C-18 Curriculum

Electronics &Communication Engineering

Semester-V

C-18 DECE SEMESTER V TEACHING AND EXAMINATION SCHEME														
S. NO	**Course**		**Teaching Scheme**					**Examination Scheme**						
			Instruction Periods per week			**Total Periods per semester**	**Credits**	**Continuous Internal Evaluation (CIE)**			**Semester End Examination (SEE)**			
	Code	**Course Name**	**L**	**T**	**P**			**Mid Sem 1**	**Mid Sem 2**	**Internal Evaluation**	**Max marks**	**Min marks**	**Total Marks**	**Min marks for passing including internal**
1	18EC-501F	Industrial Management & Entrepreneurship	3	1	0	60	3	20	20	20	40	14	100	35
2	18EC-502C	Industrial Electronics	3	1	0	60	3	20	20	20	40	14	100	35
3	18EC -503C	Data Communication and Computer Networks	3	1	0	60	3	20	20	20	40	14	100	35
4	18EC-504E	Elective1 (A) Electronic Measuring Instruments (B) Digital Circuit Design using Verilog hdl	3	1	0	60	3	20	20	20	40	14	100	35
5	18EC-505E	Elective2 (A) Mobile & Optical Fibre Communication (B) Basics of VLSI circuits	3	1	0	60	3	20	20	20	40	20	100	35
6	18EC -506P	Industrial Electronics Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18EC-507P	Computer Hardware and Networking Lab practice	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18EC-508P	8086 Microprocessor Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18EC-509P	Programming in C Lab practice	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18EC-510P	Project Work	1	0	2	45	1.5	20	20	20	40	20	100	50
11		**Skill Upgradation**	0	0	7	105	2.5	0	0	**Rubrics**			--	-
		TOTAL	**20**	**5**	**17**	**630**	**25**	**100**	**100**	**400**	**400**	**170**	**1000**	**425**

Note: For Activities student performance is to be assessed through Rubrics.
Pass criteria: The minimum marks required for passing in any of courses are given below
1. Cumulative 35% (Mid sem 1 + Mid sem 2+ Tutorials+ End examination) and minimum marks in end examination is 35% (i.e.14marks).
2. If the cumulative of CIE is less than 35% (i.e.21 marks out of 60) therefore more than 35% of SEE is required to get overall 35%.

18EC-501F-INDUSTRIAL MANAGEMENT & ENTREPRENEURSHIP

Course Title :	**Industrial Management & Entrepreneurship**	Course Code	**18EC-501F**
Semester	**V**	Course Group	**Foundation**
Teaching Scheme in Periods(L:T:P)	**45:15:00**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact Hours :	**60Pds**
CIE	**60 Marks**	**SEE**	**40 Marks**

This course is common with DCME, DEEE, DEIE & DFWT

Pre requisites:

This course requires the basic knowledge of management and Entrepreneur skills.

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

CO	**Course Outcome**	**Course Level**	**Periods**
CO1	To become aware of business and management concepts.	R/U	10
CO2	Analyze the various rules and regulations required for the planning of factory and its staff.	R/U/A	6
CO3	Analyse balance sheet and various budget issues.	R/U/A	10
CO4	Optimize the material required and its management economically.	R/U/A	12
CO5	Apply the quality management and know the analysis procedure for quality.	R/U/A	10
CO6	Develop entrepreneur skills to establish a small scale industry	R/U/A	12

Course Content

1.0 Overview of Business, Management Process and Organization Management :

Business - types of business in various sectors- service, manufacturing & trade- Industrial sectors – Engineering, process, Textile, Chemical, Agro industries – Globalization and effect of globalization – advantages and Disadvantages- Intellectual Property Rights (I.P.R.)- Concept of management – levels of management – Scientific management – by FW Taylor – Principles of management- functions of management – Administration – management, Organization – types of organization(line, line & staff, staff & project) – Departmentation – Classification (centralized, decentralized, Authority, Responsibility, and span of control – Forms of

Ownership – Proprietorship – Partnership – Joint stock – Co-operative society and Government sectors.

2.0 Human resource Management

Personal Management – Staffing – Introduction to HR planning – Recruitment procedures – Types of Trainings –Personal training – skill development training – Leaderships – types – Motivation – Maslow's theory – Causes of accidents – safety precautions – Indian Factory Act – Workmen's compensation Act – Industrial disputes Act- ESI Act.

3.0 Finance Management

Introduction – Objectives of Financial Management – Types of capitals – sources of raising capital – Types of budgets – production budgets – labour budgets – Concept of Profit loss Account – Concept of balance sheet – proforma – types of taxes – brief concepts of – Excise Tax, Service Tax, Income Tax, VAT and custom duty.

4.0 Material Management

Inventory Management – objectives of Inventory Management – ABC Analysis – Economic order Quality – Purchasing – Objectives of purchasing – Functions – Procedures – Material Management.

5.0 Project Management

Introduction – CPM & PERT – concept of Break event Analysis – quality system - Definition of Quality , concept of Quality , Quality policy, Quality control, Quality Circle, Quality Assurance, Introduction to TQM- Kaizen 5's and 6 sigma concepts, ISO 9000 series standards- Merits and drawbacks of ISO series standards.

6.0 Entrepreneurship and Supporting Institutions

Qualities of entrepreneurer-Manager- entrepreneur and technical entrepreneurer-Advantages of being an entrepreneurer-Functions of entrepreneurer-Types of entrepreneurer and their meaning- Role of entrepreneurship in economy development-Barriers to entrepreneurship-Mention different types of industries-Definitions of small scale industry-Features of SSI-Mention the objectives of developing SSIs-Scope of SSI in terms of various activies-Meritis of SSIs-Explain the important steps involved in starting an SSI-Definition of startup company-start up development basis-state level and national levelsources of information-various central Government institutions and their funcrtions(like NSIC,SIDO,SISI and SSIB)- Telangana State industry policy-Demographic merits of Telanagana state to set up SSIs-Names of state level institutions and their functions(Like SSIDC,DIC,APIITCO)-Banks that support SSIs like SIDBI,APSFC-Thrust areas and core sector as per Telanaga state industry policy-Classification of the projects as per TSIP-Special assistance schemes for women and SC/ST entrepreneurers-Features of TS-IPASS.

Suggested Learning Outcomes: Upon completion of the course the student should be able to

1.0 Explain the basics of Business, Management and Organization

1.1 Define Business

1.2 State the Types of Business (Service, Manufacturing, Trade)

1.3 Explain about the various industrial sectors like engineering, process, textile, Agro based industries.

1.4 State the need for Globalization.

1.5 List the Advantages & Disadvantages of globalization w.r.t. India.

1.6 Explain the importance of Intellectual Property Rights (I.P.R.)

1.6 Define Management.

1.7 Explain the concept of management

1.8 Explain the Different Levels of management

1.9 Explain Administration & management

1.10 State the principles of scientific management by F.W.Taylor

1.11 State the principles of Management by Henry Fayol (14 principles)

1.12 List the Functions of Management

i) Planning ii) Organizing iii) Directing iv) Controlling

1.13 Define Organization

1.14 List the Types of organization: a) Line b) Line & staff c) Functional d) Project

1.15 Explain the four types of organization.

1.16 Define departmentalization.

1.17 Explain the following types of departmentalization

i) Centralized & Decentralized ii) Authority & Responsibility iii) Span of Control

1.18 Explain the Forms of ownership

i) Proprietorship ii) Partnership iii) Joint stock iv) Co-operative Society v)Govt. Sector

2.0 Appreciate the need for Human Resource Management

2.1 Define Personal Management.

2.2 Explain the functions of Personal Management

2.3 Define Staffing.

2.4 State the importance of HR Planning.

2.5 Explain the various Recruitment Procedures.

2.6 Explain the need for Training & Development.

2.7 State the various types of training procedures (Induction, Skill Enhancement etc)

2.8 State the different types of Leaderships.

2.9 Explain the Maslow's Theory of Motivation.

2.10 Explain the Causes of accident and the Safety precautions to be followed.

2.11 Explain the importance of various Acts – Indian Factory Act, ESI Act, Workmen Compensation Act, Industrial Dispute Act etc.

3.0 Explain the basics of Financial Management

3.1 State the Objectives of Financial Management.

3.2 State the Functions of Financial Management.

3.3. State the necessity of Capital Generation & Management.

3.4 List the types of Capitals.

3.5 List the Sources of raising Capital.

3.6 Explain the Types of Budgets

i) Production Budget (including Variance Report) ii) Labour Budget.

3.7 Explain Profit & Loss Account (only concepts) .

3.8 Explain the proforma of Balance Sheet.

3.9 Explain i) Excise Tax , ii) GST iii) Income Tax

4.0 Explain the importance of Materials Management

4.1. Define Inventory Management (No Numerical).

4.2 State the objectives of Inventory Management.

4.3 Explain ABC Analysis.

4.4 State Economic Order Quantity.

4.5 Explain the Graphical Representation of Economic Order Quantity.

4.6 State the objectives of Purchasing.

4.7 State the functions of Purchase Department.

4.8 Explain the steps involved in Purchasing.

4.9 State the Modern Techniques of Material Management.

5.0 Explain the importance of Project Management and Quality Assurance

5.1 State the meaning of Project Management.

5.2 Explain the CPM & PERT Techniques of Project Management.

5.3 Distinguish between CPM & PERT techniques.

5.4 Identify the critical path and find the project duration using CPM & PERT techniques (solve problems on CPM and PERT).

5.5 Explain the concept of Break Even Analysis.

5.6 Define Quality.

5.7 State the concept of Quality.

5.8 Explain the various Quality Management systems.

5.9 Explain the importance of Quality policy, Quality control, Quality Circle.

5.10 State the principles of Quality Assurance.

5.10 State the concepts of TQM, Kaizen 5's and 6 sigma.

5.12 State the constituents of ISO 9000 series standards.

5.13 Merits and draw backs of ISO 9000 series standards.

6.0. Entrepreneurship and supporting Institutions

6.1 Explain the concept of entrepreneurship.

6.2 Mention the qualities of entrepreneur.

6.3 Distinguish between manager-entrepreneur and technical entrepreneur.

6.4 Mention the advantages of being an entrepreneur.

6.5 List the functions of entrepreneur.

6.6 Mention the important types of entrepreneur and their meaning.

6.7 Explain the role of entrepreneurship in economic development.

6.8 Mention the barriers to entrepreneurship.

6.9 Mention different types of Industries.

6.10 Define Small scale industry.

6.11 List the features of SSI.

6.12 Mention the objectives of developing SSIs.

6.13 Explain the scope of SSI in terms of various activities.

6.14 List the merits of SSIs.

6.15 Explain the important steps involved in starting an SSI.

6.16 Define a startup company.

6.17 Explain various start up development phases

6.18 Name the state level and National level sources of information

6.19 Mention the various Central government institutions and their functions

(like NSIC , SIDO, SISI_SSIB)

6.20 Explain Telangana state industry policy.

6.21 Mention the demographic merits of Telangana state to set up SSIs.

6.22 Mention the names of State level institutions and their functions (like SSIDC, DIC, APITCO)

6.23 List the banks that support SSIs like SIDBI, APSFC.

6.24 List the thrust areas and Core sectors as per Telangana state industry policy.

6.25 Classify the projects as per TSIP.

6.26 Mention Special assistance schemes for women and SC/ST entrepreneurs.

6.27 Mention the features of TS-iPASS.

REFERENCE BOOKS:

1. Industrial Engg &Management by Dr. O.P. Khanna - Dhanpath Rai & sons New Delhi
2. Business Administration &Management Dr. S.C. Saxena & W.H. Newman& E.Kirby Warren- Sahitya Bhavan Agra
3. The process of Management by Andrew R. McGill - Prentice Hall
4. Industrial Management by Rustom S. Davar - Khanna Publication
5. Total Quality Management, S Raja Ram, M Shivashankar
6. Industrial management and organizational behaviour, K.K.Ahuja

Suggested E-Learning resources

1.http:jiem.org/index.php/jiem
2. https://dipp.gov.in
3. www.worldwidelearn.com/online-education-guide/business/industrial-management-major.htm

Suggested Student Activities:

1. Student visits Library to refer to Management courses.
2. Student observes the solo and partnership business establishments near by and prepare a report about the activities.
3. Identify any one product, being manufactured in local industry, study the process they are following for manufacturing the product, submit hand written report.
4. Visit a nearby industry, make a report on Plant layout, type of production, quality system is put in practice and quality tools they are using in work place.
5. Motivate student to take case study on plant maintenance of nearby industry, observe type of maintenance they undertake in their industry.
6. Each student should prepare a detailed project report on selected product.
7. Visit a local industry and list the safety precautions carried out there.
8. Meet a local Entrepreneur and prepare a report on his success story.
9. Quiz.
10. Group discussion.
11. Surprise test.

Co-Po Mapping Matrix

Course Outcome		**CL**	**Linked PO**	**Teaching Hours**
CO1	To become aware of business and management.	R/U	1,2	10
CO2	Analyze the various rules and regulations required for the planning of factory and its staff.	R/U/A	1,2,5,6,7	6
CO3	Analyse the balance sheet and understanding of various budget issues.	R/U/A	1,2,9	10
CO4	Analyse the material required and its management economically.	R/U/A	1,2,5,7	12
CO5	Analyze the quality management and know the analysis procedure for quality.	R/U/A	1,2,5,10	10
CO6	Able to establish a small scale industry by knowing the enterprenuer skills.	R/U/A	1,2,3,7,10	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><th rowspan="2">Sl No</th><th rowspan="2">Unit No.</th><th colspan="3">Questions to be set for SEE</th><th rowspan="2">Remarks</th></tr>
<tr><th colspan="2">R(1 Mark)</th><th>U(3 Marks)</th><th>A(5 Marks)</th></tr>
<tr><td>1</td><td>I</td><td rowspan="10">4</td><td rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td rowspan="2"></td></tr>
<tr><td>2</td><td>II</td></tr>
<tr><td>3</td><td>III</td><td rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">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="2">8</td><td>8</td><td>8</td><td></td></tr>
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MID SEM -1 MODEL QUESTION PAPER 18EC-501F

PART- A

Total marks:20

Answer all questions. Each question carries one mark. 1x4=4M

1. Define business.
2. Define organization.
3. What are the different types of Leaderships?
4. Define personnel management.

PART-B

Answer all questions. Each question carries three marks. 3x2=6M

5.(a) State the need for Globalization .

OR

5.(b) Briefly explain Proprietor form of business ownership.

6.(a) Briefly explain the need for Training & Development .

OR

6.(b) What are the Causes of accident in an industry.

PART-C

Answer all questions. Each question carries five marks. 5x2=10M

7(a) State the principles of Scientific management by F.W.Taylor .

OR

7(b) Explain the line and staff type of organisation.

8(a) Explain the Maslow's Theory of Motivation.

OR

8(b) Explain various features of Indian Factory Act.

MID SEM -II MODEL QUESTION PAPER 18EC-501F

PART- A

Total marks:20

Answer all questions. Each question carries one mark. 1x4=4M

1. List the types of Capitals.
2. Mention any two objectives of financial management.
3. Define inventory management.
4. List any two objectives of purchasing.

PART-B

Answer all questions. Each question carries three marks. 3x2=6M

5 (a) What is the necessity of Capital Generation?

OR

5(b) Briefly explain Profit & Loss Account .

6 (a) State the Modern Techniques of Material Management.

OR

6(b) What are the steps involved in Purchasing?

PART-C

Answer all questions. Each question carries five marks. 5x2=10M

7(a) Explain about production budget.

OR

7(b) Explain the proforma of balance sheet.

8(a) Explain ABC analysis .

OR

8(b) Explain the Graphical Representation of Economic Order Quantity.

SEMESTER END EXAM (SEE) - MODEL QUESTION PAPER 18EC-501F

PART- A

Total marks: 40

Answer all questions. Each question carries one mark. 1x8 = 8M

1. Define Staffing.
2. List the types of Capitals.
3. State the concept of Quality.
4. List the functions of entrepreneur.
5. What is meant by Project Management?
6. What is meant by Quality Assurance?
7. Define Small scale industry.
8. Define a start up company.

PART-B

Answer all questions. Each question carries three marks. 3x4=12M

9(a) Write salient features of partnership type of business ownership.

OR

9(b) Explain briefly the importance of Quality policy .

10(a) what is meant by GST?

OR

10(b) Mention the barriers to entrepreneurship.

. 11(a) what are the concepts of TQM?

OR

11(b) Explain the importance of Quality control.

12(a) Explain briefly the role of entrepreneurship in economic development.

OR

12(b) Mention the features of TS-iPASS.

PART-C

Answer all questions. Each question carries five marks. 5x4=20M

13(a) Explain the principles of Management by Henry Fayol.

OR

13(b) Explain the concept of Break Even Analysis .

14(a) Explain the labour budget.

OR

14(b) Explain the important steps involved in starting an SSI.

15(a) Draw a network diagram and find out project duration for the following activities.

Activity	1-2	1-3	1-4	2-6	3-5	4-5	5-6	6-7
Duration in days	4	2	3	5	1	2	2	7

OR

15(b) Explain the importance of quality circle.

16(a) Explain briefly Telangana state industry policy.

OR

16(b) what are the special assistance schemes provided for women entrepreneurs?

18EC-502C - Industrial Electronics

Course Title :	**Industrial Electronics**	Course Code	**18EC-502C**
Semester	**V**	Course Group	**Core**
Teaching Scheme in Periods(L:T:P)	**45:15:00**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact Hours :	**60Pds**
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 :	Compare various power electronic device characteristics; identify their Application and identify the use of UPS and SMPS.	1,2,10	12
CO2 :	Identify the use of choppers, rectifiers and inverters.	1,2,5,6,7	08
CO3 :	Transducers & Ultrasonics	1,2,9	10
CO4 :	Explain different welding techniques	1,2,5,7	10
CO5 :	Use the concepts of PLC & SCADA for industrial applications	1,2,5	12
CO6 :	Develop an understanding of control systems	1,2,3,7	08

Suggested Learning Outcomes:

1. Power Electronic Devices **Duration: 12 Periods (L: 10– T:2)**

Different thyristor family devices- circuit symbols - Constructional details of SCR- Working of SCR using two Transistor analogy- Volt-Ampere characteristics of SCR- Ratings of SCR- forward break over voltage, latching current, holding current, turn on triggering time, turn off time of SCR- volt-ampere characteristics of Diac&Triac under forward/Reverse bias- SUS, SBS, SCS & LASCR- SCR circuit triggering by UJT - input and Output waveforms- Use of SCR in single phase and three phase Power rectifiers- Volt-ampere characteristics of Diac - Volt-ampere characteristics of Triac- Phase control circuit using Diac and Triac for AC power control- input and output waveforms. Need for protection of power devices- Important specifications of power electronic devices from Manufacturer's data sheet - Important applications of power electronic devices- working of a) Off Line UPS b) Online UPS- PWM

Voltage control of UPS- Limitations of series Voltage regulated power supplies- Working of SMPS with block diagram- Applications of SMPS- Working of Servo stabilizer .

2.0 Identify the use of choppers, rectifiers and inverters. **Duration:08 Periods (L: 6– T:2)**

Need for a chopper- types of choppers- principle of operation of choppers-need for a controlled rectifier- single phase half-wave controlled rectifier- single phase full -wave controlled rectifier- 3-phase half-wave controlled rectifier- 3- phase full -wave controlled rectifier-Define inverters- need for an inverter- types of inverters-series inverter- parallel inverter.

3.0 Transducers & Ultrasonics Duration:10 Periods (L: 8– 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 Tachogenerators-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:10 Periods (L: 8– 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:12 Periods (L: 10– T:2)

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:08 Periods (L: 6– 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 Power Electronic Devices, UPS and SMPS.

1.1 List different thyristor family devices.

1.2 Sketch the circuit symbols for each device.

1.3 Explain constructional details of SCR.

1.4 Explain the working of SCR using two Transistor analogies.

1.5 Explain the Volt-Ampere characteristics of SCR.

1.6 Mention the important ratings of SCR.

1.7 Define *forward break over voltage, latching current, holding current, turn on triggering time, turn off time* of SCR.

1.8 Distinguish between SUS, SBS, SCS & LASCR

1.9 Explain SCR circuit triggering by UJT with a circuit diagram and Draw input and Output waveforms.

1.10 Mention the use of SCR in single phase and three phase Power rectifiers.

1.11 Explain the working and Volt-ampere characteristics of Diac

1.12 Explain the working and Volt-ampere characteristics of Triac.

1.13 Explain the Phase control circuit using Diac and Triac for AC power control and Draw the input and output waveforms.

1.14 Give important specifications of power electronic devices from Manufacturer's data sheet.

1.15 List the six important applications of power electronic devices.

1.16 With a block diagram explain the working of a) Off Line UPS b) Online UPS

1.17 Explain the limitations of series Voltage regulated power supplies

1.18 Explain the working of SMPS with block diagram

1.19 Mention any 3 applications of SMPS.

1.20 Explain the working of Servo stabilizer.

2.0 **Understand the working of choppers, rectifiers and inverters.**

2.1 Define choppers.

2.2 What is the need for a chopper?

2.3 List the types of choppers.

2.4 Explain the principle of operation of choppers.

2.5 What is the need for a controlled rectifier?

2.6 Draw and explain the principle of operation of single phase half-wave controlled rectifier.

2.7 Draw and explain the principle of operation of single phase full -wave controlled rectifier.

2.8 Draw and explain the principle of operation of 3-phase half-wave controlled rectifier.

2.9 Draw and explain the principle of operation of 3- phase full -wave controlled rectifier.

2.10 Define inverters.

2.11 What is the need for an inverter?

2.12 List the types of inverters.

2.13 Draw and explain the operation of series inverter.

2.14 Draw and explain the operation of parallel inverter.

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 Tacho generators.

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

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 wielding 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.

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
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

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Compare various power electronic device characteristics; identify their Application and identify the use of UPS and SMPS.	R/U	1,2,10	12
CO2	Identify the use of choppers, rectifiers and inverters.	R/U	1,2,5,6,7	08
CO3	Apply sensor for various applications	R/U/A	1,2,9	10
CO4	Explain different welding techniques	R/U/A	1,2,5,7	10
CO5	Use the concepts of PLC & SCADA for industrial applications	R/U/A	1,2,5	12
CO6	Develop an understanding of control systems	R/U/A	1,2,3,7	08

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	

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	

C18EC-502C, V SEMESTER

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

C18EC-502C, V SEMESTER, INDUSTRIAL ELECTRONICS

MID EXAM - I MODEL QUESTION PAPER

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

PART-A

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

1. List different thyristor family devices
2. Draw the symbol of SCR, SCS.
3. Define choppers.
4. List the types of Inverters.

PART-B

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

5 (a) Explain the Volt-Ampere characteristics of SCR.

(OR)

5(b) Explain the Volt-Ampere characteristics of Triac

6(a) Explain the need for a controlled rectifier.

(OR)

6(b) Explain the working principle of Chopper.

PART-C

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

7 (a)Explain the working of SCR using two Transistor analogy.

(OR)

7(b) Explain the Phase control circuit using Diac and Triac for AC power control.

8(a) Explain the working of 3-phase half wave controlled rectifier.

(OR)

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

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD
C18EC-502C, V SEMESTER, INDUSTRIAL ELECTRONICS
MID EXAM - II MODEL QUESTION PAPER

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

PART-A

Answer All 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 TWO 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 TWO 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
C18EC-502C, 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.

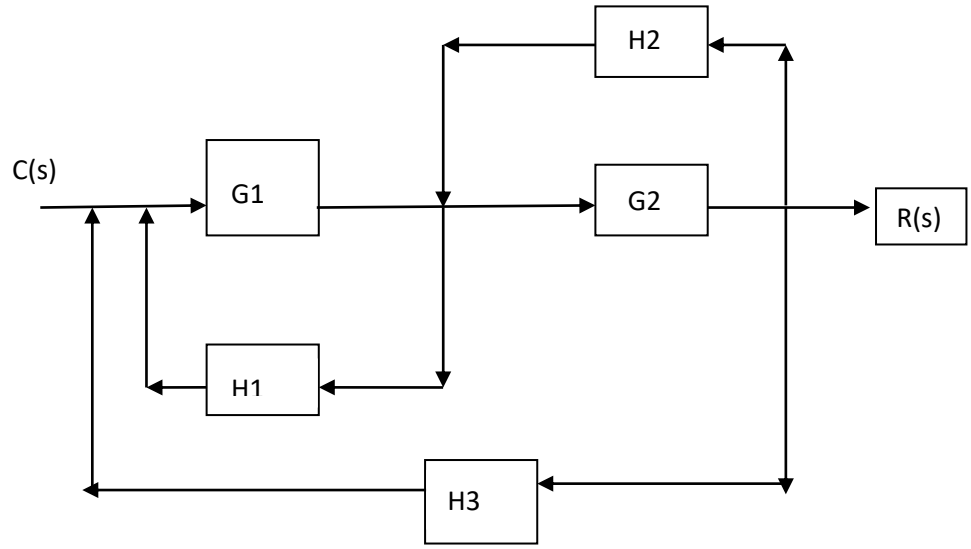
(OR)

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.

18EC-503C-DATA COMMUNICATIONS AND COMPUTER NETWORKS

Course Title	**Data Communications and Computer Networks**	Course Code	**18EC-503C**
Semester	**V**	Course Group	**Core**
Teaching Scheme in Periods(L:T:P)	**45:15:00**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact Hours :	**60Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites:

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

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	10
CO2	Acquire knowledge of wired and wireless MAC protocols	R/U/A	1,2,3,4,9,10	10
CO3	Use network layer protocols	R/U/A	1,2,3,9,10	10
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	08
CO6	Use application layer protocols	R/U/A	1,2,3,4,9,10	12

COURSE CONTENT

Upon completion of the course the student should be able to

UNIT 1 –

Basics of Data communication & OSI Layer Duration: 10 Periods (L: 8– T:2)

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:10 Periods (L: 8– T:2)

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:10 Periods (L: 10– T:2)**

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 **Duration: 10 Periods (L: 6– 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. **Duration: 08 Periods (L: 6– 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. **Duration: 12 Periods (L: 10– 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 Crptography
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 Explain Address Resolution Protocol (ARP).
4.10 Write the functions of port and sockets.
4.11 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

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 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 e more than needed.	Listens and talks a fare amount

CO PO Mapping Matrix:

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><th rowspan="2">Sl No</th><th rowspan="2">Unit No.</th><th colspan="4">Questions to be set for SEE</th><th rowspan="2">Remarks</th></tr>
<tr><th colspan="2">R(1 Mark)</th><th>U(3 Marks)</th><th>A(5 Marks)</th></tr>
<tr><td>1</td><td>I</td><td rowspan="10">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">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 rowspan="2">10(a)</td><td rowspan="2">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>
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18EC-503C

STATE BOARD DIPLOMA EXAMINATIONS , (C-18)

DECE IV SEMESTER MID SEMESTER EXAMINATION – I

MODEL PAPER

DATA COMMUNICATIONS AND COMPUTER NETWORKS

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

PART-A

Instructions: 1.Answer ALL questions. **4X1=4 Marks**

2.Each question carries ONE mark.

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.** **2X3=6 Marks**

2.Each question carries THREE marks.

5(a) Distinguish between analog and digital data.

OR

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

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

OR

6(b).Explain CSMA/CD.

PART-C

Instructions: 1.Answer any 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

18EC-503C

STATE BOARD DIPLOMA EXAMINATIONS, (C-18)

DECE IV SEMESTER MID SEMESTER EXAMINATION – II

MODEL PAPER

DATA COMMUNICATIONS AND COMPUTER NETWORKS

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

PART-A

4X1=4MARKS

Instructions: 1.Answer ALL questions.

2.Each question carries ONE mark.

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.Answer any 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.Answer any 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)Explain different layers of TCP/IP

18EC-503C

BOARD DIPLOMA EXAMINATIONS , (C-18)
MARCH/APRIL-2020
DECE IV SEMESTER EXAMINATION
MODEL PAPER
DATA COMMUNICATIONS AND COMPUTER NETWORKS

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

PART-A

8X1=8 Marks

Instructions: 1.Answer ALL questions.

2. Each question carries ONE mark.

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

4X3=12Marks

Instructions: 1.Answer any FOUR questions.

2.Each question carries THREE marks.

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

18EC-504E (A) - ELECTRONIC MEASURING INSTRUMENTS

Course Title :	**ELECTRONIC MEASURING INSTRUMENTS**	Course Code	**18EC-504E(A)**
Semester	**V**	Course Group	**ELECTIVE**
Teaching Scheme in Periods(L:T:P)	**45:15:00**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact Periods :	**60**
CIE	**60 Marks**	SEE	**40 Marks**

Common with 18EI-504E(A)

Pre requisites

This course requires the basic knowledge of Analog and digital circuits

Course Outcomes

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

Course Outcome	
CO1	UseAnalog instruments for measuring Basic Electrical Quantities
CO2	Use ac and dc bridges for determining unknown parameters
CO3	Use digital instruments for measuring the given electrical quantities
CO4	Understand the working of AF, RF signal generators and power meters
CO5	Understand the working principles of CRO and its applications
CO6	Use the Test instruments in Laboratory applications

Course Contents

1.0 Analog instruments

Characteristics of ideal Voltmeter and ideal Ammeter- Construction and principle of operation of PMMC instrument- Principle of extending the range of DC ammeter- Principle of extending the range of DC voltmeter- Principle and working rectifier type voltmeter and ammeter- Construction and principle of series and shunt type ohmmeters- Use of Megger for measuring the insulation resistance- loading effect with an example- Need for high input impedance for Voltmeters- working of FET input voltmeter with a circuit diagram- Drift problem in FET Voltmeters- Working of differential voltmeters-

2.0 DC & AC bridges

Use of high voltage probe and clamp-on current probe- Construction of AC Bridge- Conditions for bridge balance- Types of DC bridges and AC bridges- Use of above bridges- Resistance measurement using Wheat Stone Bridge- Inductance measurement using Maxwell's Bridge- capacitance measurement using Schering Bridge- important errors and their prevention in bridge measurements- Limitations of AC bridge method for measurement of small inductances and capacitances

3.0 Digital instruments

Advantages of digital instruments over Analogue instruments- Working of Ramp type digital voltmeter with block diagram- Successive approximation type digital voltmeters with block diagram- Specifications of digital voltmeters- Working of digital frequency meter with block diagram- Important specifications of digital frequency meter- Accuracy and Resolution of a meter- Factors effecting the accuracy and Resolution of a frequency meter- Working of digital LCR meter with block diagram- specifications of digital LCR meter.

4.0 working principle of AF, RF signal generators and powermeters

Working of AF Oscillator (sine & square) - Block diagram- Front panel controls and specifications of AF Oscillator- Working of function generator with block diagram- Applications of AF oscillators and function generators- Working of RF signal generator- Specifications of RF signal generator- Important Applications of RF signal generators- Importance of shielding in RF generators- Working of AF power meter- Applications of power meters.

5.0 Working principle and use of CRO

Block diagram of general purpose CRO - Function of each block- Necessity of time base and deflection amplifiers- Deflection sensitivity of CRO- Conditions for stationary waveforms- Conditions for flicker free waveforms- Triggered sweep with necessary circuit- Advantages of triggered sweep- Function of various controls on front panel of CRO- Procedure for measurement of - Voltage (DC & AC) b) frequency - Phase angle - Time interval - Depth of modulation-Define a pulse - Waveform of a pulse- Define the pulse parameters - Pulse width - Rise time - Fall time - Duty cycle-delay time- procedure for measuring above pulse parameters with CRO- Different types of probes and connectors used in oscilloscopes.

6.0 Test instruments

- Stray inductance and stray capacitance of a coil- Q meter with a block diagram- Parameters that can be measured using Q meter- Distortion factor- Distortion Factor Meter with block diagram- Digital IC tester with block diagram- Working of logic analyser with block diagram- Working principle of spectrum analyser and uses- Plotters and Recorders- XY recorders- plotter- logic probe.

REFERENCE BOOKS:

1. Modern Electronic Instrumentation and Measurement techniques - Albert D. Helfrick William David Cooper-PHI Publications
2. Electrical and Electronics Measurements and Instrumentation - A.K. Sawhney , PuneetSawhneyDhanpatRai& Company, 2010

Electronic Instrumentation - HS Kalsi ,-Tata McGraw Hill

Specific Learning Outcomes:

After completing this course the student will be able to

1.0. Understand the working of analog instruments.

1.1. List the characteristics of ideal volt meter and ideal ammeter.

1.2. Explain the construction and principle of operation of PMMC instrument.

1.3. Explain the principle of extending range of DC ammeter.

1.4. Explain the principle of extending range of DC voltmeter.

1.5. Explain the principle & working of rectifier type voltmeter.

1.6. Explain the principle of series & shunt type ohmmeters.

1.7. Explain the use of Megger for measuring the insulation resistance.

1.8. Explain loading effect of voltmeter with an example circuit

1.9. Explain the need for high input impedance for voltmeters.

1.10. Explain the working of FET input voltmeter with a circuit diagram.

1.11. Explain the drift problems in FET voltmeters.

1.12. Explain the working of differential voltmeters.

1.13. Explain the use of high voltage probe & clamp-on current probe.

2.0 DC bridges and AC Bridges

2.1 Explain the construction of AC bridge.

2.2 State the conditions for AC bridge balance.

2.3 List 4 types of AC bridges.

2.4 Mention the use of above bridges.

2.5 Explain the resistance measurement using Wheatstone Bridge.

2.6 Explain the inductance measurement using Maxwell's Bridge.

2.7 Explain the capacitance measurement using Schering Bridge.

2.8 List 4 important errors and their prevention in bridge measurements.

2.9 Mention the limitations of AC bridge method for measurement of small inductances and capacitances.

3.0 Understand the working of Digital Instruments.

3.1 List 4 advantages of digital instruments over analog instruments.

3.2 Explain the working of RAMP type digital voltmeter with block diagram.

3.3 Explain the working of Successive approximation type digital voltmeter with block diagram.

3.4 List 4 important specifications of digital voltmeter.

3.5 Explain the working of digital frequency meter with block diagram.

3.6 List 4 important specifications of digital frequency meter.

3.7 Define accuracy and resolution of a meter.

3.8 Explain factors effecting the accuracy and resolution of a frequency meter.

3.9 Explain the working of digital LCR meter with block diagram.

3.10 List 4 specifications of digital LCR meter.

4.0 Understand the construction and working of signal generators &power meters.

4.1 Explain the working of AF oscillator with block diagram.

4.2 List the front panel controls and specifications of AF oscillator.

4.3 Explain the working of function generator with block diagram.

4.4 List the applications of AF oscillators and function generators.

4.5 Explain the working of RF signal generator with block diagram.

4.6 List the specifications of RF signal generator.

4.7 Mention 3 important applications of RF signal generator.

4.8 Explain the importance of shielding in RF generators.

4.9 Explain the working of AF power meter.

4.10 List the applications of power meter

5.0 Understand construction and working of CRO.

5.1 Draw the block diagram of general purpose CRO and describe the function of eachblock.

5.2 Explain the necessity of time base and deflection amplifiers.

5.3 Define deflection sensitivity of CRO.

5.4 List the conditions for stationary waveforms.

5.5 Mention the conditions for flicker free waveforms.

5.6 Explain the triggered sweep with necessary circuit.

5.7 Mention the advantages of triggered sweep.

5.8 Explain the function of various controls on front panel of CRO.

5.9 Explain the procedure for measurement of a) voltage (DC & AC) b) frequency c) phase angle d) time interval e) depth of modulation.

5.10 Define a pulse.

5.11 Draw the waveform of a pulse.

5.12 Define the pulse parameters a) pulse width b) rise time c) fall time d) duty cycled) delay time.

5.13 Explain the procedure for measuring above pulse parameters with CRO.

5.14 List different types of probes and connectors used in CRO's.

Understand the construction and working of test instruments.

6.1 Define stray inductance and stray capacitance of a coil.

6.2 Explain the working of Q-meter with a block diagram.

6.3 List various parameters that can be measured using Q-meter.

6.4 Define distortion factor.

6.5 Explain the working of distortion factor meter with block diagram.

6.6 Explain the working of digital IC tester.

6.7 Explain the working of logic analyser with block diagram.

6.8 Explain the basic working principle of spectrum analyser and mention its use.

6.9 State the need for plotters and recorders.

6.10 Explain the working of XY recorders.

6.11 Explain the working of plotters.

6.12 Explain the working of logic probe

Suggested Student Activities

1. Student visits Library to refer to Manuals and related books of electronic instruments
2. Student inspects the available equipment in the Lab
3. Visit nearby Industry to familiarize with working of various electronic instruments
4. Participate in the Quiz &discussion
5. Search internet for knowing latest trends in electronic instruments

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
5. 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
6. 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
7. 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

Suggested E-Learning references

1. www.electronics-tutorials.ws
2. www.nptel.ac.in
3.www.Techopedia.com
4.www.circuitdigest.com

CO-PO MAPPING MATRIX

Course Outcome		Linked PO
CO1	Use Analog instruments for measuring Basic Electrical Quantities	1,2
CO2	Use ac and dc bridges for determining unknown parameters	1,2,3,5,
CO3	Use digital instruments for measuring the given electrical quantities	1,2,5,9
CO4	Explain the working of AF, RF signal generators and power meters	1,2,5,7
CO5	Understand the working principles of CRO and it's applications	1,2,5,7
CO6	Use the Test instruments in Laboratory applications	1,2,3,7,10

MID SEM-I EXAM

S.No	Unit Name	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	

MID SEM –II EXAM

S.No	Unit Name	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 Examination

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R		U	A	
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) 11(a) 11(b)	13(b) 15(a) 15(b)	

6	VI			7,8	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	
Total Questions		8			8	8	

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

STATE BOARD OF TECHNICAL EDUCATION & TRAINING: TS: HYDERABD

C18EC-504E (A), V SEMESTER, ELECTRONIC MEASURING INSTRUMENTS

MID EXAM - I MODEL QUESTION PAPER

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

PART-A

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

1. List the characteristics of ideal ammeter
2. State the importance of high input impedance of voltmeter
3. State the conditions for AC bridge balance
4. List the limitations of AC bridge for measuring of small inductance.

PART-B

Note: Answer all questions. Each carries 3marks. 2X3=6 Marks

5.(a) Explain loading effect of volt meter

(or)

5. (b) Explain the principle of extending range of DC voltmeter

6. (a) Explain the resistance measurement using Wheatstone Bridge

(or)

6. (b).Explain the capacitance measurement using Schering bridge

PART-C

Note: Answer all questions. Each carries 5 marks. 2X5=10 Marks

7.(a)Explain the construction and principle of operation of PMMC instrument

(or)

7.(b)Explain the principle & working of rectifier type voltmeter

8.(a) Explain the inductance measurement using Maxwell's Bridge

(or)

8.(b).State the conditions for AC bridge balance and Explain the construction of AC bridge

STATE BOARD OF TECHNICAL EDUCATION & TRAINING: TS: HYDERABD

C18EC-504E (A), V SEMESTER, ELECTRONIC MEASURING INSTRUMENTS

MID EXAM - II MODEL QUESTION PAPER

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

PART-A

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

1. List two advantages of digital instruments over analog instruments
2. Define accuracy of a meter
3. List the front panel controls of AF oscillator.
4. Mention 3 important applications of RF signal generator.

PART-B

Note: Answer allquestions. Each carries 3marks. 2X3=6 Marks

5.(a)Explain factors effecting the accuracy and resolution of a frequency meter

(or)

5.(b)Explain the working of RAMP type digital voltmeter with block diagram.

6.(a) Explain the importance of shielding in RF generators

(or)

6.(b).Explain the importance of shielding in RF generators

PART-C

Note: Answer all questions. Each carries 5 marks. 2X5=10 Marks

7.(a)Explain the working of Successive approximation type digital voltmeter with block diagram

(or)

7.(b) Explain the working of digital frequency meter with block diagram.

8.(a) Explain the working of function generator with block diagram.

(or)

8.(b).Explain the working of AF power meter.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING: TS: HYDERABD

C18EC-504E (A), V SEMESTER, ELECTRONIC MEASURING INSTRUMENTS

SEMESTER END EXAMINATION MODEL QUESTION PAPER

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

PART-A

Answer All questions. Each carries 1 mark. **8X1=8 Marks**

1. List the characteristics of ideal volt meter.
2. Define resolution of a digital instrument.
3. List any two applications of a power meter.
4. Define pulse parameters like rise time and duty cycle.
5. Define deflection sensitivity of CRO.
6. State the conditions for stationary wave forms.
7. Define distortion factor.
8. State the need for plotters.

PART-B

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

9.(a) Explain loading effect of voltmeter

(or)

9. (b) Explain the procedure for measurement of voltage(AC) and Frequency using CRO.

10.(a)Explain factors effecting the accuracy and resolution of a frequency meter

(or)

10.(b)Draw the block diagram of Q-meter.

11.(a)Mention the function of various controls on front panel of CRO.

(or)

11.(b)Explain the triggered sweep with necessary circuit.

12.(a)Draw the block diagram of distortion factor meter.

(or)

12.(b) State the basic working principle of spectrum analyzer and mention its use.

. **PART-C**

Answer allquestions. Each carries 5 marks **4X5=20Marks**

13.(a) Explain the capacitance measurement using Schering Bridge.

(or)

13. (b) Draw the block diagram of general purpose CRO and describe the function of each block.

14. (a)Explain the working of function generator with block diagram.

(or)

14. (b) Explain the working of XY recorders

15. (a)Explain the necessity of time base and deflection amplifiers..

(or)

15. (b) Explain the procedure for measuring pulse parameters like parameters a) pulse width b) rise time c) fall time d) duty cycle e) delay time with CRO

16. (a) Explain the working of logic probe

(or)

16. (b) Explain the working of plotters.

18EC-504E (B)- DIGITALCIRCUIT DESIGN USING VERILOG hdl

Course title :	**Digital circuit design through verilog hdl**	Course code	**18EC-504E (B)**
Semester	**V**	Course Group	**Elective**
Teaching Scheme in Periods(L:T:P)	**45:15:00**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact Periods:	**60Pds**
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 :	Use Layout design rules; Draw stick diagrams; Interpret fabrication process, timing simulation.	12
CO2 :	Apply the basics of Hardware Description Languages and use Verilogmodules, instantiation process.	8
CO3 :	Use Verilog HDL constructs and conventions.	12
CO4 :	Develop Simple logic circuits using various levels of Abstraction in Verilog HDL.	8
CO5 :	Design and Simulate Combinational and sequential circuits using Verilog HDL.	10
CO6 :	Apply Verilog HDL principles to develop various real time applications using FSM and FPGA.	10

Course Content

Unit 1: Basic Concepts of VLSI Circuits: Duration:12 Periods (L: 7 - T: 5)

MOS Transistor fabrication-Merits of CMOS technology-CMOS fabrication process-Layout design rules-Stick diagrams-VLSI design flow-VLSI design specification and design entry-Functional simulation-Planning Placement and Routing (PPR)-Timing simulation-Fusing/Fabrication into the chip-Use of Verilog HDL in VLSI simulation.

Unit 2: Introduction to Verilog HDL: **Duration:8 Periods (L: 5 - T: 3)**

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.

Unit 3:Language constructs and conventions: **Duration:8Periods (L: 5 - T: 3)**

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 4: Gate level, Data Flow and Behavioral modeling: **Duration:12Periods (L: 7 - T: 5)**

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-Initial and Always statements-Assignment statements in data flow modeling-Different types of delays used in the data flow level 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)-Hierarchical modeling-Advantages of hierarchical modeling-Modeling techniques in Verilog HDL-Design simple logic circuits like adders, subtractors using Behavioral, Dataflow and Structural modeling.

Unit 5: Modeling of combinational and Sequential Logic circuits:

Duration:10Periods (L: 8 - T: 2)

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-Compare RTL level and structural level modelling.Test Bench module-Need of a stimulus module-Structure of stimulus module-stimulus modules for combinational and sequential circuits of Verilog designs.

Unit 6: System Design Concepts: **Duration: 10Periods (L: 8- 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-Design of UART using FPGA board-Design of Traffic Light controller using FPGA board.

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

1.0 **Basic Concepts of VLSI Circuits**

1.1 Explain the processes of MOS Transistor fabrication

1.2 List the merits of CMOS technology

1.3 Explain CMOS fabrication process

1.4 List Layout design rules

1.5 Explain layout design rules

1.6 Explain stick diagrams

1.7 Explain VLSI design flow

1.8 Explain VLSI design specification and design entry

1.9 Explain functional simulation

1.10 Explain Planning placement and Routing (PPR)

1.11 Explain timing simulation

1.12 Explain Fusing/Fabrication into the chip

1.13 Explain the use of of Verilog HDL in VLSI simulation

2.0 Introduction to Verilog HDL

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

2.2 Explain the importance of Hardware Description Languages in VLSI design

2.3 Compare VHDL and Verilog HDL

2.4 List the features of Verilog HDL

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

2.6 Explain differences between modules and module instances in Verilog.

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

2.8 Identify the components of a Verilog module definition

2.9 Explain the port connection rules in a module instantiation

3.0 **Language constructs and conventions**

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

3.2 Explain different data types like value set, nets, registers, vectors, integer, real and time register data types, arrays, memories and strings.

3.3 Explain defparam and localparam keywords

3.4 Explain about system tasks and compiler directives

3.5 Define expressions, operators and operands.

3.6 Explain all types of operators used in the Verilog HDL

4.0 **Understand concepts of Gate level, Data flow and behavioral modeling**

4.1 Identify the logic gate primitives provided in Verilog

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

4.3 Explain Rise, fall and turn-off delays in the gate level design

4.4 Explain about the initial and always statements.

4.5 Explain the assignment statements in data flow modeling

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

4.7 Explain blocking and non blocking procedural assignments with examples

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

4.9 Explain conditional statements.

4.10 Explain multiway branching – use case, casex, and casez statements.

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

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

4.13 Explain sequential and parallel blocks.

4.14 Explain about user defined primitives (UDP).

4.15 Explain about the hierarchical modeling.

4.16 List the advantages of hierarchical modeling.

4.17 Explain about modeling techniques in Verilog HDL.

4.18 Design simple logic circuits like Half Adder, Full Adder, Half Subtractor, Full Subtractor using Behavioral, Data Flow and Structural Modeling.

5.0 **Understand modeling of combinational and sequential logic circuits**

5.1 Design combinational circuits like multiplexers, decoders, encoders,Comparators and ALU

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 modelings.

5.9 Define test bench module.

5.10 Explain the need of a stimulus module.

5.11 Explain the structure of stimulus module.

5.12 Apply the stimulus modules for combinational and sequential circuits of Verilog design

6.0 **Understand the system design concepts**

6.1 List different 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 Explain various design tools which are useful in different stages of design.
6.6 List 4 important 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 of UART using FPGA.
6.14 Explain the design of 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 Zvi Kohavi
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 Zvonko Vranesic, TMH, 2005.

Suggested E-Learning resources

1.http://electrical4u.com

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

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 and/or examples.	Every major point was adequately supported with relevant facts, statistics and/or examples.	Every major point was supported with facts, statistics and/or examples, but the relevance of some was questionable.	Every point was not supported.
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.

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Use Layout design rules; Draw stick diagrams; Interpret fabrication process, timing simulation.	R/U/A	1,2,10	**12**
CO2	Apply the basics of Hardware Description Languages and use Verilog modules, instantiation process.	R/U	1,2,5,6,7	**8**
CO3	Use Verilog HDL constructs and conventions.	R/U	1,2,9	**8**
CO4	Develop Simple logic circuits using various levels of Abstraction in Verilog HDL.	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	**13**
CO6	Apply Verilog HDL principles to develop various real time applications using FSM and FPGA.	R/U/A	1,2,3,7	**7**

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	

MID SEM EXAMINATIONS

SEMESTER END EXAMINATIONS

<table>
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<tr><td colspan="3">R(1 Mark)</td><td>U(3 Marks)</td><td>A(5 Marks)</td></tr>
<tr><td>1</td><td>I</td><td rowspan="11">4</td><td rowspan="2">1</td><td rowspan="2"></td><td>9(a)</td><td>13(a)</td><td rowspan="2"></td></tr>
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<tr><td rowspan="3">5</td><td rowspan="3">V</td><td rowspan="5">3</td><td rowspan="3">5, 6</td><td>9(b)</td><td>13(b)</td><td rowspan="3"></td></tr>
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Model Paper for Mid-I,

BOARD DIPLOMA EXAMINATION, (C-18)

VI SEMESTER, 18EC-504E (B)

DIGTAL CIRCUIT DESIGN USING VERILOG

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

PART-A

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

1. List the merits of CMOS technology
2. Explain the need for stick diagrams
3. List types of design entry methods in VLSI.
4. Write the difference between module and instance.

PART-B

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

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

   OR

   b) Explain Layout Design rules.
6. a) Explain the differences between Verilog HDL and VHDL.

   OR

   b)Explain about connecting ports by ordered list and ports by name in module instantiation.

PART-C

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

7. a) Draw the stick diagram of CMOS transistor

   OR

7. b) Describe about the various steps involved in VLSI design flow.

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

   OR

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

Model Paper for Mid-II,

BOARD DIPLOMA EXAMINATION, (C-18)

VI SEMESTER, 18EC-504E (B)

DIGTAL CIRCUIT DESIGN USING VERILOG

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

PART-A

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

1. List the types of operators available in Verilog HDL.
2. Mention the difference between $display and $monitor.
3. Define Rise time delay and fall time delay in gate level design.
4. List the advantages of hierarchical modelling.

PART-B

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

5. a) Explain about defparam and localparam keywords.

OR

b) Explain about compiler directives in Verilog HDL.

6. a) Explain about initial statement.

OR

b)Explain about casex, casez and case statements.

PART-C

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

7. a) Explain about the following operators
   i) Logical operators ii) Bit wise operators iii) Binary arithmetic operators
   iv) Unary reduction operators

OR

b) Explain about system tasks available in Verilog for making and controlling simulation.

8. a)Design 1-bit half subtractor using gate level modeling.

OR

b) Design 1-bit full adder logic circuit using gate level modeling.

Model Paper for SEE,

BOARD DIPLOMA EXAMINATION, (C-18)

VI SEMESTER, 18EC-504E (B)

DIGTAL CIRCUIT DESIGN USING VERILOG

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

PART-A

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

1. List the Layout design rules.
2. List the features of Verilog HDL.
3. List any three system tasks in Verilog HDL.
4. Write the need for stimulus module.
5. Define test bench module.
6. List programmable logic devices.
7. Write any three applications of PLD's.
8. Classify programmable logic devices.

PART-B

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

9. a) Explain layout design rules.

OR

b)Explain about RTL level modelling.

10. a) Explain about compiler directives in verilog

OR

b) Explain the architecture of FPGA.

11. a) Explain about structural modelling.

OR

b) Explain the structure of stimulus module.

12. a) Explain the architecture of PLA's.

OR

b) Explain various design tools which are useful in different stages of design.

PART-C

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

13. a)Draw the stick diagram of two input NMOS NAND gate.

OR

b)Design up/down counter using Verilog HDL.

14. a) Design a 1 bit full adder using gate level and dataflow level modelling**.**

OR

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

15. a) Design a Dflip-flop with asynchronous reset and its Test bench using verilog HDL.

OR

b)Design 4 X 1 Mux using data flow level modeling.

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

OR

b) Explain the design of UART using FPGA.

18EC-505E-(A) -MOBILE COMMUNICATION & OPTICAL FIBER COMMUNICATION

Course Title :	**Mobile Communication& Optical Fiber Communication**	Course Code	**18EC-505E(A)**
Semester	**V**	Course Group	**Elective**
Teaching Scheme in periods (L:T:P)	**45:15:00**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact Periods	**60**
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	12
CO2	Comprehend GSM and Apply Intelligent Cell Concept in Mobile Communication	PO1,PO2,PO5,PO6,PO7	08
CO3	Understand the Basics of Optical Fibre Communication	PO1,PO2	10
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	10
CO6	Understand Wave Length Division Multiplexing&Apply Optical Amplifiers	PO1,PO2,PO3,PO7,PO10	10

Course Contents

UNIT1-Introduction to Mobile Communication & Cellular System Duration: 12 Periods (L: 10– T:2) 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-Definition of the term 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: 10 Periods (L: 6– T:4)

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 – Intelligent Micro cell operation - Power delivery intelligent cells--Advanced Intelligent Network System

UNIT 3 –Basics of Optical Fiber CommunicationDuration: Duration: 10Periods (L: 8– T:2)

Advantages 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 Fibre Optic Components, Devices and Measuring Instruments Duration: 10 Periods (L: 6– T:4)

Various fibre optic components- Need for connectors in FiberOpticCommunication - Function of splice in optical fibres- Types of connectors and splices- Mechanical splice and fusion splice- Need for optical coupler/splitter- Different optical couplers- Working of an optical coupler- Need for isolator in Optical Fibre Communication (OFC) - Working of isolator - Different types of measuring/testing instruments used in the field of OFC- Use of optical attenuators- Working of Optical Time Domain Reflectometer (OTDR)-Types of sources and detectors used in Optical Fibre Communication (OFC) - Features of an optical source and detector- Principle of LASER- Construction and working of LASER source-construction and working of APD - Block diagram of fibre optic communication system

Unit-5: ModernWireless Communication Systems Duration: 10 Periods (L: 8– T:2)

Demerits of GSM system-Features of General Packet Radio Service (GPRS)- Features of Enhanced Data Rates GSM Evolution (EDGE)-Compare the features of GSM, GPRS and EDGE systems-Specifications of Digital European Cordless Telecommunication (DECT) system-Architecture of DECT- DECT Radio Link – Personal Access Communication System (PACS) – Classification of Mobile Data Networks- PACS Radio Interface - Basic concept of Wireless local loop (WLL)-Salient features of 3G system-Advantages of 3G over earlier versions-Basic concepts of 4G.

UNIT 6 Wavelength Division Multiplexing and Optical Amplifiers Duration: 10 Periods (L: 6– T:4)

Optical Time Domain Multiplexing- Limitations of Time Division Multiplexing (OTDM) in FOC- Need for WDM in fibre optic communication- Wideband WDM and narrowband WDM - Dense Wavelength Division Multiplexing (DWDM) - Block diagram of WDM system- Block diagram of DWDM-Need for repeaters-Compare R, 2R and 3R repeaters- Comparison of repeaters and optical amplifiers- Block diagram of Erbium Doped Fibre Amplifier (EDFA)- Principle and Operation of EDFA – Synchronous Optical Network (SONET) - Fibres in Ethernet and Gigabit Ethernet- Use of optical cables in submarines- Local TelephoneNetwork, in Cable T.V application

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 List the limitations of conventional mobile phone system.

1.2 Define the terms mobile station and base station

1.3 State the functions of Mobile switching centre (MSC)

1.4 Define 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 Explain uplink and downlink channels in mobile communication

1.8 Draw the block diagram of a basic mobile cellular system and explain each block.

1.9 Draw the and explain block diagram of mobile phone handset

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

1.11 State the need for hexagonal cell site.

1.12 Explain the 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 Define co-channel interference.

1.17 Define Hand-off in mobile communication

1.18 Explain channel assignment strategies

1.19 Explain Cell splitting and sectoring

1.20 Define micro-cell concept

1.21 Define umbrella cell

2.0 Comprehend Digital Cellular & Intelligent Cell Concept in Mobile Systems

2.1 List the disadvantages of analog cellular system.

2.2 Mention the features of digital cellular system.

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

2.4 Mention GSM channels

2.5 Explain GSM services

2.6 Explain the GSM radio subsystem

2.7 Explain the frame structure of the GSM

2.8 List the drawbacks of micro cell system

2.9 State the need for intelligent cell concept in mobile communication

2.10 Define Intelligent Cell

2.11 Mention the advantages of implementing intelligent cell

2.12 Explain intelligent micro cell operation

2.13 Explain power delivery intelligent cells

2.14 Mention the applications of intelligent micro cell system

2.15 List the types of intelligent network

2.16 Explain the types of intelligent network

2.17 Define Advanced Intelligent Network

2.18 Explain the characteristics of Advanced Intelligent Network

2.19 Draw and explain the architecture of Advanced Intelligent Network System

3.0 **Basics of Optical Fibre Communication**

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

3.2 Mention different optical spectral bands.

3.3 Explain the 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 List the 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 Explain Group Velocity Dispersion

3.16 Distinguish between inter modal and intra modal dispersion.

3.17 Define Wave Guide Dispersion

3.18 Explain Polarization Mode Dispersion

4.0 **Use Optical Components, Devices and Measuring Instruments**

4.1 List various fibre optic components

4.2 Mention the need for connectors in Fibre Optic Communication (FOC)

4.3 State the function of splice in optical fibres

4.4 List types of connectors and splices

4.5 Distinguish between mechanical splice and fusion splice

4.6 State the need for optical coupler/splitter

4.7 List different optical couplers

4.8 Explain the working of an optical coupler

4.9 State the need for isolator in Optical Fibre Communication (OFC)

4.10 Explain the working of optical isolator.

4.11 List different types of measuring/testing instruments used in the field of OFC.

4.12 State the use of optical attenuators

4.13 Explain the working of Optical Time Domain Reflectometer (OTDR)

4.14 List two types of sources and detectors used in OFC

4.15 Mention important features of an optical source and an optical detector

4.16 State the principle of Light Amplification by Stimulation Emission of Radiation (LASER)

4.17 Explain the construction and working of LASER source.

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

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

5.0 Explain Modern Wireless Communication Systems

5.1 Mention the demerits of GSM system.

5.2 List the features of General Packet Radio Service (GPRS)

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

5.4 Compare the features of GSM, GPRS and EDGE systems

5.5 List specifications of Digital European Cordless Telecommunication (DECT) system.

5.6 Draw the architecture of DECT

5.7 Explain the architecture of DECT

5.8 Explain about DECT Radio Link

5.9 Draw and Explain the architecture of Personal Access Communication System (PACS)

5.10 Explain PACS Radio Interface

5.11 Mention mobile data applications

5.12 Classify mobile data networks

5.13 Explain basic concept of Wireless Local Loop (WLL)

5.14 List the salient features of 3G system

5.15 List the advantages of 3G over earlier versions

5.16 List the basic concepts of 4G version

6.0 Understand Wave Length Division Multiplexing and Optical Amplifiers

6.1 Explain Optical Time Division Multiplexing (OTDM)

6.2 Mention the limitations of Optical Time Division Multiplexing (OTDM) in FOC

6.3 Explain the need for WDM in fibre optic communication

6.4 Distinguish between wideband WDM and narrowband WDM

6.5 Explain wideband WDM

6.6 Draw the block diagram of WDM system

6.7 Draw and explain the block diagram of Dense Wavelength Division Multiplexing (DWDM)

6.8 State the need for repeater in Fibre Optic Communication

6.9 Compare R, 2R and 3R repeaters.

6.10 Distinguish between repeaters and optical amplifiers.

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

6.12 Explain about Synchronous Optical Network (SONET)

6.13 Explain the use of fibres in Ethernet and Gigabit Ethernet.

6.14 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. OpticalFiber 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

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

CO/PO Mapping Matrix

Course Outcome		Linked PO	Teaching Hours
CO1	Interpret the Basic Concepts of Mobile Communication System	PO1,PO2	12
CO2	Explain Cellular System Design Fundamentals	PO1,PO2,PO5,PO6,PO7	08
CO3	Compare and use various Multiple Access Techniques	PO1,PO2,PO4,PO9	10
CO4	Comprehend Digital Cellular Mobile Systems	PO1,PO2,PO5,PO7,PO8	10
CO5	Apply Intelligent Cell Concept in Mobile Communication	PO1,PO2,PO5,PO10	10
CO6	Explain Modern Wireless Communication Systems	PO1,PO2,PO3,PO7,PO10	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

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

V Semester, 18EC-505E (A)-MOBILE COMMUNICATION & OFC

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) Draw and explain the architecture of Advanced Intelligent Network System

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

V Semester, 18EC-505E (A)-MOBILE COMMUNICATION& OFC

MID SEM – 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. 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, 18EC-505E (A)-MOBILE COMMUNICATION& OFC

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?

Explain the characteristics of Advanced Intelligent Network

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)?

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)?

18EC-505E (B) - BASICS OF VLSI CIRCUITS

Course Title :	**Basics of VLSI Circuits**	Course Code	**18EC-505E (B)**
Semester	**V**	Course Group	**Elective**
Teaching Scheme in Periods(L:T:P)	**45:15:00**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact Hours :	**60Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites :

This course requires the basic knowledge of logic gates, combinational logic

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

CO	**Learning Outcomes**	**Periods**
CO1 :	Compare various MOS fabrication technologies	8
CO2 :	Analyze the various factors affecting designing of MOS circuits	12
CO3 :	Appreciate various design rules MOS fabrication	8
CO4 :	Calculate resistance, capacitance, time delay of C MOS	12
CO5 :	Compare the structures of Verilog and VHDL	12
CO6 :	Use the concepts of Verilog programming	8

Course Content

1. **Introduction to MOS technology** **Duration: 8 Periods (L: 6– 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,CMOS fabrication – the n-well process, CMOS fabrication – Twin tube process, BiCMOS technology, CMOS and Bipolar technologies.

2. **Basic Electrical Properties of MOS and BiCMOS Circuits**

   Duration: 12 Periods (L: 10– T:2)

   Drain to source current I_{ds} versus voltage V_{ds} relationships, aspects of MOS transistor threshold voltage MOS transistor trans conductance g_m and output conductance g_{ds},MOS transistor figure of merit ω_0, pass transistor, 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, 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:8 Periods (L: 6– T:2)**

MOS layers, Stick diagrams, nMOS design style, CMOS design style, Design rules, 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: 12 Periods (L: 10– T:2)**

Sheet resistance, Inverter resistance. ,Area capacitances of layers, Standard unit of capacitance Cg, area capacitance calculation, delay unit (ĩ), Inverter delays, Rise-time and fall-time estimations of CMOS inverter, 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: 12 Periods (L: 10– T:2)**

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: 8 Periods (L: 6– T:2)**

Components of a Verilog module definition- port connection rules in a module instantiation- 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-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 transistor .

1.5 Explain Depletion mode 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.

2.2 Examine aspects of MOS transistor threshold voltage V_t

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

2.4 Define MOS transistor figure of merit ω_0.

2,5 Explain the pass transisitor.

2.5 Explain the nMOS inverter,

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

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

2.8 Differentiate alternative forms of Pull-up.

2.9 Explain the CMOS inverter – five regions of operation.

2.10 Draw MOS transistor circuit model.

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

2.12 Draw BiCMOS inverters.

2.13 Examine latch-up in CMOS circuits.

2.14 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

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

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

4. 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

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

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	10
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	10
CO5:	Compare the structures of Verilog and VHDL	R/U/A	1,2,5	10
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

<table>
<tr><th rowspan="2">Sl No</th><th rowspan="2">Unit No.</th><th colspan="4">Questions to be set for SEE</th><th rowspan="2">Remarks</th></tr>
<tr><th colspan="2">R(1 Mark)</th><th>U(3 Marks)</th><th>A(5 Marks)</th></tr>
<tr><td>1</td><td>I</td><td rowspan="10">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">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 rowspan="2">10(a)</td><td rowspan="2">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>
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STATE BOARD OF TECHNICAL EDUCATION & TRAINING: TELANGANA

18EC-505E (B)– BASICS OF VLSI CIRCUITS

VI SEMESTER MID SEMESTER-I MODEL PAPER

TIME:1 HOUR **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

18EC-505E (B)– BASICS OF VLSI CIRCUITS

VI SEMESTER MID SEMESTER-II MODEL PAPER

TIME:1 HOUR **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

18EC-505E (B)– BASICS OF VLSI CIRCUITS

VI 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 verilog module.

OR

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

PART-C

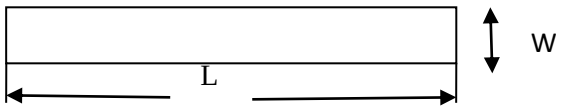
Answer any four questions. Each question carries five marks. 4x5=20M

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).Write verilog 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.

18EC-506P -INDUSTRIAL ELECTRONICS LAB PRACTICE

Course Title :	**Industrial Electronics Lab Practice**	Course Code	**18EC-506P**
Semester	**V**	Course Group	**Practical**
Teaching Scheme in Periods(L:T:P)	**15:0:30**	Credits	**1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**45Pds**
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

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

18EC-507P -COMPUTER HARDWARE & NETWORKING LAB PRACTICE

Course Title :	**Computer Hardware & Networking Lab Practice**	Course Code	**18EC-507P**
Semester	**V**	Course Group	**Practical**
Teaching Scheme in Periods(L:T:P)	**15:0:30**	Credits	**1.5**
Methodology	**Lecture + Practical**	Total Contact Periods :	**45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Rationale: With the computer becoming a household item , the need for Computer hardware knowledge need not be stressed. Computer hardware industry is another major area where excellent job opportunities are available. Experiments in Optical fibre communication are also included to give additional practical inputs.

Course outcomes:

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

Course Outcome		**CL**	**Linked PO**	**Teaching Periods**
CO1	Identification of the tools required for computer repair	R/U/A	1,2,4,10	**9**
CO2	Study of the basic computer Hardware	R/U/A	1,2,3,4,10	**12**
CO3	Study of the Computer Networking methods	R/U/A	1,2,3,4,5, 10	**15**
CO4	Study of the Fiber optic Communication links	R/U/A	1,2,3,4,5, 10	**9**
				45

Course Content:

1.0 PC Hardware- Identification of System Layout.

1.1 Identify the tools and material required for carrying out computer repair

1.2 Identify and familiarize with use of Cleaning material : Micro Fibre cloth , Brushes and blower, cleaning alcohol

1.3 Identify and familiarize with safety procedures: wearing a Dicharge wrist band, Goggles, gloves, attire

2.0. Basic Computer hardware

2.1 Open a PC cabinet and Identify Basic Computer Hardware: mother board , Components ,Chipset, Cables,Cards, Disk drives,connecting cards,Heatsink

2.2 Identify various Internal and External slots in the mother board and connect them with required extension cards and connecting cables

2.3 Identify the voltage ratings of SMPS cables connected to :Disk drives, motherboard, Fans, Measure the Output voltages of SMPS

2.4 Perform systematic Disassembling of the PC

2.5 Assemble the PC and perform routine tests of Monitor,Fan,SMPS and RAM

2.6 Change the settings of CMOS Setup in Drive sizes, partitions, booting sequence, password, date and time, and verify them on completing booting

2.7 Install the latest version of Windows Operating system

2.8 Verify the function of control panel settings.

2.9 Perform Partitioning and and Formatting of Hard disks.

2.10 Install and Run antivirus software

2.11 Carry out Preventive maintenance of a PC

2.12 Take Backup of C drive

2.13 Identify Laptop Hardware

2.14 Carry out PC Troubleshooting by :removing RAM,disconnecting Fan power card, removing Heat sink

2.15 Connect,operate and maintain i) Inkjet Printer ii) Laser Printer iii)Scanner iv) Web Cam

3. Computer Networking

3.1 Identify and note down the specifications of various networking devices & Cables, Jacks Connectors, tools etc used in local area networks

3.2 Prepare the UTP cable for cross and direct connections using crimping tool.

3.3 Transfer files between systems in LAN using FTP Configuration,

3.4 Test the Network using ipconfig, ping / tracert and Netstat utilities and debug the network issues (3)

3.5 Install and configure Network Devices: HUB ii) Switch iii) Routers

3.6 Configure Host IP, Subnet Mask and Default Gateway in a system in LAN (TCP/IP Configuration).

3.7 Configure DNS to establish interconnection between systems

3.8 Install and Configure Wireless NIC and transfer files between systems in LAN and Wireless LAN

3.9 access a remote desktop using Team viewer software

3.10 store the files in Cloud using Google drive/One drive/Drop box & share

4.0 Fiber Optics

4.1 Set up fiber optic analogue link.

4.2 Set up a fiber optic digital link

4.3 Verify modulation & Demodulation of light source by pulse width modulation technique.

4.4 Test Fiber optic Voice Link.

4.5 Verify the NRZ & RZ modulation formats in Optical Communication.

REFERENCE BOOKS

1. PC Upgrading -- Stephen Bigelow (TMH)

2. Computer Hardware -- Manhar Lotia & Others (BPB Publications)

3. Computer Networks, 4th Edition -- Tannenbaum

4. Enhanced Guide to Managing And Maintaining Your PC -- Jean Andrews (Thomson)

5. Basics of Networking -- NIIT PHI publications

6. PC Hardware A Beginners Guide -- Gilster (TMH)

7. Basics of Networking -- NIIT, PHI Publications

8. Networking Essentials with Projects - Palmer, Thomson

Suggested E-Learning references

1. www.electronics-tutorials.ws
2. www.nptel.ac.in
3.www.Techopedia.com
4. www.circuitdigest.com

8086 Microprocessors Programming Lab practice

Course Title :	**8086 Microprocessors Programming Lab Practice**	Course Code	**18EC508P**
Semester	**V**	Course Group	**Practical**
Teaching Scheme in Periods(L:T:P)	**15:0:30**	Credits	**1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites
Knowledge of instruction SET OF 8086 and keil software.

Course outcomes

Course Outcome		**CL**	**Linked PO**	**Teaching Hours**
CO1	Write programs using Data Transfer Instructions and Arithmetic Instructions	**R, U, A**	**1,2,3,4,8,9,10**	**10**
CO2	Write Programs using Logical, Shift and Rotate Instructions	**R, U, A**	**1,2,3,4,8,9,10**	**5**
CO3	Write Programs using Branching Instructions	**R,U, A**	**1,2,3,4,8,9,10**	**20**
CO4	Write Programs using CALL and RET Instructions	**U, A**	**1,2,3,4,8,9,10**	**10**
			Total Sessions	**45**

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

List of Experiments

1. Execute an assembly language program related to data transfer group of instructions.
2. Execute an assembly language program for the addition of two 8 bit Numbers and two 16 bit Numbers
3. Execute an assembly language program for the Subtraction of two 8 bit Numbers and two 16 bit Numbers
4. Execute an assembly language program for Multiplication of two 8 bit Numbers and two 16 bit Numbers
5. Execute an assembly language program for Division of 16 bit Number by 8 bit Number
6. Execute an assembly language program to add two BCD numbers.
7. Execute an assembly language program to find reverse of a given number
8. Execute an assembly language program to find the factorial of a number.
9. Execute an assembly language program to count number of ones and zeros in a number.
10. Execute an assembly language program to find sum of 'N' numbers given in an array.
11. Execute an assembly language program to find sum of 'N' Natural Numbers
12. Execute an assembly language program to find the Smallest among 'N' Numbers.
13. Execute an assembly language program to implement searching on an array.

14. Execute an assembly language program to manipulate strings.
15. Execute an assembly language program to implement pattern matching.
16. Execute an assembly language program to move data from one location to another location.
17. Execute a program for generating multiplication table for a given number
18. Execute an assembly language program to sort the numbers in ascending order.
19. Execute an assembly language program to sort the numbers in descending order.

Suggested Student Activities

Student activity like mini-project, quizzes, etc. should be done in group of 5-10 students.

1. Each group should do any one of the following type of activity or any other similar activity related to the course with prior approval from the course coordinator and programme coordinator concerned.
2. Each group should conduct different activity and no repetition should occur.
3. Visit different web sites relevant to topics. Listen to the lectures and submit a handwritten report
4. Coding competitions

18EC-509P-PROGRAMMING IN 'C'LAB PRACTICE

Course Title :	**Programming in 'C' Lab practice**	Course Code	**18EC-509P**
Semester	**V**	Course Group	**:practical**
Teaching Scheme in Periods(L:T:P)	**15:0:30**	Credits	**: 1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**:45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Prerequisites:

Basics of digital electronics and logical thinking

Course outcomes:

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

Course Outcome		**CL**	**Linked PO**	**Teaching Periods**
CO1	Appreciate the necessity and evolution of the computer language and selection of programming paradigms	R/U/A	1,2,4,10	3
CO2	Perform algorithm development, its representation using flow-charts and analysis of solution for simple problems.	R/U/A	1,2,3,4,10	15
CO3	Employ C-programming language for simple real-world problem-solving using computer	R/U/A	1,2,3,4,5, 10	6
CO4	Develop and analyze simple programs/functions and their integration in larger problem solving.	R/U/A	1,2,3,4,5, 10	18

List of Exercises

1. Write a C Program Display your country name and beep at the end.
2. Write a C Program Display the following text:

   "welcome to C programming language"
3. Write a C Program Compute the area and circumference of a circle given the radius.
4. Given the resistance and standard tolerance, generate the color bands ofthe resistor.
5. Write a C Program Compute simple interest given the interest rate, principal and duration.
6. Write a CProgram to find if given number is even or odd.
7. Write a CProgram to find if given year is leap year.
8. Write a CProgram to find largest of three numbers.
9. Write a CProgram to grade students using switch case statement

   90-100% A grade

70-89% B grade

50-69% C grade

40-49 D grade

Below 40% Fail

10. Write a CProgram to add 1 to n natural numbers.
11. Write a CProgram to print following output on screen.

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    **

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    ****
12. Write a CProgram to add numbers in array.
13. Write a CProgram to add two 3X3 matrices.
14. Write a CProgram to multiply two 3X3 matrices.
15. Write a CProgram to find transpose of matrix.
16. Write a CProgram to find length of string.
17. Write a CProgram to find whether given string is palindrome or not.
18. Write a CProgram to swap two numbers by using call by value.
19. Write a CProgram to swap two numbers by using call by reference.
20. Write a CProgram to find factorial by using recursion technique.
21. Write a CProgram to add two numbers using user defined add function and return statement.
22. Write a CProgram to Find Absolute value of a number using math.h header file.
23. Write a C Program to Compute the area and circumference of a circle given the radius using macro for pi.
24. Write a C Program to Find smallest of three numbers using macro

SCHEME OF INSTRUCTIONS AND EXAMINATION

18EC-510P - PROJECT WORK V

SEMESTER

Course Title :	Project Work	Course Code	18EC-510P
Semester	V	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	15:0:30	Credits	1.5
Methodology	Lecture + Assignments	Total Contact Hours :	45Pds
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.

SKILL UPGRADATION-V

Course Title	: Skill Upgradation -V	Course Code	:Common
Semester	: V	Course	: Core
Teaching Scheme in periods (L :	: 0:0:7	Credits	: 2.5
Methodology	: Activities	Total Contact	: 105
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	Swach 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	16	4 Times
Total Periods		105	

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

Course Outcomes

CO	Outcome	CO/PO Mapping
CO1	Practice the moral values that ought to guide the Engineering profession.	1,2,5,6,7,8,9,10
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	8,10
CO3	Create awareness of saving environment through activities	3,4,5,8,9
CO4	Create awareness of Constitution of India	1,4,7,8,9,10

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.

CO-PO Mapping Matrix											
	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	
CO1	✓				✓					✓	5,10
CO2					✓					✓	5,10
CO3						✓	✓		✓	✓	6,7,9,10
CO4					✓		✓			✓	5,7,10

CO PO Mapping Matrix

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