authentication
6. State Need for Cyber security
7. List HTTP commands
8. State the use of hyperlinks

PART-B

Instructions: 1.Answer any FOUR questions.

2.Each question carries THREE marks. **4X3=12Marks**

9(a)Define simplex, half-duplex and full-duplex communication

OR

9(b)List Salient Features of I.T Act

10(a)Explain the features of TCP.

OR

10(b)Explain how email is transferred

11(a)Define message confidentiality and message integrity

OR

11(b)List security Measures for threats

12(a)Explain DNS namespace

OR

12(b)Explain the purpose of proxy server

PART-C

4X5=20 Marks

Instructions: 1.Answer<u>any FOUR</u> questions.

2.Each question carries FIVE mark.

13(a).Draw the ISO: OSI 7 layer architecture and explain the function of each layer

OR

13(b) Explain key management, digital signature and firewalls in securing the networks

14(a)Describe the working of X.25 WAN Protocol

OR

14(b) Describe the web browser architecture.

15(a) State various security threats of network and explain them.

OR

15(b) Ex[lain Network security devices

16(a) Explain POP server and SMTP server

OR

16(b) Explain the working of Web server

EC-574 -MOBILE COMMUNICATION & OPTICAL FIBRE COMMUNICATION

Course Title :	Mobile Communication & Optical Fibre Communication	Course Code	EC-574
Semester	V	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic knowledge of Analog Communication, Digital Communication and Advanced Communication Systems

Course Outcomes

Upon completion of the course, the student should be able to

Course Outcome		**Linked PO**	**Teaching Hours**
CO1	**Interpret the Basic Concepts of Mobile Communication and Cellular Systems**	PO1,PO2	13
CO2	Comprehend GSM and Apply Intelligent Cell Concept in Mobile Communication	PO1,PO2,PO5,PO6,PO7	12
CO3	Understand the Basics of Optical Fibre Communication	PO1,PO2	12
CO4	Use Fiber Optic Components, Devices and Measuring Instruments	PO1,PO2,PO3,PO5,PO8,PO9	10
CO5	Explain Modern Wireless Communication Systems	PO1,PO2,PO3,PO4,PO7,PO10	14
CO6	Understand Wave Length Division Multiplexing &Apply Optical Amplifiers	PO1,PO2,PO3,PO7,PO10	14

CO	**Learning Outcome**	**Periods**
CO1	Understand the basics of Mobile Communication & Cellular System	13
CO2	Comprehend Digital Cellular & Intelligent Cell Concept in Mobile Systems	12
CO3	Understand the Basics of Optical Fiber Communication	12
CO4	Use Optical Components, Devices and Measuring Instruments	10
CO5	Explain Modern Wireless Communication Systems	14
CO6	Understand Wave Length Division Multiplexing and Optical Amplifiers	14

Course Contents

UNIT1-Introduction to Mobile Communication & Cellular System

Duration:13Periods (L: 11– T:3)

Limitations of conventional mobile phone system-Mobile Station and Base Station-Functions of Mobile Switching Centre (MSC)-Roamer- -Frequency Division Duplex (FDD) and Time Division Duplex (TDD)-Uplink and Downlink channels in mobile communication-Block diagram of a basic cellular system-Mobile Phone Handset-Call progress in a cellular telephone system- Hexagonal cell site-Frequency reuse-Capacity of a mobile cellular system-Cell-Cluster- Relation between capacity and cluster size- Hand-off in mobile communication-Channel assignment strategies- Cell splitting and sectoring- Micro-cell concept- Umbrella cell

UNIT -2: Digital Cellular Mobile System & Intelligent Cell Concept

Duration: 12 Periods (L: 10– T:2)

1.1 multiple access techniques –Types- Compare FDMA, TDMA and CDMA - Disadvantages of analog cellular system-Features of digital cellular system-Global system for Mobile Communication (GSM): architecture with block diagram-Channels and Services in GSM -GSM radio subsystem-Frame structure of the GSM- - Concept of Intelligent cell – Advantages of implementing Intelligent Cell – Applications of intelligent micro cell system – Intelligent Network and Types

UNIT 3 –Basics of Optical Fiber Communication

Duration: 12Periods (L: 10– T:2)

Merits of Light wave communication system over EM wave systems.- Different optical spectral bands- Structure of optical fibre- Classification of optical fibres based on refractive index profile- Types of fibres based on core diameter- Single Mode Fibre (SMF)- Multi Mode Fibre (MMF)- Advantages of SMFs over MMFs- Total internal reflection in optical fibre-Define acceptance angle-Define cone of acceptance- Define Numerical Aperture (NA)-Advantages of optical fibres over other communication media- Various losses in optical fibres--Classification of dispersions that occur in optical fibres- Group Velocity Dispersion- Inter modal and intra modal dispersion- Wave Guide Dispersion- Polarization Mode Dispersion

UNIT-4:FibreOpticComponents,Devices

Duration:10Periods(L:8–T:2)

Various fibre optic components- Need for connectors in Fibre Optic Communication -Need for Switch in OFC - Types of splices- Function of splices in optical fibers- Functionof Mechanical splice and fusion splice- Comparison between mechanical & fusion Splice-Needforopticalcoupler/splitter-Differentopticalcouplers-Workingofanoptical coupler- Need for isolator in Optical Fibre Communication (OFC) - Working ofOpticalisolator - Use of Optical attenuators- Working of Optical Time Domain Reflecto meter(OTDR)- Block diagram of Fibre Optic Communication system-Types of sources anddetectors used in Optical Fibre Communication (OFC) - Features of an optical source anddetector-PrincipleofLED-PrincipleofLASERDiode--ConstructionandWorkingprinciple of LED source- Construction and Working of LASER source- Construction andWorkingofAvalanchephotodiode(APD)

UNIT-5:ModernWirelessCommunicationSystems Duration:14Periods(L:11–T:3)

Architecture of GSM system –Functions of Radio Sub System in GSM – Functions ofSwitching Sub System in GSM -Security aspects in GSM-Need for authentication keyand ciphering keyin GSM –Needfor authenticationand ciphering algorithmsin GSM - Features of GSM- Draw backs in GSM- Architecture of General Packet RadioService(GPRS)-FeaturesofGeneralPacketRadioService(GPRS)-FeaturesofEnhanced Data Rates GSM Evolution (EDGE)-Compare the features of GSM, GPRSand EDGE systems-Specifications of Digital European Cordless Telecommunication(DECT) system -Features of Digital European Cordless Telecommunication (DECT)system - Basic Personal Access Communication System (PACS) network- PersonalAccess Communication System (PACS) Subscriber set – Classification of MobileDataNetworks–BasicConfigurationofWirelesslocalloop(WLL)-Typesandfeatures of Wireless local loop-merits of WLL- Salient features of 3G system-Salientfeaturesof 4Gsystem-Comparethefeatures2G,3Gand4G

UNIT-6:WavelengthDivisionMultiplexingandOpticalAmplifiers

Duration:14Periods(L:11–T:3)

Schematic Diagram of Basic Principle of Optical Time Domain Multiplexing-Principle ofOTDM- Advantages Of OTDM- Limitations of Time Division Multiplexing (OTDM) inOFC- Need for WDM in fibre optic communication- Wideband WDM and

narrowbandWDM–BenefitsofWDM-TypesofWDM-BlockdiagramofDenseWavelengthDivisionMultiplexing(DWDMusingwavelengthconvertingtransponders)-Needforrepeaters in OFC-Compare R, 2R and 3R repeaters-Block diagram of Erbium Doped FibreAmplifier (EDFA)- Principle and Operation of EDFA – Application of EDFA in OpticalFibre Communication - Comparison ofrepeaters and optical amplifiers-– Block diagramof Synchronous Optical Network (SONET) System – Functions of Multiplexer and add-drop multiplexer and de multiplexer - Fibers in Ethernet and Gigabit Ethernet- Use ofopticalcablesinsubmarines-LocalTelephoneNetworkandinCableT.Vapplication

Suggested Learning Outcomes: After completing this course the student will be able to

1.0 Interpret the Basic Concepts of Mobile Communication System & Cellular System

1.1 Limitations of conventional mobile phone system.

1.2 Define the terms mobile station and base station

1.3 Functions of Mobile switching centre (MSC)

1.4 Voice and control channels in mobile communication

1.5 Define Roamer

1.6 Distinguish between frequency division duplex (FDD) and time division duplex (TDD).

1.7 Uplink and downlink channels in mobile communication

1.8 Block diagram of a basic mobile cellular system.

1.9 Block diagram of mobile phone handset

1.10 Explain the process of call progress in a cellular telephone system

1.11 Hexagonal cell site.

1.12 Concept of frequency reuse.

1.13 Define the terms Cell and cluster

1.14 Explain the capacity of a cellular system

1.15 State the relation between capacity and cluster size.

1.16 Co-channel interference.

1.17 Hand-off in mobile communication

1.18 Channel assignment strategies

1.19 Cell splitting and sectoring

1.20 Micro-cell concept

1.21 Umbrella cell concept

2.0 Comprehend Digital Cellular & Intelligent Cell Concept in Mobile Systems

2.1 State the need for multiple access techniques

2.2 List the three types of multiple access techniques.

2.3 Compare FDMA, TDMA and CDMA

2.4 Disadvantages of analog cellular system.

2.5 Features of digital cellular system.

2.6 Explain the Global System for Mobile (GSM) architecture with block diagram.

2.7 GSM channels

2.8 GSM services

2.9 GSM radio subsystem

2.10 Frame structure of the GSM

2.11 Drawbacks of micro cell system

2.12 Need of intelligent cell concept in mobile communication

2.13 Concept of Intelligent Cell

2.14 Advantages of implementing intelligent cell

2.15 Explain intelligent micro cell operation

2.16 Explain power delivery intelligent cells

2.17 Applications of intelligent micro cell system

2.18 List the types of intelligent network

3.0 **Basics of Optical Fibre Communication**

3.1 Advantages of Light wave communication system over EM wave systems.

3.2 Different optical spectral bands.

3.3 Structure of optical fibre

3.4 Classify optical fibres based on refractive index profile

3.5 Draw the refractive index profile for step index and graded index fibre and explain

3.6 Types of fibres based on core diameter

3.7 Define Single mode fibre (SMF)

3.8 Define multimode fibre (MMF)

3.9 List the advantages of SMFs over MMFs.

3.10 Explain total internal reflection in optical fibre.

3.11 Define acceptance angle, cone of acceptance and Numerical Aperture(NA)

3.12 List the advantages of optical fibres over other communication media

3.13 List various losses in optical fibres.

3.14 Classify different types of dispersions occur in optical fibres.

3.15 Group Velocity Dispersion

3.16 Distinguish between inter modal and intra modal dispersion.

3.17 Wave Guide Dispersion

3.18 Polarization Mode Dispersion

4.0 Use Optical Components, Devices and measuring instruments

4.1 List various fibre optic components

4.2 State the need for connectors and switch in Fibre Optic Communication (FOC)

4.3 Explain the function of mechanical splice & fusion splice in optical fibres

4.4 Distinguish between mechanical splice and fusion splice

4.5 Explain the working of an optical coupler/Splitter

4.6 Explain the working of optical isolator in Optical Fibre Communication (OFC)

4.7 State the use of optical attenuators in OFC

4.8 Draw and Explain the working of Optical Time Domain Reflectmeter (OTDR)

4.9 Draw the block diagram of Fibre Optic Communication System and explain each block.

4.10 Explain the construction and working principle of LED source.

4.11 Explain the construction and working principle of LASER source.

4.12 Explain the construction and working of Avalanche Photo Diode(APD)

5.0 Modern Wireless Communication Systems

5.1 Draw and explain the architecture of GSM system

5.2 Explain Security aspects in GSM

5.3 Draw the architecture of General Packet Radio Service (GPRS)

5.4 List the features of Enhanced Data Rates GSM Evolution (EDGE)

5.5 Compare the features of GSM, GPRS and EDGE systems

5.6 Explain the basics of Digital European Cordless Telecommunication (DECT) system

5.7 List the specifications and features of DECT system

5.8 Compare features of GSM, GPRS & EDGE technologies

5.9 Explain Personal Access Communication System(PACS)

5.10 Classify mobile data networks

5.11 What is Wireless Local Loop (WLL)

5.12 Draw the configuration of Wireless local loop

5.13 List types, features and merits of WLL

5.14 List the salient features of 3G,4G systems

5.15 Compare the features of 2G,3G & 4G

6.0 Understand Wave Length Division Multiplexing and Optical Amplifiers

6.1 Draw and explain Schematic Diagram of Basic Principle of Optical Time Domain Multiplexing (OTDM)

6.2 Classify Wavelength Division Multiplexing (WDM) methods in OFC

6.3 Explain the block diagram of WDM system

6.4 Explain Dense WDM (using wave length converting transponders) in OFC

6.5 Distinguish between wide band WDM and narrow band WDM

6.6 Explain the need for different repeaters in Fibre Optic Communication

6.7 Draw and explain the block diagram of Erbium Doped Fibre Amplifier (EDFA).

6.8 Draw and explain the use of EDFA in Optical Fiber Communication

6.9 Distinguish between repeaters and optical amplifiers.

6.10 Draw the block diagram & explain about Synchronous Optical Network system (SONET)

6.11 Explain the use of fibers in Ethernet and Gigabit Ethernet.

6.12 Explain the fibre optic cables for use in submarines, local telephone network and CTV

References

RECOMMENDED BOOKS

1. Mobile and Personal Communication Sytems and Services by Raj Pandya, PHI
2. Wireless Communications-Principles and Practice by Theodore S. Rappaport, PEARSON
3. Mobile Cellular Telecommunications-Analog and Digital systems by Willium C. Y. Lee, McGrawHill
4. Mobile Communications by Jochen Schiller, PEARSON Publishers
5. Wireless and Cellular Communications by Sanjay Sharma, Katson Publications
6. Optical Fiber Communications by Gerd Keiser, McGraw Hill Publication

7. Optical Fiber and Laser Principles and Applications by Anuradha, New Age Publications
8. Optical Fiber Communications-Principles and Practice, John M. Senior, Pearson Publications
9. Optical Fiber Communications and Its Applications ,S.C.Gupta, PHI
10. Electronic Communication Systems by Roy Blake, Thomson Delmar

Suggested E-Learning resources:

1. www.electronics-tutorials.ws
2. www.nptel.ac.in

CO/PO Mapping Matrix

Course Outcome		Linked PO	Teaching Hours
CO1	**Interpret the Basic Concepts of Mobile Communication System**	PO1,PO2	13
CO2	Explain Cellular System Design Fundamentals	PO1,PO2,PO5,PO6,PO7	12
CO3	Compare and use various Multiple Access Techniques	PO1,PO2,PO4,PO9	12
CO4	Comprehend Digital Cellular Mobile Systems	PO1,PO2,PO5,PO7,PO8	10
CO5	Apply Intelligent Cell Concept in Mobile Communication	PO1,PO2,PO5,PO10	14
CO6	Explain Modern Wireless Communication Systems	PO1,PO2,PO3,PO7,PO10	14

MID SEM EXAMINATIONS

S.No	**Unit Name**	**MID SEM-I EXAM**			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R(1 Mark)		U(3 Marks)	A(5 Marks)	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3	9(b)	13(b)	
			5, 6	11(a)	15(a)	
				11(b)	15(b)	
6	VI		7,8	10(b)	14(b)	
				12(a)	16(a)	
				12(b)	16(b)	
Total Questions		8		8	8	

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

V SEMESTER, EC-574 -MOBILE COMMUNICATION &OPTICAL FIBRE COMMUNICATION

MID SEM – I MODEL QUESTION PAPER

Time: 1 hour **Max. Marks: 20**

PART-A

Answer <u>All</u> questions. Each carries 1 marks. **4X1=4 marks**

1. State the functions of Mobile switching centre
2. State the need for cellular concept in mobile communication
3. List the disadvantages of analog cellular system
4. Mention GSM channels

PART-B

Answer All questions. Each carries 3 marks. **2X3=6 Marks**

5(a) Draw the block diagram of a basic cellular system and explain each block?

OR

5(b) Explain the concept of frequency reuse?

6(a) Explain the GSM radio subsystem

OR

6(b). Explain power delivery intelligent cells

PART-C

Answer All questions. Each carries 5 marks.
2X5=10Marks

7(a) Explain the process of call progress in a cellular telephone system

OR

7(b) Explain Cell splitting and sectoring

8(a) Explain the Global System for Mobile (GSM) architecture with block diagram

OR

8(b) Compare FDMA, TDMA and CDMA in any five aspects?

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

V SEMESTER, EC574-MOBILE COMMUNICATION &OPTICAL FIBRE COMMUNICATION

MID SEM – II MODEL QUESTION PAPER

Time: 1 hour **Max. Marks: 20**

PART-A

Answer All questions. Each carries 1 marks. 4X1=4 Marks

1. Mention the advantages of Light wave communication system over EM wave systems?

2. List the advantages of SMFs over MMFs?

3. List various fibre optic components?

4. State the use of optical attenuators?

PART-B

Answer All questions. Each carries 3marks.
2X3=6Marks

5(a) Mention different optical spectral bands?

OR

5(b) Explain Group Velocity Dispersion?

6(a) What is the need for isolator in Optical Fibre Communication (OFC)?

OR

6(b) Distinguish between mechanical splice and fusion splice?

PART-C

Answer All questions. Each carries 5 marks.
2X5=10Marks

7(a) Draw the refractive index profile for step index fibre and explain?

OR

7(b) Explain Polarization Mode Dispersion

8(a) Explain the working of Optical Time Domain Reflectometer (OTDR)?

OR

8(b) Draw the block diagram of Fibre Optic Communication System and explain each block?

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS: HYDERABD

V Semester, EC574-MOBILE COMMUNICATION &OPTICAL FIBRE COMMUNICATION

SEMESTER END EXAMINATION MODEL QUESTION PAPER

Time: 2 hour **Max. Marks: 40**

PART-A

Answer <u>All</u> questions. Each carries 1 marks. **8X1=8 Marks**

1. List the limitations of conventional mobile phone system
2. List various losses in optical fibres?
3. Classify mobile data networks?
4. Mention the applications of intelligent micro cell system
5. List the demerits of GSM system?
6. List the advantages of 3G over earlier versions?
7. What is the need for repeater in Fibre Optic Communication?
8. What is the need for WDM in fibre optic communication?

PART-B

Answer all questions. Each question carries 3 marks **4X3=12Marks**

9(a) Distinguish between frequency division duplex (FDD) and time division duplex (TDD)?

OR

9(b) List the salient features of 3G system?

10(a) List important features of an optical source used in Fibre Optic Communication?

OR

10(b) Distinguish between wideband WDM and narrowband WDM?

11(a) Explain the architecture of Digital European Cordless Telecommunication (DECT) system?

OR

11(b) Draw and Explain the architecture of Personal Access Communication System (PACS)?

12(a) Compare R, 2R and 3R repeaters?

OR

12(b) Explain the fibre optic cables for use in submarines?

PART-C

Answer all questions. Each question carries 5 marks **4X5=20Marks**

13(a) Draw the block diagram of a basic cellular system and explain each block?

OR

13(b) Explain about DECT Radio Link?

14(a) Explain total internal reflection in optical fibre?

OR

14(b) Explain Optical Time Division Multiplexing (OTDM)?

15(a) Explain basic concept of Wireless Local Loop (WLL)?

OR

15(b) Explain the architecture of DECT?

16(a) Draw and explain the block diagram of Dense Wavelength Division Multiplexing (DWDM)?

OR

16(b) Draw and explain the block diagram of Erbium Doped Fibre Amplifier (EDFA)?

EC-584 - BASICS OF VLSI CIRCUITS

Course Title	Basics of VLSI Circuits	Course Code	EC-584
Semester	V	Course Group	Elective
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Hours	75 Periods
CIE	60 Marks	SEE	40 Marks

Pre requisites :

This course requires the basic knowledge of logic gates, combinational circuits, sequential circuits and Memories.

Course Outcomes : After completion of the course the student will attain following outcomes

CO	Learning Outcomes	Periods
CO1 :	Compare various MOS fabrication technologies	10
CO2 :	Analyze the various factors affecting designing of MOS circuits	15
CO3 :	Appreciate various design rules MOS fabrication	10
CO4 :	Calculate resistance, capacitance, time delay of C MOS	15
CO5 :	Compare the structures of Verilog and VHDL	15
CO6 :	Use the concepts of Verilog programming	10

Course Content

1. Introduction to MOS technology **Duration: 10 Periods (L:8– T:2)**

Evolution of Integrated circuit technology, Metal Oxide Semiconductor (MOS) and VLSI Technology, Basic MOS transistor, Enhancement mode transistor, Depletion mode transistor. nMOS fabrication process, pMOS fabrication process, CMOS fabrication – the p-well process, the n-well process, the Twin tube process, BiCMOS technology, CMOS and Bipolar technologies.

2. Basic Electrical Properties of MOS and BiCMOS Circuits

Duration: 15 Periods (L:10– T:5)

Drain to source current I_{ds} versus voltage V_{ds} relationships in saturation region and non-saturation region, aspects of MOS transistor threshold voltage, MOS transistor

transconductance g_m and output conductance g_{ds}, MOS transistor figure of merit ω_0, The pass transistor, The nMOS inverter, nMOS inverter pull-up to pull-down ratio ($Z_{p.u}./Z_{p.d.}$) for an nMOS inverter driven by another nMOS invert, Pull-up to pull-down ratio for an nMOS inverter driven through one or more pass transistors, alternative forms of Pull-up, CMOS inverter – five regions of operation, MOS transistor circuit model, Comparative aspects of key parameters of CMOS and Bipolar transistors, BiCMOS inverters, latch-up in CMOS circuits, BiCMOS latch-up susceptibility.

3. Design Processes of MOS and BiCMOS Circuits Duration:10 Periods (L:8– T:2)

MOS layers, Stick diagrams - nMOS design style and CMOS design style, Design rules and Layouts – Lambda based design rules, Contact cuts, Double metal MOS process rules, CMOS lambda based design rules, Layout diagrams, CMOS layout.

4. Basic circuit concepts: Duration: 15 Periods (L:10– T:5)

Sheet resistance R_s, Inverter resistance, Area capacitances of layers, Standard unit of capacitance Cg, some area capacitance calculations, delay unit (ĩ), Inverter delays, estimations of CMOS inverter delays, Driving large capacitive loads-Cascaded inverters as drivers, Inverting type nMOS super buffer, BiCMOS drivers. Propagation delays – cascaded pass transistors, Long polysilicon wires, wiring capacitances.

5. Understand Design flow for designing VLSI IC Duration: 15 Periods (L:10– T:5)

Use of Verilog VHDL in VLSI simulation- steps involved in the design flow for the VLSI IC design- importance of Hardware Description Languages in VLSI design-Compare VHDL and Verilog HDL-Features of Verilog HDL- Instantiation and inference of a component- modules and module instances in Verilog - four levels of abstraction to represent the internals of a module.

6. Concepts of Verilog Duration: 10 Periods (L:8– T:2)

Components of a Verilog module definition- port connection rules in a module instantiation- lexical conventions like number specifications, Identifiers, keywords, etc different data types like value set, nets, registers, vectors, integer, real and time register data types, arrays, memories and strings- defparam and localparam keywords- system tasks and compiler directives-Define expressions, operators and operands- types of operators used in the Verilog HDL

Suggested Learning Outcomes :

1.0 Introduction to MOS technology

1.1 Evolution of Integrated circuit technology

1.2 Describe Metal Oxide Semiconductor (MOS) and VLSI Technology

1.3 Draw Basic MOS transistor

1.4 Explain Enhancement mode MOS transistor .

1.5 Explain Depletion mode MOS transistor.

1.6 Explain nMOS fabrication process.

1.7 Explain pMOS fabrication process.

1.8 List steps in CMOS fabrication – the p-well process.

1.9 List steps in CMOS fabrication – the n-well process.

1.10 List steps in CMOS fabrication – Twin tube process.

1.11 Explain BiCMOS technology.

1.12 Compare CMOS and Bipolar technologies.

2.0 Analyze Basic Electrical Properties of MOS and BiCMOS Circuits

2.1 Derive drain to source current I_{ds} versus voltage V_{ds} relationships.

2.1.1 The Non-saturated Region

2.1.2 The Saturated Region

2.2 Examine aspects of MOS transistor threshold voltage V_t

2.3 Explain MOS transistor transconductance g_m and output conductance g_{ds}.

2.4 Define MOS transistor figure of merit ω_0.

2,5 Explain the pass transisitor.

2.6 Explain the nMOS inverter,

2.7 Determine pull-up to pull-down ratio ($Z_{p.u.}/Z_{p.d.}$) for an nMOS inverter driven by another nMOS inverter.

2.8 Explain Pull-up to pull-down ratio for an nMOS inverter driven through one or more pass transistors.

2.9 Differentiate alternative forms of Pull-up.

2.10 Explain the CMOS inverter – five regions of operation.

2.11 Draw MOS transistor circuit model.

2.12 Compare aspects of key parameters of CMOS and Bipolar transistors.

2.13 Draw BiCMOS inverters.

2.14 Examine latch-up in CMOS circuits.

2.15 Explain BiCMOS latch-up susceptibility.

3.0 Design Processes of MOS and BiCMOS Circuits

3.1 Illustrate MOS layers.

3.2 Sketch Stick diagrams.

3.3 Describe nMOS design style.

3.4 Describe CMOS design style.

3.5 Apply Design rules.

3.6 Apply Lambda-based design rules.

3.7 Illustrate Contact cuts.

3.8 List Double metal MOS process rules.

3.9 List CMOS lambda-based design rules.

3.10 Describe Layout diagrams.

3.11 Draw the simple CMOS layout.

4.0 Understand Basic circuit concepts

4.1 Define Sheet resistance R_s

4.2 Calculate Inverter resistance.

4.3 Explain Area capacitances of layers.

4.4 Define Standard unit of capacitance □Cg

4.5 Calculate area capacitance.

4.6 Define the delay unit (ĩ)

4.7 Explain Inverter delays.

4.8 Explain Rise-time and fall-time estimations of CMOS inverter.

4.9 Explain Cascaded inverters as drivers.

4.10 Explain Inverting type nMOS super buffer.

4.11 Explain BiCMOS drivers.

4.12 Explain Propagation delays – cascaded pass transistors.

4.13 Describe long poly-silicon wires.

4.14 Explain Wiring capacitances.

5.0 Understand Design flow for designing VLSI IC

5.1. Explain the use of Verilog VHDL in VLSI simulation

5.2. Explain the steps involved in the design flow for the VLSI IC design

5.3. Explain the importance of Hardware Description Languages in VLSI design

5.4. Compare VHDL and Verilog HDL

5.5. List the features of Verilog HDL

5.6. Explain the difference between an instantiation and inference of a component.

5.7. Explain differences between modules and module instances in Verilog.

5.8. Explain four levels of abstraction to represent the internals of a module.

6.0 Concepts of Verilog

6.1 Identify the components of a Verilog module definition

6.2 Explain the port connection rules in a module instantiation

6.3 Explain the lexical conventions like number specification, Identifiers, keywords, etc

6.4 Mention different data types like value set, nets, registers, vectors, integer, real and time register data types, arrays, memories and strings

6.5 Explain defparam and localparam keywords

6.6 Explain about system tasks and compiler directives

6.7 Define expressions, operators and operands.

6.8 Mention important types of operators used in the Verilog HDL

Reference Books :

1. Pucknell&Eshraghian: Basic Vlsi Design, Phi, (3/E), 1996

2. Samir Palnitkar: Verilog HDL: A Guide to Digital Design and Synthesis, 2nd Ed.

3. E.Weste&Eshraghian: Principles Of CMOS VlSI Design, Addition Wesley, 1994

4. M.Conway: Introduction to VlSI Systems, Addition Wesley, 1980

5. A.Mukherjie: Introduction To NMOSand CMOS System Design, Phi,1986

Suggested E-Learning references

1. http://www.vlsi-expert.com
2. www.nptel.ac.in

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1:	Compare various MOS fabrication technologies	R/U	1,2,10	10
CO2:	Analyze the various factors affecting designing of MOS circuits	R/U	1,2,5,6, 7	15
CO3:	Appreciate various design rules MOS fabrication	R/U/ A	1,2,9	10
CO4:	Calculate resistance, capacitance, time delay of C MOS	R/U/ A	1,2,5,7	15
CO5:	Compare the structures of Verilog and VHDL	R/U/ A	1,2,5	15
CO6:	Use the concepts of Verilog programming	R/U/ A	1,2,3,7	10

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE					Remarks
		R(1 Mark)			U(3 Marks)	A(5 Marks)	
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
					12(a)	16(a)	
					12(b)	16(b)	
Total Questions		8			8	8	

STATE BOARD OF TECHNICAL EDUCATION & TRAINING TELANGANA

EC-584– BASICS OF VLSI CIRCUITS

VI SEMESTER MID SEMESTER-I MODEL PAPER

TIME:11/2 H **Max Marks:20**

PART-A

Answer all questions. Each question carries 1 mark. 4x1=4M

1. Draw enhancement mode nMOS transistor.
2. Name two methods of CMOS fabrication process.
3. Write the relation between I_{ds}&V_{ds}.
4. Draw Pass transistor.

PART-B

Answer all questions. Each question carries 3 marks . 2x3=6M

5(a). List the steps in CMOS fabrication process.

OR

5(b). Draw basic MOS transistor.

6(a). What are the three alternative forms of pull-up?

OR

6(b). What is meant by z_{pu} and z_{pd} for an nMOS inverter.

PART-C

Answer all questions. Each question carries five marks 2x5=10M

7(a). Explain BiCMOS technology.

OR

7(b).Compare five differences between CMOS and Bipolar Technology.

8(a). Explain the five regions of CMOS Inverter.

OR

8(b). Explain BiCMOS Latch-up susceptibility.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING TELANGANA

EC584– BASICS OF VLSI CIRCUITS

V SEMESTER MID SEMESTER-II MODEL PAPER

TIME:11/2 H **Max Marks:20**

PART-A

Answer all questions. Each question carries 1 mark. 4x1=4M

1. List the basic layers in MOS circuits.
2. What is meant by Stick diagram.
3. Define Sheet resistance.
4. Define delay unit.

PART-B

Answer all questions. Each question carries 3 marks . 2x3=6M

5(a). What is meant by contact cuts.

OR

5(b). List three lambda based design rules.

6(a). What is meant by wiring capacitance?

OR

6(b). What is meant rise time and fall time of CMOS inverter.

PART-C

Answer all questions. Each question carries five marks 2x5=10M

7(a). Draw the layout diagram of CMOS NOR gate

OR

7(b). Draw the layout diagram of nMOS inverter.

8(a). Explain propogation delay with cascaded pass transistor.

OR

8(b). Explain cascaded inverter as drivers.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING - TELANGANA

EC584– BASICS OF VLSI CIRCUITS

V SEMESTER END EXAM MODEL PAPER

TIME: 2 Hrs **Max Marks:40**

PART-A

Answer all questions. Each question carries 1 mark. 8x1=8M

1. Draw depletion mode nMOS transistor
2. What are the colours followed for n diffusion and p diffusion layers
3. List the logical operators in verilog.
4. Define standard unit of capacitance.
5. Define module in verilog.
6. List the four levels of abstraction in verilog
7. List 2 data types in verilog
8. Define operator in verilog.

PART-B

Answer all questions. Each question carries 3 marks . 4x3=12M

9(a). Draw BiCMOS inverter.

OR

9(b). State the use of verilog HDL in VLSI simulation.

10(a). List CMOS lambda based design rules.

OR

10(b). Define defparam with an example.

11(a). What is the difference between instantiation and inference of a component.

OR

11(b). List three features of verilog HDL.

12(a). What are the components of a verilogmodule.

OR

12(b). Explain the representation of number literal in verilog .

PART-C

Answer any four questions. Each question carries five marks. 4x5=20M

13(a). An nMOS inverter is operating in saturation region with following parameters. V_{GS} = 5 V, V_{tn}= 12 V, W/L= 110, $\mu_n Cox$= 110 $\mu A/V^2$. Find the transconductance of the device.

OR

13(b). Explain the importance of hardware description languages in VLSI design.

14(a). For the figure shown below calculate the area capacitance relative to that of standard gate L=30 λ and W=3 λ

OR

14(b). Explain port connection rules in a module instantiation.

15(a). Explain the steps in VLSI IC design flow.

OR

15(b).Writeverilog module for "and" gate in gate level and behavioural modelling.

16(a). Explain five operators used in verilog with an example.

OR

16(b). Explain about system tasks and compiler directives.

EC-575-CYBER PHYSICAL SYSTEMS AND INTERNET OF THINGS

Course title	Cyber Physical Systems and Internet of Things	Course code	EC-575
Semester	V	Course group	Core
Teaching scheme in periods (L:T:P)	4:1:0	Credits	3
Methodology	Lecture + tutorial	Total contact periods	75
CIE (Continuous Internal Evaluation)	60 Marks	See (Semester End Examination)	40 Marks

Prerequisites

Knowledge of basics of OSI stack, how the connectivity protocols work and what are the latest standard in **IoT** communication.

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Understand the basic principles of design and validation of cyber physical systems
CO2	Understand the internet of things and its communication protocols.
CO3	Know about IOT Technology fundamentals
CO4	Understand the IOT hardware and software components
CO5	Know about IOT application development
CO6	Working on IoT case studies

Course Contents

1. Introduction to cyber physical systems:

Introduction to cyber physical systems -Cyber-Physical Systems (CPS) in the real world - Basic principles of design and validation of CPS, Industry 4.0, CPS - Platform components: CPS HW platforms - Processors, Sensors, Actuators, CPS Network – Wireless, Hart, CAN, Automotive Ethernet, CPS Software Platform, Role of Control systems in CPS - Principles of Automated Control Design -Automotive Case study and Attacks on Smart Grids - Industry 4.0 to Society 5.0

2. Introduction to Internet of Things

Definition and characteristics of IoT, Physical design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT, IoT functional blocks, IoT communication Models, IoT communication

API's, IoT enabling Technologies Wireless sensor networks, Cloud Computing, Big Data Analytics, Communication protocols, embedded systems. IoT Levels and Deployment templates – IoT Level-1, IoT Level-2, IoT Level-3, IoT Level-4,IoT Level-5, IoT Level-6

3. IoT and M2M

Basics of Networking, M2M and IoT Technology Fundamentals- Devices andgateways, Data management, Business processes in IoT, Everything as a Service (XaaS), Role of Cloud in IoT, Security aspects in IoT.

4. Elements of IoT

Hardware Components- Computing (Arduino, Raspberry Pi), Communication, Sensing, Actuation, I/O interfaces. Software Components- Programming API's (using Python/Node.js/Arduino) for Communication Protocols-MQTT, ZigBee, Bluetooth, CoAP, UDP, TCP.

5. IoT Application Development

Solution framework for IoT applications- Implementation of Device integration, Data acquisition and integration, Device data storage- Unstructured data storage on cloud/local server, Authentication, authorization of devices.

6. IoT Case Studies

IoT case studies and mini projects based on Industrial automation, Transportation, Agriculture, Healthcare, Home Automation

Objectives:

1.0 Introduction to cyber physical systems

1.1 Define Cyber physical system(Cps)
1.2 Understand the Cyber physical system in the real world
1.3 Know the basic principles of design and validation of Cps
1.4 Know about industry 4.0
1.5 Understand the Cps platform components
1.6 Understand the Cps HW platforms
- 1.6.1 Processors
- 1.6.2 Sensors
- 1.6.3 Actuators
- 1.6.4 Cps network- wireless
- 1.6.5 Hart
- 1.6.6 CAN
- 1.6.7 Automotive Ethernet

1.7 Understand the Cps software platforms
1.8 Role of control system in Cps
1.9 Know the principles of automated control design
1.10 Automotive case studyand Attacks on Smart Grids
1.11 Industry 4.0 to society 5.0

2.0 Introduction to Internet of Things

2.1 Define IoT and list the Characteristics of IoT

2.2 Understand Physical design of IoT

2.3 Know Things in IoT and IoT protocols

2.4 Know about IoT enabling Technologies

- 2.4.1 Wireless Sensor networks
- 2.4.2 Cloud Computing
- 2.4.3 Big Data Analytics
- 2.4.4 Communication Protocols
- 2.4.5 Embedded Systems

2.5 Understand IoT Levels and Development Templates

- 2.5.1 IoT Level-1
- 2.5.2 2.5.2IoT Level-2
- 2.5.3 2.5.3IoT Level-3
- 2.5.4 2.5.4IoT Level-4
- 2.5.5 2.5.5IoT Level-5

3.0 IoT and M2M

3.1 Know basics of Networking

3.2 Understand M2M and IoT Technology Fundamentals

- 3.2.1 Devices and Gateways
- 3.2.2 Data Management
- 3.2.3 Business Process in IoT
- 3.2.4 Everything as a Service (XaaS)

3.3 Know the Role of cloud in IoT

3.4 Understand Security aspects of IoT

4.0 Elements of IoT

4.1 Know about IoT hardware components

- 4.1.1 Computing Hardware (Arduino, Raspberry Pi)
- 4.1.2 Know about Communication, Sensing, Actuation and I/O Interfaces

4.2 Know about software components of IoT

- 4.2.1 Programming APIs (using Python/Node.js/Arduino)
- 4.2.2 MQTT
- 4.2.3 Zigbee
- 4.2.4 Bluetooth
- 4.2.5 CoAP

4.2.6 UDP

4.2.7 TCP

5.0 IoT Application Development

5.1 Understand the Solution framework for IoT applications

5.2 Know Device Integration Implementation

5.3 Know about Data acquisition ad integration

5.4 Understand Device Data Storage in IoT

5.4.1 Unstructured data storage on cloud/local server

5.4.2 Authentication

5.4.3 Authorization of devices

6.0 IoT Case Studies

6.1 Learn IoT Case Studies and Mini projects

6.1.1 Home Automation

6.1.1.1 Smart lighting

6.1.1.2 Home intrusion detection

6.1.2 Environment

6.1.2.1 Weather monitoring system

6.1.2.2 Air pollution monitoring system

6.1.3 Agriculture

6.1.3.1 Smart irrigation

6.1.3.2 Green house control

6.1.4 Healthcare

6.1.4.1 Health and fitness monitoring

6.1.4.2 Wearable electronics

6.1.5 Productivity applications

6.1.5.1 IOT Printer

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Understand the basic principles of design and validation of cyber physical systems	**R, U**		**15**
CO2	Understand the internet of things and its communication protocols.	**R,U,A**		**10**
CO3	Know about IOT Technology fundamentals	**R,U,A**		**10**
CO4	Understand the IOT hardware and software components	**R,U,A**		**15**
C05	Know about IOT application development	**R,U,A**		**10**
C06	Working on IoT case studies	**R,U,A**		**15**
			Total Sessions	**75**

Recommended Books

1. Vijay Madisetti, ArshdeepBahga, İnternet of Things, "A Hands on Approach", University Press
2. Dr. SRN Reddy, RachitThukral and Manasi Mishra, "Introduction to Internet of Things: A practical Approach", ETI Labs
3. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
4. Jeeva Jose, "Internet of Things", Khanna Publishing House, Delhi
5. Adrian McEwen, "Designing the Internet of Things", Wiley
6. Raj Kamal, "Internet of Things: Architecture and Design", McGraw Hill
7. Cuno Pfister, "Getting Started with the Internet of Things", O Reilly Media

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments		5
Seminars		5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
				Total Marks		20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
				Total Marks		40 Marks

<table>
<tr><td rowspan="2">Unit No</td><td colspan="3">Questions to be set for SEE</td></tr>
<tr><td colspan="2">R</td><td>U</td><td>A</td></tr>
<tr><td>I</td><td rowspan="8">Q4</td><td rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td></tr>
<tr><td>III</td><td rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td></tr>
<tr><td>V</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),
Q11(a), Q11(b)</td><td>Q13(b),
Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Q7,Q8</td><td>Q10(b),
Q12(a), Q12(b)</td><td>Q14(b),
Q16(a), Q16(b)</td></tr>
<tr><td>Total Questions</td><td colspan="2">8</td><td>8</td><td>8</td></tr>
</table>

Model Question Paper
BOARD DIPLOMA SEMESTER MID-I EXAMINATIONS (C-21)
V SEMESTER EXAMINATION
CYBER PHYSICAL SYSTEMS AND INTERNET OF THINGS (EC-575)

TIME: 1 Hour **Maximum Marks: 20**

PART-A ***MARKS: 4X1 =4***

Instructions: Answer all the questions. Each question carries ONE mark.

1. Define cyber physical system
2. List the Cps platform components.
3. Define IoT
4. State cloud computing

PART –B ***2X3=6***

Instructions: Answer TWO questions. Each question carries THREE marks.

5(a) Role of control system in Cps.

(OR)

5(b) List the the Cps HW platforms

6(a) list the Characteristics of IoT

(OR)

6(b).Write short notes on communication protocols

PART –C

Instructions: Answer TWO questions. Each question carries FIVE marks. ***2X5=10***

7(a) Explain about industry 4.0

(OR)

7(b). Explain about the following Cps HW platforms

i) Processors
ii) Automotive Ethernet

8(a) Explain about cloud computing IOT enabling technology.

(OR)

8(b) Explain the following iot levels.

i) IoT Level-1

ii) IoT Level-2

Model Question Paper
BOARD DIPLOMA SEMESTER MID-II EXAMINATIONS (C-21)
V SEMESTER EXAMINATION
CYBER PHYSICAL SYSTEMS AND INTERNET OF THINGS (EC-575)

TIME: 1 Hour **Maximum Marks: 20**

PART –A ***MARKS: 4X1 =4***

Instructions: Answer all the questions. Each question carries ONE mark.

1. State M2M in IoT
2. What is an IoT Gateway?
3. List the software components of internet of things.
4. State zigbee in IoT

PART –B

Instructions: Answer TWO questions. Each question carries THREE marks.

MARKS:2X3=6

5(a) List the security aspects of IoT

(OR)

5(b) Write Short Notes on Everything as a Service (XaaS)

6(a) What Is the Main Function of Arduino

.

(OR)

(b) Write short notes on MQTT software of IoT

PART –C

Instructions: Answer TWO questions. Each question carries FIVE marks.

MARKS: 2X5=10

7(a) Explain about the Data Management &Business Process in IoT.

(OR)

7(b) Explain about the Role of cloud in IoT

8(a) Explain about Actuation and I/0 Interfaces

(OR)

8(b) Explain about the following software components of IoT

i) UDP

ii) TCP

Model Question Paper
BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-21)
V SEMESTER EXAMINATION
CYBER PHYSICAL SYSTEMS AND INTERNET OF THINGS (EC-575)

TIME: 2 Hours **Maximum Marks: 40**

PART –A

Instructions: Answer all the questions. Each question carries ONE mark. MARKS: 8X1 =8

1. Define cyber physical system.
2. State cloud in IoT
3. State Data acquisition
4. Define IoT
5. Define Data stotage in IoT
6. State Unstructured data storage on cloud
7. List any two IoT case studies
8. Name any two IoT miniprojects

PART –B

Instructions: Answer FOUR questions. Each question carries THREE marks.

MARKS: 4X3=12

9(a) List the the Cps HW platforms.

(OR)

9(b) write short notes on Device Integration Implementation.

10(a) Write Short Notes on Everything as a Service (XaaS)

(OR)

10(b) Write Short Notes on transportation case study in IoT

11(a) List IoT Applications

(OR)

11(b) write short notes on data integration.

12(a) List the applications of healthcare case study of IoT

(OR)

12(b) List the applications of Industrial case study of IoT

PART –C

Instructions: Answer FOUR questions. Each question carries FIVE marks.

MARKS: 4X5=20

13(a)Explain about the following levels of IoT

i))IoT Level-3

ii) IoT Level-4

(OR)

13(b) Explain about Device Integration Implementation

14(a) Explain about Security aspects of IoT

(OR)

14(b) Explain About Agriculture Case Study in Iot with Relevant Sketches

15(A) Explain About Unstructured Data Storage on Local Server with Neat Sketch

(OR)

15(B) Explain About Solution Framework for Iot Applications

16(a) Explain about following IoT Case studies.

i) Industrial automation

ii) Transportation

(OR)

16(b) Describe any two miniprojects of IoT.

EC-585 - DIGITAL CIRCUIT DESIGN USING VERILOG HDL

Course title :	Digital Circuit Design using Verilog HDL	Course code	EC-585
Semester	V	Course Group	Elective
Teaching Scheme in Periods(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods:	75
CIE	60 Marks	SEE	40 Marks

Pre requisites:

1. Concepts of switching theory and logic design.
2. Familiarity with a programming language like C or C++.

Course Outcomes:

After completion of the course the student should be able to

CO	Learning Outcome	Periods
CO1 :	Apply the basics of Hardware Description Languages and use Verilog modules, instantiation process and hierarchical modeling concepts	12
CO2 :	Use Verilog HDL constructs and conventions.	12
CO3 :	Develop Simple combinational logic circuits using Gate level and Data flow modeling.	12
CO4 :	Develop Simple combinational and sequential logic circuits using Behavioralmodeling in Verilog HDL.	12
CO5 :	Design and Simulate sequential circuits using Verilog HDL.	15
CO6 :	Using concepts of Finite State machine and PLDs , analyze system designs steps of UART and Traffic Light Controller	12

Unit 1: Introduction to Verilog HDL: Duration:12 Periods (L: 10- T: 2)

Steps involved in the design flow for the VLSI IC design-Importance of Hardware Description Languages in VLSI design-Compare VHDL and Verilog HDL-Features of Verilog HDL-Difference between an instantiation and inference of a component-Differences between modules and module instances in Verilog-Levels of abstraction to represent the internals of the module-Identify the components of a Verilog module definition-Port connection rules in module instantiation- hierarchical modeling concepts

Unit 2: Language constructs and conventions: Duration:12 Periods (L: 10 - T: 2)

Lexical conventions like number specification, Identifiers, Keywords, etc-Different data types like value set, nets, registers, vectors, integer, real and time register data types, arrays, memories and strings-defparam and localparam keywords-System tasks and compiler directives-Expressions, operators and operands-Types of operators used in the Verilog HDL

Unit 3: Gate level and Data Flow modeling: Duration:12 Periods (L: 10 - T: 2)

Logic gates primitives provided in Verilog-Instantiation of gates, gate symbols, and truth tables for and/or and buf/not types gates-Rise, fall and turn off delays in gate level design - Assignment statements used in data flow modeling-Different types of delays used in the data flow level-compare gate level and behavioral Design simple logic circuits like adders, subtractors using Dataflow and Gatelevelmodeling.

Unit 4: Behavioralmodeling: Duration:12 Periods (L: 10 - T: 2)

Initial and Always statements-modeling-Blocking and Non blocking procedural assignments with examples-Timing controls like delay based timing control and event based timing control-Conditional statements-Multiway branching-Use of case, casex and casez statements-Difference between conditional if statement and case statements-Looping statements such as while, for, repeat and forever-Sequential and parallel blocks- User Defined Primitives (UDP)-combinational and sequential UDPs

Unit 5: Modeling of combinational and Sequential Logic circuits:

Duration:15 Periods (L: 12 - T: 3)

Modeling of combinational and sequential circuits-Design combinational circuits like multiplexers, decoders, encoders, comparators and ALU-Design RS, JK, T and D flip flops with asynchronous and synchronous clock and reset- Explain implementation of shift registers like SISO, SIPO, PISO, PIPO, etc-Design synchronous and asynchronous counters-Design a divide by 3 counter-Design shift register counters like ring counter, etc-Design memories like RAM and ROM-.Importance of stimulus block-Structure of stimulus module-stimulus modules for combinational and sequential circuits of Verilog designs.

Unit 6: System design concepts: Duration:12 Periods (L: 10 - T: 2)

Concept of Finite State Machines-Mealy and Moore types of state machines-Problems on Mealy and Moore state machines-Design of Mealy state machine using Verilog HDL. Various design tools which are useful in different stages of design-Important programmable logic devices- Architecture of PLAs -Architecture of CPLD-Architecture of FPGAs-Comparison-Applications.

Specific Learning Outcomes: After completion of the course the student will be able to understand

1.0 Introduction to Verilog HDL

1.1 Explain the steps involved in the design flow for the VLSI IC design

1.2 Explain the importance of Hardware Description Languages in VLSI design

1.3 Compare VHDL and Verilog HDL

1.4 List the features of Verilog HDL

1.5 Explain the difference between an instantiation and inference of a component.

1.6 Explain differences between modules and module instances in Verilog.

1.7 Explain four levels of abstraction to represent the internals of a module

1.8 Identify the components of a Verilog module definition

1.9 Explain the port connection rules in a module instantiation

1.10 Explain about the hierarchical modeling/ Design methodologies

1.11 List the advantages of hierarchical modeling.

2.0 Language constructs and conventions

2.1 Explain the lexical conventions like number specification, Identifiers, keywords, etc.

2.2 Explain different data types like value set, nets, registers, vectors, integer, real and time register data types

2.3 Explain data types like arrays, memories and strings.

2.4 Explain the difference between arrays and vectors with example

2.5 Explain defparam and localparam keywords

2.6 Explain about system tasks and compiler directives

2.7 Define expressions, operators and operands.

2.8 Explain all types of operators used in the Verilog HDL

3.0 Understand the concepts of Gate level and Data flow modeling.

3.1 Identify the logic gate primitives provided in Verilog

3.2 Explain the instantiation of gates, gate symbols, and truth tables for and/or and buf/not type gates.

3.3 Explain Rise, fall and turn-off delays in the gate level modeling.

3.4 Explain the assignment statements in data flow modeling

3.5 Explain different types of delays used in the data flow level modeling

3.6 List the advantages of data flow modeling over gate level modeling.

3.7 Design simple logic combinational circuits like adders and subtractors, multiplexers and demultiplexers, encoders and Decoders, comparators and ALU using Data Flow and Gate level Modeling.

4.0 Analyze the concepts of Behavioralmodeling

4.1 Explain structural procedures - initial and always statements.

4.2 Explain blocking and non blocking procedural assignments with examples

4.3 Explain timing controls like delay based timing control and event based timing control

4.4 Explain conditional statements.

4.5 Explain multiway branching – use case, caseX, and caseZ statements.

4.6 Explain the difference between conditional if statement and case statements.

4.7 Explain looping statements such as while, for, repeat, and forever.

4.8 Explain sequential and parallel blocks.

4.9 Explain about user defined primitives (UDP).

4.10 List the types of UDPs

4.11 Explain combinational UDPs with example

4.12 Explain sequential UDPs with example

5.0 Understand modeling of combinational and sequential logic circuits

5.1 Design combinational circuits using Behavioralmodeling

5.2 Design RS, JK, T and D flip flops with Asynchronous and Synchronous Clock and reset

5.3 Explain implementation of shift registers like SISO, SIPO, PISO, PIPO, etc.

5.4 Design synchronous and asynchronous counters

5.5 Design a divide by 3 counter

5.6 Design shift register counters like ring counter, etc.

5.7 Design memories like RAM and ROM.

5.8 Compare RTL level and structural level modeling.

5.9 Explain the importance of stimulus block/test bench module.

5.10 Explain the structure of stimulus module.

5.11 Apply the stimulus modules for combinational and sequential circuits of Verilog designs

6.0 **Understand the system design concepts**

6.1 Explain the importance of Finite State Machines

6.2 Explain the Mealy and Moore types of State Machines.

6.3 Explain the design of Mealy state machine using Verilog HDL

6.4 Explain the design of Moore state machine using Verilog HDL

6.5 List various design tools which are useful in different stages of design.

6.6 List fourimportant programmable logic devices.

6.7 Explain the architecture of PLAs.

6.8 Explain the architecture of PALs

6.9 Explain the architecture of CPLD.

6.10 Explain the architecture of FPGA.

6.11 Compare the programmable logic devices.

6.12 List any 3 applications of programmable logic devices.

6.13 Explain the design steps for simple systems like UART, Traffic Light controller using FPGA board

Recommended Books:

1. Digital systems design by Morris Mano
2. Verilog HDL: A guide to digital design and synthesis by S. Palnitkar
3. Advanced Digital Design with VERILOG HDL by Michael D. Ciletti
4. Switching and finite automation theory by ZviKohavi
5. Digital state machine design by David J. Comes
6. Digital Systems by Ronald Tocci
7. Digital design principles and practice- John F Wakerly, PHI / Pearson education Asia 3rd Edn,2005
8. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, IEEE Press, 2004.
9. A Verilog Premier – J. Bhasker, BSP, 2003.
10. Fundamentals of Logic Design with Verilog – Stephen. Brown and ZvonkoVranesic, TMH, 2005.

Suggested E-Learning resources

1.http://electrical4u.com

2. www.electronics-tutorials.ws
3. www.nptel.ac.in
4. www.allaboutcircuits.com

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Apply the basics of Hardware Description Languages and use Verilog modules, instantiation process.	R/U/A	1,2,5,6,7	**12**
CO2	Use Verilog HDL constructs and conventions.	R/U	1,2,9	**12**
CO3	Develop Simple logic circuits using Gate level and Data flow modeling.	R/U	1,2,5,7	**12**
CO4	Develop Simple logic circuits using Behavioralmodeling.	R/U/A	1,2,5,7	**12**
CO5	Design and Simulate Combinational and sequential circuits using Verilog HDL.	R/U/A	1,2,5	**15**
CO6	Use the concept of Finite State machine and PLD analyzedifferent FSMs and PLDs	R/U/A	1,2,3,7	**12**

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	**Unit Name**	**MID SEM-II EXAM**			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

<table>
<tr><td rowspan="2">Sl No</td><td rowspan="2">Unit No.</td><td colspan="4">Questions to be set for SEE</td><td>Remarks</td></tr>
<tr><td colspan="3">R(1 Mark)</td><td>U(3 Marks)</td><td>A(5 Marks)</td><td></td></tr>
<tr><td>1</td><td>I</td><td rowspan="10">4</td><td colspan="2" rowspan="2">1</td><td>9(a)</td><td>13(a)</td><td rowspan="2"></td></tr>
<tr><td>2</td><td>II</td></tr>
<tr><td>3</td><td>III</td><td colspan="2" rowspan="2">2</td><td>10(a)</td><td>14(a)</td><td rowspan="2"></td></tr>
<tr><td>4</td><td>IV</td></tr>
<tr><td rowspan="3">5</td><td rowspan="3">V</td><td rowspan="6">3</td><td rowspan="3">5, 6</td><td>9(b)</td><td>13(b)</td><td rowspan="3"></td></tr>
<tr><td>11(a)</td><td>15(a)</td></tr>
<tr><td>11(b)</td><td>15(b)</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">VI</td><td rowspan="3">7,8</td><td>10(b)</td><td>14(b)</td><td rowspan="3"></td></tr>
<tr><td>12(a)</td><td>16(a)</td></tr>
<tr><td>12(b)</td><td>16(b)</td></tr>
<tr><td colspan="2">Total Questions</td><td colspan="3">8</td><td>8</td><td>8</td><td></td></tr>
</table>

Model Paper for Mid-I,

BOARD DIPLOMA EXAMINATION, (C-21)

V SEMESTER, EC-585

DIGTAL CIRCUIT DESIGN USING VERILOG HDL

Time :**1** Hr Total Marks :20Marks

PART-A

Answer **all** questions, each carries **one** marks 4 X 1 = 4

1. Compare VHDL and Verilog HDL
2. Write the structure of Verilog module
3. List any three system tasks used in Verilog HDL.
4. Define expression and operator.

PART-B

Answer **all** questions, each carries **three** marks 2 X 3 = 6

5. a) Explain the importance of HDLs in VLSI design.

OR

b) Explain the difference between module and module instance.

6. a) Differentiate arrays and vectors

OR

b) Explain about compiler directives used in Verilog HDL.

.

PART-C

Answer **all** questions, each carries **five** marks 2 X 5 = 10

7. a)Explain about the four levels of abstraction Supported by Verilog HDL

OR

b) With neat sketch, explain the design methodologies

8. a) Explain the data types - value set and registers

OR

b) Explain different types of operators used in Verilog HDL.

Model Paper for Mid-II,

BOARD DIPLOMA EXAMINATION, (C-21)

V SEMESTER, EC-585

DIGTAL CIRCUIT DESIGN USING VERILOG HDL

Time :**1** Hr Total Marks:20Marks

PART-A

Answer **all** questions, each carries **one** marks 4 X 1 = 4

1. Write the truth table of basic primitive **-** ***and*** gate
2. Give the syntax of continuous assignment statement
3. List the conditional statements used in Behavioralmodeling.
4. What is meant by UDP? List the types of UDPs

PART-B

Answer **all**questions, each carries **three** marks 2 X 3 = 6

5. a) List the advantages of data flow modeling over gate level modeling.

OR

b) Design half adder circuit using gate level and data flow modeling.

6. a) Explain about initial statement.

OR

b) Explain about casex, casez and case statements.

PART-C

Answer **all**questions, each carries **five** marks 2 X 5 = 10

7. a) Design 3 to 8 decoder using data flow modeling.

OR

b) Design single-bit full adder logic circuit using gate level modeling.

8. a) Explain ***while loop***and ***for loop*** with simple example.

OR

b) Explain blocking and non blocking procedural assignments with examples

Model Paper for SEE,

BOARD DIPLOMA EXAMINATION, (C-21)

V SEMESTER, EC-585

DIGTAL CIRCUIT DESIGN USING VERILOG HDL

Time :**2**Hrs Total Marks: 40Marks

PART-A

Answer **all** questions, each carries **one** marks 8 X 1 =8.

1. List the features of Verilog HDL.
2. Define Rise delay and fall delay in gate level modeling.
3. State the need for stimulus module.
4. Define defparam and localparam keywords
5. Define synchronous and asynchronous counters
6. What is meant by RTL level modeling?
7. Draw the block diagram of Mealy state machine
8. List fourimportant programmable logic devices

PART-B

Answer **all** questions, each carries **three** marks 4 X 3 =12

9. a) Explain four levels of abstraction to represent the internals of a module.

OR

b) Design D flip flop using behavioralmodeling.

10. a) Explain the assignment statements in data flow modeling.

OR

b) Explain the architecture of PLAs.

11. a) Compare RTL level and structural level modeling.

OR

b) Design 4x1 MUX using behavioralmodeling.

12. a) List various design tools which are useful in different stages of design

OR

b). Explain the architecture of PALs.

PART-C

Answer **all** questions, each carries **five** marks 4 X 5 =20

13. a) Explain port connection rules in a module instantiation

OR

b) Design up/down counter using Verilog HDL.

14. a) Design a single bit comparator using gate level and dataflow level modelling**.**

OR

b) Explain the design of Moore state machine using Verilog HDL with an example.

15. a) Design a JK flip-flop with asynchronous reset and write its Test bench using Verilog HDL.

OR

b) Design a 4-bit SIPO register using behavioralmodeling.

16.a) Explain the design of Moore state machine using Verilog HDL with an example.

OR

b) Explain the design steps for Traffic Light controller using FPGA board

EC-506 -INDUSTRIAL ELECTRONICS LAB

Course Title :	Industrial Electronics Lab	Course Code	EC-506
Semester	V	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours :	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic knowledge of the components and basic skill in electronic laboratory

Course outcomes

On successful completion of the course, the students will be able to attain below Course Outcome

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Analyze characteristics of various power electronic devices	R/U/A	1,2,4,10	**9**
CO2	Design UJT relaxation oscillator	R/U/A	1,2,3,4,10	**12**
CO3	Illustrate various power control methods	R/U/A	1,2,3,4,5, 10	**9**
CO4	Appreciate characteristics of various types of transducers	R/U/A	1,2,3,4,5, 10	**15**
				45

Course Content

I. Power devices

1. Identify and test using DMM the Power Semiconductor devices SCR, TRIAC, DIAC,, SUS SBS
2. Identify and test using DMM MOSFET, IGBT, LASCR, UJT, OPTO COUPLERS MCT2E, MOC 3011 .
3. Plot the characteristics of MOSFET and determine gate source threshold voltage
    a) Implement a MOSFET switch and control a 6V lamp using NAND gate
4. Plot the characteristics of SCR and determine Triggering current
    a) To Verify 3 methods of switching off scr.
    b) To design a simple burglar alarm circuit using SCR and test it

II. UJT Circuits

5. Plot the characteristics and determine the intrinsic standoff ratio of UJT
6. Construct UJT Relaxation oscillator circuit and observe the output waveforms on CRO

III. Power control

7. Trigger the SCR by UJT and control output Power
8. Plot the characteristics of TRIAC and DIAC
   a) Verify that TRIAC can be triggered by positive and negative pulses
   b) Verify 3 methods of switching off TRIAC
9. Implement 100 watt 230V AC Lamp Control circuit using Optocoupler MOC3011 and 4 Amps TRIAC.
10. Vary the speed of a 1 phase 230V AC motor using TRIAC-DIAC phase control
    a) Observe the waveforms at the gate terminal and load using isolation transformer on CRO
    b) Replace the motor with a 230 volts incandescent lamp and observe the waveforms on CRO

IV. Transducers

11. Draw the performance characteristics of LVDT
12, Draw the performance characteristics of RTD
13. Measure the temperature using IC LM 335
14. Implement an ON/OFF temperature controller using IC LM335
15. Draw the characteristics of Load cell

Reference Books

1. Power Electronics by P.C.Sen Tata McGraw-Hill Education
2. Industrial Electronics and Control by S.K.Bhattacharya, S.Chatterjee TTTI Chandigarh –TES
3. Industrial And Power Electronics (Paperback) By: G. K. Mithal (Author) | Khanna Publishers
4. Control Systems Engineering by I. J. Nagrath And M. Gopal New Age Publisher, New Delhi
5. PLCs &SCADA : Theory and Practice by Rajesh Mehra, Vikrant Vij- Laxmi Publications

E Learning Resources

1. http://electrical4u.com/
2. www.nptel.ac.in
3. www.youtube.com

CS-517- COMPUTER HARDWARE AND NETWORKING LAB

Course Title :	Computer Hardware and Networking Lab	Course Code	CS-517
Semester	V	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Periods:	45 Periods
CIE	60 Marks	SEE	40 Marks

Pre requisites

Basic knowledge on working of computer.

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Identify the PC components
CO2	Learn different system boards, Processors, Memories and Mass storage devices
CO3	Learn Input and Output devices
CO4	Learn Networking Basics & Topologies
CO5	Understand LAN Components & Protocols
CO6	Understand Network Addressing and Management

Course Content

Unit No	Unit Name	Hours/Periods
1	Identify the PC components	**5**
2	Learn different system boards, Processors, Memories and Mass storage devices	**10**
3	Learn Input and Output devices	**7**
4	Learn Networking Basics & Topologies	**8**
5	Understand LAN Components & Protocols	**9**
6	Understand Network Addressing and Management	**6**
	Total sessions	**45**

Recommended Books

1. Enhanced Guide to Managing -- Jean Andrews (Thomson) and Maintaining Your PC
2. PC Hardware A Beginners Guide -- Gilster (TMH)
3. Computer Networks -- Andrew S. Tanenbaum

1. Windows server 2012 by Charlie Russel and Craig zacker
2. Mastering windows server 2012 R2 by Mark minasi
3. Unix and Linux System Administration hand book 4th edition by Garth snyder
4. Linux Administration by Jason cannon

E-References

1. https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
2. http://www.garfieldcs.com/wordpress/wordpress/wp-content/uploads/2011/09/Computer-Hardware-Basics.pdf
3. https://abiiid.files.wordpress.com/2010/12/pc-hardware-a-beginners-guide.pdf
4. **https://www.computerhope.com/**

Mapping Course outcomes with program outcome

Course Outcome		CL	Linked PO	Teaching Hours
1	Identify the PC components	**R, U, A**	**1,2,3,4,7**	**5**
2	Learn different system boards, Processors, Memories and Mass storage devices	**R, U, A**	**1,2,3,4,7**	**10**
3	Learn Input and Output devices	**R,U, A**	**1,2,3,4,7**	**7**
4	Learn Networking Basics & Topologies	**U, A**	**1,2,3,4,7**	**8**
5	Understand LAN Components & Protocols	**R,U, A**	**1,2,3,4,7**	**9**
6	Understand Network Addressing and Management	**R,U, A**	**1,2,3,4,7**	**6**
			Total Sessions	**45**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

LIST OF EXCERCISES:

1. Identify the front panel indicators and switches and rear side connector in a computer system.
2. Identify various motherboards components, connectors, slots, ports (USB, VGA, DVI, and HDMI), cables and Connectors, ROM, RAM (Memory), CPU (Processor), Hard Drive Connections, AGP, CD/DVD, Add On Cards, IDE/PCI Slots, Sound Cards.
3. Configure BIOS Setup Program
4. Installation of Hard Disk (a) Install Hard Disk (b) Partition and Format Hard Disk (c) Disk Defragmentation
5. Installation of additional RAM
6. Installation of operating system software
7. Installation of application software
8. Installation of Printer (Laser/Inkjet/Multifunction Printer) & device driver software
9. Installation of Scanner & Device driver Software
10. Know the precautions to be taken while troubleshooting the hardware and know about Anti-static Wrist band, Workbench etc.,
11. Trouble shooting Keyboard, Monitor and Printer.
12. Study of various LAN Devices.
13. Install and Configure Wired and Wireless NIC .
14. Preparing the UTP cable (Cat-5 or Cat-6) for cross and straight connections using crimping tool.
15. Install and configure Network Devices: HUB, Switch.
16. Install and Configure Router (Normal or Wireless).
17. Connect the computers in Local Area Network.
18. Implementation of Wi-Fi Network with the help of Wireless router and Access Point.

EC-508-LABVIEW

Course Title :	LabVIEW	Course Code	EC-508
Semester	V	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the knowledge Electronics Engineering and Handling skills of electronic equipment

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Periods	Marks for SEE			Marks weightage	%Weightage
			Coding	Debugging	Execution		
1	VI Interface	3	8	0	0	8	20
2	Mathematical functions &Structures	15	2	2	8	12	30
3	Data acquisition & Measurement	18	2	2	8	12	30
4	Design & Development	9	2	2	4	8	20
	Total	45	14	6	20	40	100

Note: To assess all skill levels, sub experiments may be given

Course outcomes

On successful completion of the course, the students will be able to attain below Course Outcome

Course Outcome			CL	Linked PO	Teaching Hours
CO1	I.	Use and manipulate VI interface	A		3
CO2	I.	Use Mathematical functions and structure	A		18
CO3	I.	Students able to perform acquisition from sensors, analysis and apply control techniques	A		15
CO4	I.	Students can able to build complete system based design and development	A		6
					45

Note : Lab exercise number 1 should be excluded from End Examination

Course Contents

Rationale: Lab View Co is introduced as a substitute for industrial Training. This course is aimed at imparting same skills a student would acquire in the industry during the initial training period. in other words industry like environment is simulated in the institution during this course to prepare the students for Industry.

I. Familiarize with Labview interface

II. Programming exercises for Numeric, Boolean and Arithmetic functions

1 To perform basic arithmetic operations using Labview.

2 To perform Boolean operations using Labview.

III. Programming exercises for loops and case structures

3 To find the sum of 'n' numbers using FOR loop.

4 Factorial of a give number using for loop.

5 To find the sum of n natural numbers using while loop.

6 To perform the factorial of a given number using WHILE loop.

7 Programming exercises on file Input / Output

8 Integration of mathscript program in LabVIEW

IV. Data Acquisition

9 Design and Development of AM, FM, PM using Virtual Instrumentation

10 Design and Development of Sampling theorem using Virtual Instrumentation

11 Design and characterization of any analog circuits using virtual instrumentation

V. Design &Development

12 Design and characterization of any digital circuits using virtual Instrumentation

13 Design and Develop signal generator, CROand Voltmeter using DAQ cards

14 Design and Develop Filter and Spectrum analyzer using DAQ cards

15 Real time temperature monitoring and control using Virtual Instrumentation

State Board of Technical Education and Training, Telangana

Semester End Examination Model Question paper

DECE V semester practical Examination

Corse Code:EC-508 **Duration:3 hours**

Course Name: LabVIEW
Max.Marks:40

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Choose the required equipment/tools

iii) Record the results on a graph sheet if required , and conclude your observation of the experiment

(iv) Draw the circuit /layout diagram for illustration ,choose appropriate values when not mentioned in the question

1.To find the sum of 'n' numbers using FOR loop.
2.Factorial of a give number using for loop.
3.To find the sum of n natural numbers using while loop.
4.To perform the factorial of a given number using WHILE loop.
5. Generate a sine waveform of 10kHz with 5V amplitude
6.Generate an AM wave form with 100kHz Carrier and 1kHz Sinewave modulating signal.
7. simulate a low pass filter with 5kHz frequency
8. Measure the the temperature using DAQ card
9. Implement a CRO and function Generator
10. Implement analog amplifier with a gain of 120

EC-509-DIGITAL CIRCUIT DESIGN USING VERILOG HDL LAB

Course Title	Digital Circuit Design using Verilog HDL Lab	Course Code	EC-509
Semester	V	Course Group	Practical
Teaching Scheme in Periods(LTP)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

1 Concepts of switching theory and logic design.

2 A basic understanding of digital hardware design and verification.

Course Contents:

Using Xilings / Modelsim /Multisim or similar software

I. Implementing Basic logic gates+

1. Implement Basic Logic Gates
2. Implement Adders(Half adder and Full Adder)
3. Implement Subtractors(Half Subtractor and Full Subtractor)

II. Combinational Circuits

4. Implement 4-bit Parallel Adder
5. Implement Multiplexers (2:1, 4:1 and 8:1 MUX)
6. Implement Demultiplexers (1:2, 1:4 and 1:8 DEMUX)
7. Implement Decoders (1:2, 2:4 and 3:8 Decoder)
8. Implement Encoders (2:1, 4:2 and 8:3 encoder)
9. Implement Comparator (2-bit and 4-bit)
10. Implement ALU

III. Sequential Circuits

11. Implement Flip Flops (JK- Flip Flop and SR-Flip flop)
12. Implement Flip Flops (D- Flip Flop and T-Flip flop)

IV. Registers & counters

13. Implement Shift Registers (SISO, SIPO)
14. Implement Shift Registers (PISO, PIPO)
15. Implement Counter (BCD and Decimal Counters)
16. Implement Ring Counter

Tools Required:

Xilinx ISE 9.2i simulator and Modelsim Software.

E Learning Resources

1 www.nptel.ac.in

2 http://www.iitk.ac.in/eclub/summercamp/Courses/CompArch/Verilog_lab_Solutions.pdf

3 http://users.ece.utexas.edu/~ljohn/teaching/ee460m_lab_manual.pdf

4 http://treymorris.com/classes/elen/248/lab/lab%20manuals/lab_manual_5.pdf

5 http://d1.amobbs.com/bbs_upload782111/files_33/ourdev_585395BQ8J9A.pdf

6 www.cc.gatech.edu/~hadi/.../01.../verilog/An%20Introduction%20to%20Verilog.pdf

7 www.ece.niu.edu.tw/~chu/download/fpga/verilog.pdf

8 http://www.asic-world.com/

CO/PO mapping Matrix

Course Outcome		CL	Linked PO
CO1	Understand the basics of Hardware Description Languages, Program structure and basic language elements of Verilog.	R/U/A/E	1,2,3,4, 10
CO2	Design, Simulate and Synthesize various Verilog descriptions for combinational circuits.	U/A/E	1,2,3,4,5, 8,10
CO3	Design, Simulate and Synthesize various Verilog descriptions for Sequential circuits.	U/A/E	1,2,3,4,5, 8,9,10
CO4	Design, Simulate and Synthesize various Verilog descriptions for Counters and register circuits.	U/A/E	1,2,3,4,5, 8,9,10

EC-510 - PROJECT WORK

Course Title :	Project Work	Course Code	EC- 510
Semester	V	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Assignments	Total Contact Hours :	45
CIE	60 Marks	SEE	40 Marks

S. No	Subject	Duration	Items	Max Marks	Remarks
1	PROJECT WORK	6 Months	1.Project Work I spell (Abstract submission)	25	
			2. Project Work II spell (Final submission)	25	
			3.a)Maintenance of Log Book	15	
			b)Record work	15	
			4.a) Seminar	10	
			b) Viva Voce	10	
Total :				**100**	

The Project shall carry 100 marks and pass marks is 50% a candidate failing to secure the minimum marks should repeat the Project work.

EC-511-SKILL UPGRADATION

Course Title	Skill Upgradation	Course Code	EC-511
Semester	V	Course Group	Core
Teaching Scheme in periods (L T P)	0:0:8	Credits	2.5
Methodology	Activities	Total Contact Periods	120
CIE	Rubrics	SEE	Nil

Rationale: This course is introduced for all semesters with a purpose of providing outside classroom experiences that lead to overall development of the students. One whole day is allocated for activities.

Course Objective

1. To create an awareness on Engineering Ethics and Human Values.
2. To instil Moral, Social Values and Loyalty.
3. Create awareness about social responsibilities of Engineers
4. To improve Communication and Participation skills

Course Content and Blue Print of Marks for SEE			
Activity No	Activity	Periods	Frequency
1	Haritha Haram(plantation &Maintenance)	9	3 times in a semester
2	Waste management	12	3 times in a semester
3	Swachh Bharath	28	4 times in a semester
4	Mini projects	7	1 time in a semester
5	Video Clips	9	3 times in a semester
6	Seminar/Quiz/Presentation/Group discussion	18	6 times in a semester
7	Local Visits (also with in the campus)	6	2 times
8	Expert Lectures ● Human Rights ● Discrimination against women in work place ● Domestic Violence ● Patent rights ● Salient features of the Constitution- ● Indian Culture &Yoga ● Emerging Technologies	31	4 Times
Total Periods		120	

Note: in case Expert faculty are not available English faculty may handle the expert lectures or Video clips on the suggested lectures may be played

On Successful completion of the course, the student will be able to attain the following Course Outcomes (COs):

Course Outcomes

CO	Outcome
CO1	Practice the moral values that ought to guide the Engineering profession.
CO2	Develop the set of justified moral principles of obligation, ideals that ought to be endorsed by the engineers and apply them in real life situations
CO3	Create awareness of saving environment through activities
CO4	Create awareness of Constitution of India

COURSE CONTENT:

Human Rights

Human Rights-Definition-constitutional provisions-right to life and liberty-Human Rights of Women-Discrimination against women- steps that are to be taken to eliminate discrimination against women in Education, employment, health care, Economic and social life, Women in rural areas- Status of Women in India - Constitutional Safeguards - Dowry Prohibition act 1961- Domestic violence act 2005- Sexual harassment at work place bill 2006-Human Rights of Children- Who is a child- list the Rights of the Child- Right to education--Protection of Children from Sexual Offences Act(POCSO)-2012- National Human Rights Commission-Constitution- Powers and function of the Commission-Employee rights- Provisions made-Contractual-Non contractual employee rights-Whistle blowing-definition-Aspects-Intellectual Property Rights (IPR)–Meaning-Need for protection- Briefly description of concept of patents, Copy right, Trade mark.

Evaluation:

The student must maintain a record of all activities conducted on ***skill upgradtion/ Activities*** day and prepare a soft copy of report and submit it to their mentor or upload to the institute website or mail.

The reports shall be evaluated by the mentors though rubrics and accordingly give the eligibility for 2.5 credits. The student must have participated in at least 75% of activities to get eligibility.

ME-501:Industrial Management & Entrepreneurship

SUGGESTED STUDENT ACTIVITIES

7. Identify any 5 industries with different types of ownerships.
8. Prepare an organizational structure of institution
9. Make a survey on marketing a product.
10. Prepare a list of ISO 9000 series as well as latest quality standards
11. Prepare sign boards representing safety measures.
12. Role play as an entrepreneur

EC-502 : Industrial Electronics

Suggested Student Activities

1 Collect specifications and data sheets of various power electronic components.

2 Analyze the various components used and connections in the UPS available in the Institution facility.

3 Compare various welding techniques and their relevance to situation

4 Participate in the Quiz &discussion

5 Search internet for knowing latest trends in industrial electronics

6 Student visits to Library to refer to Manuals and related books of industrial electronics.

Dimension	**Scale**				
	1 Unsatisfactory	**2 Developing**	**3 Satisfactory**	**4 Good**	**5 Exemplary**
1.Information search and documentation	Does not collect information relate to topic	Collects very limited information, some relate to topic	Collects basic information, most refer to the topic	Collects more information, most refer to the topic	Collects a great deals of information, all refer to the topic
Suggested E-Learning references 2. Full-fills team roles and duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs almost all duties	Performs all duties of assigned team roles
3. Shares work equality	Always relies on others to do the work	Rarely does the assigned work, often needs reminding	Usually does the assigned work, rarely needs reminding	Always does the assigned work, rarely needs reminding.	Always does the assigned work, without needing reminding
4. Listening skills	Is always talking, never allows anyone to else to speak	Usually does most of the talking, rarely allows others to speak	Listens, but sometimes talk too much,	Listens and talks a little more than needed.	Listens and talks a fare amount

EC-503: Data Communication and Computer Networks

Suggested Student Activities

1. Prepare a report on the Components of Network used in Computer Lab or Browsing centre or cellular network stations.
2. Prepare a report on ISDN or web applications.
3. Make a hand-written report on applications on internet devices that are observed in your surroundings.
4. Prepare a report on various standards organization of data communication and networking.
5. Participate in quiz
6. Participate in Group discussion
7. Attend seminars
8. Industrial visit

Model of rubrics for assessing student activity

Dimension	Scale				
	1 Unsatisfactory	**2 Developing**	**3 Satisfactory**	**4 Good**	**5 Exemplary**
1. Information search and documentation	Does not collect information relate to topic	Collects very limited information, some relate to topic	Collects basic information, most refer to the topic	Collects more information, most refer to the topic	Collects a great deals of information, all refer to the Topic
2. Full-fills team roles and duties	Does not perform any dutiesassigned to the teamrole	Performs very little duties	Performs nearly all duties	Performs almost all duties	Performs all duties of assigned team roles
3. Shares work equality	Always relies on others to do the work	Rarely does the assigned work, often needs reminding	Usually does the assigned work, rarely needs reminding	Always does the assigned work, rarely needs reminding.	Always does the assigned work, without needing reminding
4. Listening skills	Is always talking, never allows anyoneto else to speak	Usually does most of the talking, rarely allows others to speak	Listens, but sometimes talk too much,	Listens and talks a little more than needed.	Listens and talks a fare amount

EC-574 -MOBILE COMMUNICATION AND OPTICAL FIBRE COMMUNICATION
Suggested Student Activities

1. Students visits Library to refer to Manuals and related books of Mobile and Optical Communication
2. Visit nearby BSNL office / Optical Fiber Industry, Base station to familiarize with working of various mobile communication systems, fabrication techniques, splicing and fiber networks
3. and prepare a report
4. Prepare a report on various modern wireless communication systems
5. Search Internet to know e-waste management
6. Prepare a PPT/Report on optical networks
7. Construct model optical fiber communication link
8. Search internet for knowing latest trends in mobile communication and prepare a report

Model of rubrics for assessing student activity:				
Type of Skill/Score	**Excellent(4)**	**Good(3)**	**Satisfactory(2)**	**Developing(1)**
Data/Material Collection	All Data/Material was collected one time independently. Collects a great deals of information, all refer to the topic	All Data/Material was collected more than one time independently. Collects more information, most refer to the topic	All Data/Material was collected several times independently. Collects basic information, most refer to the topic	All Data/Material was collected several times with assistance. Collects very limited information, some relate to topic
Methodology/ Procedure	Procedures were outlined in a step-by-step fashion that could be followed by anyone without additional explanations.	Procedures were outlined in a step-by-step fashion that could be followed by anyone without additional explanations. Expert help was needed to accomplish this.	Procedures were outlined in a step-by-step fashion, but had 1 or 2 gaps that require explanation even after expert feedback.	Procedures that were outlined were incomplete or not sequential, even after expert feedback had been given.
Activity/ Development	Quality of Skill is high.	Skill is mastered to the level of expectation.	Skill is present but with errors and omissions.	Skill needs improvement.
Interpretation/ summary	Student provided a detailed conclusion clearly.	Student provided a somewhat detailed conclusion clearly.	Student provided a conclusion with some reference.	No conclusion was apparent.
Full-fills team roles and duties	Performs all duties of assigned team roles	Performs almost all duties	Performs nearly all duties	Performs very little duties
Shares work equality	Always does the assigned work, without needing reminding	Always does the assigned work, rarely needs reminding	Usually does the assigned work, rarely needs reminding	Rarely does the assigned work, often needs reminding.
Listen to other team mates	Listens and talks a fare amount	Listens and talks a little more than needed	Listens, but sometimes talk too much	Usually does most of the talking, rarely allows others to speak

EC-584– BASICS OF VLSI CIRCUITS

Suggested Student Activities

1. Refer to datasheets of various IC's appraise of the usefulness of VLSI ICs such as SMD processors
2. Familiarize with various fabrication technologies of VLSI IC's
3. Familiarize with various FPGA tools and technologies

EC-585-DIGTAL CIRCUIT DESIGN USING VERILOG HDL

1. **Suggested Student Activities**

1.Participate in the Quiz
2. participate in Group discussion
3. Search internet for more literature.
4. Conduct Debates.
5. Surprise test.

Model Rubric for Debate on Verilog Vs VHDL				
Lecturer Name:				
Student Name: _____				
CATEGORY	Excellent	Good	Satisfactory	Needs improvement
Information	All information presented in the debate was clear, accurate and thorough.	Most information presented in the debate was clear, accurate and thorough.	Most information presented in the debate was clear and accurate, but was not usually thorough.	Information had several inaccuracies OR was usually not clear.
Respect for Other Team	All statements, body language, and responses were respectful and were in appropriate language.	Statements and responses were respectful and used appropriate language, but once or twice body language was not.	Most statements and responses were respectful and in appropriate language, but there was one sarcastic remark.	Statements, responses and/or body language were consistently not respectful.
Use of Facts/Statistics	Every major point was well supported with several relevant facts, statistics	Every major point was adequately supported with relevant facts, statistics and/or	Every major point was supported with facts, statistics and/or examples, but the relevance	Every point was not supported.

	and/or examples.	examples.	of some was questionable.	
Presentation Style	Team consistently used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience.	Team usually used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience.	Team sometimes used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience.	One or more members of the team had a presentation style that did not keep the attention of the audience.
Organization	All arguments were clearly tied to an idea (premise) and organized in a tight, logical fashion.	Most arguments were clearly tied to an idea (premise) and organized in a tight, logical fashion.	All arguments were clearly tied to an idea (premise) but the organization was sometimes not clear or logical.	Arguments were not clearly tied to an idea (premise).
Understanding of Topic	The team clearly understood the topic in-depth and presented their information forcefully and convincingly.	The team clearly understood the topic in-depth and presented their information with ease.	The team seemed to understand the main points of the topic and presented those with ease.	The team did not show an adequate understanding of the topic.

EC-506 -INDUSTRIAL ELECTRONICS LAB

Suggested Student Activities

1. Collection of catalogues and specification sheets, preparation of a chart displaying symbols of above components
2. Familiarization of various kinds transducers that you student comes across in daily life.
3. Inspect a UPS under the guidance of experts to know various sub systems present

STUDENT ACTIVITY SHEET FOR SKILL UP GRADATION

The activity should be graded as
Excellent: 5 Marks, Good: 4 Marks, Satisfactory: 3 Marks, Needs improvement: 2 Marks, Unsatisfactory: 1 Mark
Note:

(1) Along with every activity the rubrics table should be given to the student for his information about the criterion of assessment.

(2) As a record of the activity at least Rubric sheet for each student For every activity at least Rubric sheet for each student as be preserved as a document.

RUBRICS MODEL – Group activity like Mini Project

RUBRICS FOR ACTIVITY (5 Marks)						
Dimension	Unsatisfactory	Developing	Satisfactory	Good	Excellent	Student Score
	1	2	3	4	5	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	Ex: 4
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	5
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	2
Average / Total marks=(4+5+3+2)/4=14/4=3.5=4						

Rubrics assessment for Power point presentations

ELEMENT	Exemplary	Proficient	Partially Proficient	Unsatisfactory	POINTS
Research and Note Taking	3 points	2 points	1 point	0 points	__/3
	Accurately researched a variety of information sources recorded and interpreted significant facts, meaningful graphics, and evaluated alternative points of view.	Recorded relevant information from multiple sources of information evaluated and synthesized relevant information.	Misinterpreted statements, graphics and questions and failed to identify relevant arguments.	Recorded information from four or less resources did not find graphics and ignored alternative points of view.	
Presentation planning	3 points	2 points	1 point	0 points	___/3
	the slide presentation structure with thumbnail sketches of each slide including: title of slide, text, background color, placement & size of graphic, fonts - color, size, type for text and headings. All slides are numbered, and there is a logical sequence to the presentation.	The thumbnail sketches on the topic include titles and text for each slide and are in sequential order.	The thumbnail sketches on the topic are not in a logical sequence and have incomplete information.	There a very few thumbnail sketches on the topic and do not provide an overview of the presentation.	
Introduction	3 points	2 points	1 point	0 points	___/3
	The introduction presents the overall topic and draws the audience into the presentation with compelling questions or by relating to the audience's interests or goals.	The introduction is clear and coherent and relates to the topic.	The introduction shows some structure but does not create a strong sense of what is to follow. May be overly detailed or incomplete and is somewhat appealing to the audience.	The introduction does not orient the audience to what will follow. The sequencing is unclear and does not appear interesting or relevant to the audience.	

Content	3 points	2 points	1 point	0 points	___/3
	The content is written clearly and concisely with a logical progression of ideas and supporting information. The project includes motivating questions and advanced organizers. The project gives the audience a clear sense of the main idea. Information is accurate, current and comes mainly from * primary sources.	The content is written with a logical progression of ideas and supporting information. Includes persuasive information from reliable sources.	The content is vague in conveying a point of view and does not create a strong sense of purpose. Includes some persuasive information with few facts. Some of the information may not seem to fit. Sources used appear unreliable.	The content lacks a clear point of view and logical sequence of information. Includes little persuasive information and only one or two facts about the topic. Information is incomplete, out of date and/or incorrect. Sequencing of ideas is unclear.	
Text	3 points	2 points	1 point	0 points	___/3
	The fonts are easy to read and point size varies appropriately for headings and text. Use of italics, bold, and indentations enhances readability. Text is appropriate in length for the target audience and to the point. The background and colors enhance the readability of text.	Sometimes the fonts are easy to read, but in a few places the use of fonts, italics, bold, long paragraphs, color or busy background detracts and does not enhance readability.	Overall readability is difficult with lengthy paragraphs, too many different fonts, dark or busy background, overuse of bold or lack of appropriate indentations of text.	The text is extremely difficult to read with long blocks of text and small point size of fonts, inappropriate contrasting colors, poor use of headings, subheadings, indentations, or bold formatting.	

Layout	3 points	2 points	1 point	0 points	___/3
	The layout is visually pleasing and contributes to the overall message with appropriate use of headings, subheadings and white space.	The layout uses horizontal and vertical white space appropriately.	The layout shows some structure, but appears cluttered and busy or distracting with large gaps of white space or uses a distracting background.	The layout is cluttered, confusing, and does not use spacing, headings and subheadings to enhance the readability.	
Graphics, and/or Animation	3 points	2 points	1 point	0 points	___/3
	The graphics, and/or animation assist in presenting an overall theme and enhance understanding of concept, ideas and relationships. Original images are created using proper size and resolution, and all images enhance the content. There is a consistent visual theme.	The graphics, /and or animation visually depict material and assist the audience in understanding the flow of information or content. Original images are used. Images are proper size, resolution.	Some of the graphics, and/or animations seem unrelated to the topic/theme and do not enhance the overall concepts. Most images are clip art or recycled from the internet. Images are too large/small in size. Images are poorly cropped or the color/resolution is fuzzy.	The graphics, and/or animations are unrelated to the content. Graphics do not enhance understanding of the content, or are distracting decorations that create a busy feeling and detract from the content.	

Writing Skills	3 points	2 points	1 point	0 points	___/3
	The text is written with no errors in grammar, capitalization, punctuation, and spelling.	The text is clearly written with little or no editing required for grammar, punctuation, and spelling.	Spelling, punctuation, and grammar errors distract or impair readability. (three or more errors)	Errors in spelling, capitalization, punctuation, usage and grammar repeatedly distract the reader, and major editing and revision is required. (more than five errors)	
				TOTAL POINTS	___ /24