GOVERNMENT OF TAMIL NADU

SYLLABUS

DIPLOMA
IN
ELECTRONICS AND COMMUNICATION ENGINEERING
K - SCHEME
2008-2009

DIRECTORATE OF TECHNICAL EDUCATION
TAMIL NADU

SYLLABUS COMMITTEE MEMBERS

1. ELECTRONICS AND COMMUNICATION ENGINEERING

CONVENOR
R.ARANGARAJOO
PRINCIPAL
CENTRAL POLYTECHNIC COLLEGE
CHENNAI - 113

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3. R. KALIDASS KRISHNASWAMY Principal. Sankar Polytechnic College, Sankar Nagar, Pin-627 357.	4. P. VENKATACHALAM Principal. Sakthi Polytechnic College, Sakthi Nagar, Erode District-638 315.
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9. S. MURUGANATHAN Sr. Lecturer. Government Polytechnic, Ooty-6.	10. Dr. R. THEAGARAJAN Professor. NITTTR, Tharamani, chennai-113
11. C. PARTHASARATHY Principal. Motilal Nehru Government Polytechnic, Puduchery-605 008.	12. V. CHANDRASEKARAN Sr. Lecturer. Central Polytechnic College, Tharamani, Chennai-113.
13. SAMBANDAM Director. Solo Automation, Jaffarkhanpet, Chennai	

DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEEING

SEMESTER SYSTEM
(Implemented from 2008 – 2009)
K-SCHEME

<u>R E G U L A T I O N S</u>

1. Description of the Course

The course for the Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters, as detailed below:

I	Semester	July/August	to	December
II	Semester	January	to	May
III	Semester	June	to	November
IV	Semester	December	to	May
V	Semester	June	to	November
VI	Semester	December	to	May

Each Semester will have 16 weeks duration of study.

2. Condition for Admission

Candidates for admission to the Diploma Course shall be required to have passed the S.S.L.C. Examination of the Board of Secondary Education, Tamil Nadu.

<div align="center">or</div>

The Anglo-Indian High School Examination with eligibility for Higher Secondary Course in Tamil Nadu.

<div align="center">Or</div>

The Matriculation examination conducted in Tamil Nadu.

<div align="center">Or</div>

Any other examination recognized as equivalent to the S.S.L.C. examination, by the Board of Secondary Education, Tamil Nadu.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time, with regard to the marks, in the qualifying examinations.

3. Eligibility for the Award of Diploma

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3 academic years in an Institution when joined in First Year and two years if joined under Lateral scheme in the second year, affiliated to the State Board of Technical Education and Training, Tamilnadu and has passed the prescribed examination.

4. Subject of study and curriculum outline

The subjects of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical. The curriculum outline for I Semester and II Semester is given in **Annexure – I.**

5.   Examinations

Board Examinations in all subjects of all semesters under the scheme of examinations will be conducted at the end of each semester.

The sectional marks in all the subjects will be awarded on the basis of continuous internal assessment made during the semester concerned. For each subject 25 marks are allotted for internal assessments and 75 marks are allotted for Board Examination.

6.   Continuous Internal Evaluation

THEORY

It has been decided to introduce continuous internal assessment marks for a total of 25 marks, which are to be distributed as follows:

ATTENDANCE   5 Marks
(Award of marks for attendance will be as per the range given below)

80% - 83%	:	1 Mark
84% - 87%	:	2 Marks
88% - 91%	:	3 Marks
92% - 95%	:	4 Marks
96% - 100%	:	5 Marks

TEST   10 Marks

For each subject three tests should be conducted out of three best of two will be taken for assessment.

ASSIGNMENT   10 Marks

For each subject three Assignments are to be given. Out of which best of two will be taken for   10 marks.

All Test Papers after getting the signature from the students, must be kept in the safe custody in the Department for verification and audit. It should be preserved for a Semester for Academic Audit.

PRACTICAL
The internal assessment marks calculation is given as follows:

a.	Attendance	:	5 Marks -	

Evaluation Pattern same as Theory

b.   Procedure/Observation and tabulation/   :   10 Marks
other related Practical Work

c.   Result   :   5 Marks

d.   Record writing   :   5 Marks
                                                  ----
                                                25 Marks

The Record for every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 20 for each exercise as per the above allocation.

At the end of the Semester, the average marks of all the exercises should be calculated for 20 marks and the marks awarded for attendance is added to arrive at the internal marks for Practical.

All the mark entries for assignment, Test and attendance should be entered in the Personal Log Book of the staff handling the subject. This is applicable to both Theory and Practical subjects.

7.   **Scheme of Examinations**
The Evaluation has to be done as given below

    a)   Allocation of marks for Board Practical Examination
       I)   Circuit diagram / Block diagram   -   20 Marks
       II)   Connection and procedure   -   20 Marks
       III) Observations   -   20 Marks
       IV) Result / Graph   -   10 Marks
       V)   Viva – Voce   -   5 marks

             Total   -   75 Marks
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    b)   Internal assessment for the project Work
To allocate internal assessment for the Project Work three reviews to be conducted and the average of three should be taken for the final assessment.

8.   **Criteria for Pass**

   1.   No candidate shall be eligible for the award of Diploma unless   he/she has undergone the prescribed course of study successfully in an Institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the subjects prescribed in the syllabus.

   2.   A candidate shall be declared to have passed the examination in a subject if he/she secures not less that 40% in theory, drawing subjects and 50% in practical subject out of the total prescribed maximum marks including both the sessional and the Board Examination marks put together, subject to the condition that he/she has to secure at least a minimum of 30 marks

out of 75 marks in the Board's Theory/Drawing/ Examinations and minimum of 35 marks out of 75 marks in Board Practical Examinations

9.   Classification of successful candidates

Classification of candidates who pass out the final examination from April 2010 onwards (joined in first year in 2007-2008) will be done as specified below:

<u>**FIRST CLASS WITH DISTINCTION**</u>

A candidate will be declared to have passed in First Class with Distinction if he/she secures not less than 75% of the aggregate marks in all semesters put together, except I and II Semester and passes all the above semesters in the First appearance itself and completes all papers including that of I & II Semester within the stipulated period of study 3/3 ½ /4years (Full Time/Sandwich/Part-Time) without any break in study.

<u>**FIRST CLASS**</u>

A candidate will be declared to have passed in First Class if he/she secures not less than 60% of the aggregate marks in all semesters put together, except I and II Semesters and completes all papers including that of I & II Semester within the stipulated period of study 3 / 3 ½ / 4 years   (Full Time/Sandwich/Part-Time) without any break in study.

<u>**SECOND CLASS**</u>

All other successful candidates will be declared to have passed in Second Class.

The above mentioned classification is application for the Sandwich / Part – Time students who pass out Final Examination from October 2010 / April 20011 onwards (both joined in First Year in 2007-2008).

10.   DURATION OF A PERIOD IN THE CLASS TIME TABLE

The duration of each period of teaching in a day is 1 hour and the total period of instruction hours excluding interval and lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 period of instruction (Theory & Practical).

Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Full Time)
K - Scheme
(With effect from 2008-2009)

Total Curriculum Hours : 35 Hours / Week   Total Working Hours : 35 Hours / Week
                                                                                    16weeks/Semester

III Semester

Sl. No.	Subject Code	Subject Name	Hrs Per week	Duration Of Exam Hours	Examination Marks			
					Allocation of Marks			Min. Marks
					IA	BE *	Total	For Pass
1	14031	Electronic Devices and Circuits	6	3	25	75	100	40
2	14032	Electric Circuits and Instrumentation	6	3	25	75	100	40
3	14033	'C' Programming and OOPS	5	3	25	75	100	40
4	14034	Electronic Devices and Circuits Lab	6	3	25	75	100	50
5	14035	Electric Circuits & Instrumentation Lab	6	3	25	75	100	50
6	14036	'C' Programming Lab	6	3	25	75	100	50

*Minimum of 30 marks out of 75 marks in Theory Examination
 Minimum of 35 marks out of 75 marks in Practical Examination

IV Semester

Sl. No.	Subject Code	Subject Name	Hrs Per week	Duration Of Exam Hours	Examination Marks			
					Allocation of Marks			Min. Marks
					IA	BE *	Total	For Pass
1	14041	Analog and Digital Electronics	6	3	25	75	100	40
2	14042	Industrial Electronics	6	3	25	75	100	40
3	14043	Communication Engineering	6	3	25	75	100	40
4	14044	Analog and Digital Electronics Lab	6	3	25	75	100	50
5	14045	IE and CE Lab	7	3	25	75	100	50
6	11011	English Communication Lab	4	3	25	75	100	50

*Minimum of 30 marks out of 75 marks in Theory Examination
 Minimum of 35 marks out of 75 marks in Practical Examination

V Semester

Sl. No.	Subject Code	Subject Name	Hrs Per week	Duration Of Exam Hours	Examination Marks			
					Allocation of Marks			Min. Marks For Pass
					IA	BE *	Total	
1	14051	Microprocessor and Microcontroller	6	3	25	75	100	40
2	14052	Advanced Communication Systems	6	3	25	75	100	40
3		**Elective - I**	5	3	25	75	100	40
	14071	1. Digital Signal Processing						
	14072	2. VLSI						
	14073	3. Robotics and Auto-Electronics						
4	14054	Microprocessor and Microcontroller Lab	6	3	25	75	100	50
5	14055	Advanced Communication Systems Lab	6	3	25	75	100	50
6	14074 14075 14076	Elective - I Lab Digital Signal Processing Lab VLSI Lab Robotics and Auto-Electronics Lab	6	3	25	75	100	50

*Minimum of 30 marks out of 75 marks in Theory Examination
 Minimum of 35 marks out of 75 marks in Practical Examination

VI Semester

Sl. No.	Subject Code	Subject Name	Hrs Per week	Duration Of Exam Hours	Examination Marks			
					Allocation of Marks			Min. Marks For Pass
					IA	BE *	Total	
1	14061	Computer Hardware and Networking	6	3	25	75	100	40
2	14062	Embedded Systems	6	3	25	75	100	40
3		**Elective - II**	5	3	25	75	100	40
	14081	1. Digital Image Processing						
	14082	2. Television Engineering						
	14083	3. Bio-Medical Instrumentation						
4	14064	Computer Hardware and Networking Lab	6	3	25	75	100	50
5	14065	Embedded Systems Lab	6	3	25	75	100	50
6	14066	Project Work & Entrepreneurship	6	3	25	75	100	50

*Minimum of 30 marks out of 75 marks in Theory Examination
 Minimum of 35 marks out of 75 marks in Practical Examination

Diploma in Electronics and Communication Engineering (Part Time)
K - Scheme
(With effect from 2008-2009)

Total Curriculum Hours : 18 Hours / Week   Total Working Hours : 18 Hours / Week
                                                                                        16weeks/Semester

III Semester

Sl. No.	Subject Code	Subject Name	Examinations Marks					
			Hrs Per week	Duration of Exam Hours	IA	BE*	Total	Min.* Marks For Pass
1	14031	Electronic Devices and Circuits	4	3	25	75	100	40
2	14032	Electric Circuits and Instrumentation	4	3	25	75	100	40
3	12005	Engineering Graphics	3	3	25	75	100	40
4	14034	Electronic Devices and Circuits Lab	4	3	25	75	100	50
5	12008	Computer Application Lab	3	3	25	75	100	50

IV Semester

Sl. No.	Subject Code	Subject Name	Examinations Marks					
			Hrs Per week	Duration of Exam Hours	IA	BE*	Total	Min.* Marks For Pass
1	14033	'C' Programming & OOPS	4	3	25	75	100	40
2	14032	Analog and Digital Electronics	4	3	25	75	100	40
3	14035	Electric Circuit and Instrumentation Lab	4	3	25	75	100	50
4	14036	'C' Programming Lab	3	3	25	75	100	50
5	14044	Analog and Digital Electronics Lab	3	3	25	75	100	50

 *Minimum of 30 marks out of 75 marks in Theory Examination
 Minimum of 35 marks out of 75 marks in Practical Examination

V Semester

Sl. No.	Subject Code	Subject Name	Examinations Marks					
			Hrs Per week	Duration of Exam Hours	IA	BE*	Total	Min.* Marks For Pass
1	14042	Industrial Electronics	5	3	25	75	100	40
2	14043	Communication Engineering	5	3	25	75	100	40
3	14045	IE & CE Lab	4	3	25	75	100	50
4	11011	English Communication Practical	4	3	25	75	100	50

VI Semester

Sl. No.	Subject Code	Subject Name	Examinations Marks					
			Hrs Per week	Duration of Exam Hours	IA	BE*	Total	Min.* Marks For Pass
1	14051	Microprocessor & Microcontroller	5	3	25	75	100	40
2	14052	Advanced Communication Systems	5	3	25	75	100	40
3	14054	Microprocessor & Microcontroller Lab	4	3	25	75	100	50
4	14055	Microprocessor & Microcontroller Lab	4	3	25	75	100	50

*Minimum of 30 marks out of 75 marks in Theory Examination
 Minimum of 35 marks out of 75 marks in Practical Examination

VII Semester

Sl. No.	Subject Code	Subject Name	Examinations Marks					
			Hrs Per week	Duration of Exam Hours	IA	BE*	Total	Min.* Marks For Pass
1	14061	Computer Hardware & Networking	5	3	25	75	100	40
2	14071 14072 14073	**Elective - I** 1. Digital Signal Processor 2. VLSI 3. Robotics and Auto-Electronics	5	3	25	75	100	40
3	14064	Computer Hardware & Networking Lab	4	3	25	75	100	50
4	14074 14075 14076	**Elective – I Lab** 1. Digital Signal Processor 2. VLSI 3. Robotics and Auto-Electronics	4	3	25	75	100	50

VIII Semester

SI. No.	Subject Code	Subject Name	Hrs Per week	Duration of Exam Hours	IA	BE*	Total	Min.* Marks For Pass
			Examinations Marks					
1	14062	Embedded Systems	5	3	25	75	100	40
2	14081 14082 14083	Elective - II 1. Digital Image Processor 2. Television Engineering 3. Bio-Medical Instrumentation	5	3	25	75	100	40
3	14065	Embedded Systems Lab	4	3	25	75	100	50
4	14066	Project Work and Entrepreneurship	4	3	25	75	100	50

*Minimum of 30 marks out of 75 marks in Theory Examination
 Minimum of 35 marks out of 75 marks in Practical Examination

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EQUIVALENT PAPERS
III SEMESTER

S. No	Subject Code J Scheme	Name of Subject J Scheme	Subject Code K Scheme	Name of Subject K Scheme
01	ECJ310	Electrical Circuit and Machines	14032	Electric Circuits and Instrumentation
02	ECJ320	Electronics Devices and Components	14031	Electronic Devices & Circuits
03	EEJ330	C++ Programming		No Equivalent
04	ECJ340	Electrical Circuits & Machines Lab	14035	Electric Circuits and Instrumentation Lab.
05	ECJ350	Electronic Devices & Components Lab	14034	Electronic Devices & Circuits Lab.
06	ECJ360	C++ Programming Lab.		No Equivalent

IV SEMESTER

S. No	Subject Code J Scheme	Name of Subject J Scheme	Subject Code K Scheme	Name of Subject K Scheme
01	ECJ410	Electronic Circuit	14031	Electronic Devices & Circuits
02	ECJ420	Digital Electronics	14041	Analog and Digital Electronics
03	ECJ430	Measurements and Instruments	14032	Electric Circuits and Instrumentation
04	ECJ440	Electronic Circuit Lab	14034	Electronic Devices & Circuits Lab
05	ECJ450	Digital Electronics Lab.	14044	Analog and Digital Electronics Lab.
06	ECJ460	Measurements and Instruments Lab.	14035	Electric Circuits and Instrumentation Lab.

V SEMESTER

S. No	Subject Code J Scheme	Name of Subject J Scheme	Subject Code K Scheme	Name of Subject K Scheme
01	ECJ510	Communication Engineering	14043	Communication Engineering
02	ECJ520	Micro Controllers and Advanced Microprocessor	14051	Microprocessor and Microcontroller
03	ECJ530	Elective – I		
	ECJ530.1	Surface Mount Technology		No Equivalent
	ECJ530.2	Computer Installation and servicing	14061	Computer Hardware and Networking
	ECJ530.3	Bio-Medical Instrumentation	14083	Bio-Medical Instrumentation
	ECJ530.4	Power Electronics		No Equivalent
04	ECJ540	Communication Engineering Lab.	14045	IE & CE Lab.
05	ECJ550	Micro Controllers and Advanced Microprocessor Lab	14054	Microprocessor and Microcontroller Lab.
06	ECJ560	Elective – I Lab.		
	ECJ560.1	Surface Mount Technology Lab.		No Equivalent
	ECJ560.2	Computer Installation and servicing Lab.	14064	Computer Hardware and Networking Lab.
	ECJ560.3	Bio-Medical Instrumentation Lab.		No Equivalent
	ECJ560.4	Power Electronics Lab.		No Equivalent

VI SEMESTER

S. No	Subject Code J Scheme	Name of Subject J Scheme	Subject Code K Scheme	Name of Subject K Scheme
01	ECJ610	Communication System	14052	Advanced Communication System
02	ECJ620	Industrial Electronics	14042	Industrial Electronics
03	ECJ630	Elective – II		
	ECJ630.1	Digital Communication	14052	Advanced Communication System
	ECJ630.2	Television Engineering	14082	Television Engineering
	ECJ630.3	Computer Networks	14061	Computer Hardware and Networking
	ECJ530.4	Digital Signal Processing	14071	Digital Signal Processor
04	ECJ640	Communication System Lab.	14055	Advanced Communication System Lab.
05	ECJ650	Industrial Electronics Lab	14045	IE & CE Lab.

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14031 - Electronic Devices and Circuits

Total No of Hours /week   :   6

Total No of Weeks/Semester   :   16

Total No pf Hours / Semester   :   96

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Electronic Devices and Circuits	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
	6	96	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME(HRS)
1	Components and Diodes	16
2	Bipolar Junction Transistor	16
3	Transistor oscillators and FET and UJT	18
4	SCR, DIAC, TRIAC, MOSFET and IGBT	16
5	Opto Electronics Devices and Waveshaping Circuits	18
	Revision and test	12
Total		96

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to :

- Familiarize various passive and active components
- Study the working principle of PN junction diode and transistor
- Understand the working principle of different types of rectifiers
- Understand the different transistor configurations
- Differentiate various types of amplifiers
- Study the performance of special devices like UJT,FET
- Study the performance of different transistor oscillators
- Study the performance of SCR, DIAC, and TRIAC
- Study the performance of MOSFET and IGBT
- Know the construction and working principle of optoelectronic devices
- Study the performance of solar cell
- Explain the concept of wave shaping circuits
- Study the working principle of clippers and clampers

14031 - ELECTRONIC DEVICES AND CIRCUITS
DETAILED SYLLABUS

Unit – I Components and Diodes:

Components – Electronic components – Passive components – Resistors – Fixed and variable – Colour coding – Uses – Capacitors – Fixed and Variable – Uses. Inductors – Fixed and Variable – Factors affecting the inductance – Applications – Switch – Switch function – Types – On/Off – Push to ON – Push to Off – SPST – SPDT – Relay (Construction details not required), Limit Switch.

Diodes – Semiconductors – PN Junction diode – Forward and Reverse bias characteristics – Specifications – Zener diode – Construction & working principle – Characteristics – Zener break down – Avalanche break down – Zener diode as a voltage regulator – Applications – Specifications.

Rectifier – Introduction – Classification of Rectifiers – Half Wave Rectifier – Full Wave Rectifier – Bridge Rectifier – Efficiency – Ripple factor – Applications – Filters – C, LC and PI Filters.

Unit – II Bipolar Junction Transistor:

Transistor – Transistor as an amplifier – Transistor Biasing – Fixed bias, Collector base bias, Self bias – CB, CE, CC Configurations – Characteristics – Comparison between three configurations in terms of input impedance, output impedance, current gain, voltage gain - RC coupled amplifier – Load characteristic analysis – Emitter follower and its applications – Negative feed back – Transistor as a switch.

Unit – III Transistor oscillators and FET and UJT:

Transistor Oscillator – Classifications – Condition for Oscillation (Barkhausen critierion) – General form of LC Oscillator – Hartley Oscillator – Colpitts Oscillator – RC Phase shift Oscillator, Crystal oscillator.

Field Effect Transistor– Construction – Working principle of FET – Difference between FET and BJT – Characteristics of FET – Specifications – FET amplifier (Common source Amplifier), FET as CHOPPER.

UJT – Construction – Equivalent circuit – Operation **–** characteristics – UJT as a relaxation oscillator

Unit – IV SCR, DIAC, TRIAC, MOSFET and IGBT:

SCR – Introduction – Working – Two transistor analogy of SCR – VI characteristics – SCR as a Switch, Controlled rectifier – Specifications.

DIAC – Construction – Working – Characteristics – Diac as bi-directional switch.

TRIAC – Basic working principle – Characteristics – Speed control of fan using Diac and Triac

MOSFET – Construction – Characteristics – MOSFET as a Switch – CMOS basic concept   **IGBT** – Basic principle – IGBT as a Switch.

Unit – V Opto Electronics Devices and Waveshaping Circuits:

LDR, LED, 7 segment LED, LCD, Opto coupler, Opto interrupter – Infrared transmitter and Receiver – Laser diode (simple treatment) – Solar cell – Avalanche Photodiode – Photo transistor.

Diode clipper – Types – clamper circuits using diode – Voltage doubler, Astable, Monostable and Bistable operations using Transistor.

Text books:

    1. Principle of Electronics   -   V.K. Mehta

Reference Books:

    1. Electronics principles   -   Malvino
                                      Tata McGraw Publication

    2. Electronics Devices and Circuits   -   Allen Mottershed
                                      Tata McGraw – Hill Publication

    3. Electronics Devices and Circuits   -   Jacob
                                      Millman and Halkies
                                      Tata McGraw – Hill Publication

    4. Optical Fiber Communication   -   Gerd Keiser.

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14031 Electronic Devices and Circuits
MODEL QUESTION PAPER - I

Total Marks: 75

PART – A

Answer all questions   **10 x 1 = 10 marks**

1. Distinguish between a Rectifier and a Zener
2. Define rectifier efficiency.
3. Mention the application of an Emitter follower.
4. What are current and voltage gain of common emitter configuration
5. What is Barkhausen critierion .
6. Define intrinsic stand off ratio
7. What is meant by controlled rectifier?
8. State application of TRIAC.
9. What are the two types of LCD?
10. What is meant by DC restorer?

PART – B

Answer all questions.   **5 x 3 = 15 marks**

11. How to identify the value of a resistor? And What is PIV of Bridge Rectifier?
12. Describe the features of common Base configuration, What is meant by negative feed back?
13. What are the conditions for oscillations? And compare FET and BJT.
14. Explain (a) Firing angle and (b) Conduction angle of an SCR.
15. What is meant by IGBT? Explain

PART – C

Answer any one from each question   **5 x 10 = 50 marks**

16. (a) Explain the operation of Zener diode. Distinguish between avalanche and zener breakdown.

    or

    (b) With suitable sketches, explain the operation of full wave rectifier.

17. (a) Explain the input and output characteristics of common emitter configuration.

    or

    (b) Explain the principle of emitter follower and its application.

18. (a) Explain the operation of Hartley oscillator

    or

    (b) With suitable sketches, explain the operation of FET amplifier.

19. (a) Explain the operation of SCR under two transistor analogy and draw the VI characteristics of SCR.

    or

    (b) What is a Triac? Sketch its characteristics and describe its operation.

20. (a) Describe the principle of operation of an avalanche photo-diode and mention its application.

    or

    (b) With suitable sketches, explain the operation of monostable multivibrator.

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14031 ELECTRONIC DEVICES AND CIRCUITS
MODEL QUESTION PAPER - II

Total Marks : 75

PART – A

Answer all question   **10 x 1 = 10marks**

1. Define Ripple factor.
2. Define cutin voltage.
3. What are current gain and voltage gain of CB configuration.
4. State the advantage of self bias.
5. What is meant by Pinch-off voltage?
6. State any Two difference between BJT and FET.
7. Distinguish JFET and MOSFET.
8. State any two application of MOSFET.
9. Distinguish between clipper and clamper.
10. Differentiate between astable and monostable multivirator.

PART – B

Answer all questions.   **5x 3 = 15 marks**

11. What is zener breakdown? Explain the operation of limit switch.
12. What is the need for biasing a transistor?
13. Draw an LC oscillator.
14. What are the feature of SCR and Triac
15. What is meant by opto coupler.? Mention its applications.

PART – C

Answer any one from each question   **5 x 10 = 50 marks**

16. (a) Describe the action of PN junction diode under forward and reverse bias.
                                or
    (b) With suitable sketches, explain the operation of a bridge rectifier.

17. (a) Draw and explain the operation of common collector configuration.
                                or
    (b) Discuss the switching characteristics of a transistor for a pulse input.

18. (a) Explain the operation of RC phase shift oscillator.
                                or
    (b) Draw the equivalent circuit of UJT and explain its operation, with the help of emitter characteristics.

19. (a) Explain the speed control of fan using Diac and Triac.
                                or
    (b) What is an IGBT? Sketch its construction and describe its operation.

20. (a) Describe the principle of operation of an LCD.
                                or
    (b) With suitable sketches, explain the operation of an astable multivibrator.

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14032 - ELECTRIC CIRCUITS AND INSTRUMENTATION

Total No of Hours /week   :   6

Total No of Weeks/Semester   :   16

Total No of Hours / Semester   :   96

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Electric Circuits and Instrumentation	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
	6	96	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME(HRS)
1	DC Circuits and theorems	16
2	AC Circuits and resonance	16
3	Transformers and Machines	16
4	Measuring Instruments and CRO	18
5	Recorders, Transducers and Digital Test Instruments	18
	Revision and test	12
Total		96

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to :
- Study Ohm's law and Kirchoff's Laws
- Explain the circuit theorems
- Solve simple problems in DC circuits
- Understand the different RLC series and parallel circuits
- Study the series and parallel resonance circuits
- Solve simple problems in AC circuitrs
- Explain the principle of transformer
- Study the principles and types of DC machines
- Explain the usage of stepper motor
- Study the basic measuring instruments
- List out the types of bridges
- Draw the block diagram of CRO
- List out the types of CRO
- List out the classification of recorders and transducers
- Explain the principle of operation of recorders and transducers
- Explain the concept of DVM

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14032 - ELECTRIC CIRCUITS AND INSTRUMENTATION
DETAILED SYLLABUS

UNIT I D.C. CIRCUITS AND THEOREMS:

Ohm's law - Kirchoff's laws **-** Statement of KCL and KVL – simple problems in series and parallel circuits – Relationship between Current, Voltage, Power and energy – statement and explanation of superposition Theorem, Thevenin's, Norton's and Maximum power theorems – simple problems.

UNIT II A.C. CIRCUITS AND RESONANCE:

Voltage and Current relationship in the resistance, inductance and capacitance. Concept of reactance, susceptance, conductance, Impedance and Admittance in series and parallel RL, RC and RLC circuits - Three phase supply – star and delta connection diagrams – Relation between line and phase & voltages and currents - simple problems.

Series and parallel resonance circuits – condition for resonance, resonant frequency, Q factor and bandwidth – simple problems.

UNIT III TRANSFORMERS AND MACHINES:

Ideal transformer working principle – EMF equation – core and copper losses – Efficiency and regulation – OC and SC test on transformer. D.C generator - Working principle, types and applications – D.C Motor working principle and types and uses. Single phase induction motor – Construction, principle of operation and types – Capacitor start induction motor – stepper motor – uses (qualitative treatment only).

UNIT IV MEASURING INSTRUMENTS AND CRO:

Basic force for indicating instrument –Constructional Features of Permanent magnet moving coil Instrument –Shunts and Multipliers-DC Ammeters circuit –DC Voltmeters circuit- Multi range-Voltmeter sensitivity – Schematic Diagram of a Multi meter for DC current, DC voltage, AC current, AC voltage – Bridges - Wheat stone bridge-Kelvin's double bridge- Maxwell's bridge- Hay's bridge – Wein Bridge Universal Impedance Bridge arrangements to measure R,L.C

Principle of operation and Block diagram of CRO –CRT operation- Electrostatic focusing Electrostatic deflection (No derivation)-Vertical Deflection system block diagram- Need for Time Base Voltage – Types of CRO - Applications of CRO –Block diagram of Dual trace-Dual beam CRO –Comparison –Digital storage oscilloscope – Wobbuloscope.

UNIT V RECORDERS, TRANSDUCERS & DIGITAL TEST INSTRUMENTS:

Classification of Recorders- X-Y recorder-Strip Chart Recorder- recorder-Classification of Transducers-Strain Gauges -Types & Applications -Construction, principles of operation of capacitive, inductive, Photo electric, LVDT, Velocity, Displacement transducers-Load cell- Block diagram of Electronic Weighing machine – Thermistor and Thermocouples – Construction - Types and applications.

DVM – Block diagram of DVM -Types of DVM- Successive approximation type DVM-Automation in Digital instruments-Auto Ranging- Auto Polarity- Auto Zeroing-Digital Frequency counter-Extending the range-Block diagram of digital Multimeter- Block diagram of a PC Based Data Acquisition system

TEXT BOOKS:

1. Electric Circuit theory – Dr. M. Arumugam and N. Premkumaran
2. Electronic Devices and Circuit theory-Boylestead and Nashelsley.
3. Modern Electronic Instrumentation and Measurements Techniques –Albert d. Helfrick and William David Cooper-PHI
4. Electronic Instrumentation- G.K.Mithal-Khanna Publishers.

REFERENCE BOOKS:

1. A Text book of Electrical Technology – B.L. Theraja
2. Electrical &Electronic - Measurements & Instrumentation –Sawheney, Dhanpatrai & son
3. Electrical &Electronic - Measurements & Instrumentation- Umesh Sinha, Sathyaprakashan Tech.

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14032 - ELECTRIC CIRCUITS AND INSTRUMENTATION
MODEL QUESTION PAPER – I

Time : Three Hours   Max. Marks: 75

PART – A

Answer all the questions.   **10 x 1 = 10**

1. State Kirchhoff's laws.
2. Define power.
3. What is meant by Resonance?
4. Define quality factor.
5. What are the losses in transformer?
6. State any two application of Dc shunt generator
7. List out the types of damping.
8. State any two application of Hays bridge.
9. What is meant by LVDT?
10. State any two application of load cell.

PART – B

Answer all questions.   **5 x 3 = 15**
11. Find the value of current in circuit with resistance 2 Ohm and 1 Ohm connected in parallel.
12. Explain star and delta connection.
13. List out the types of DC generator mention its application.
14. Draw the diagram of Hay's Bridge, and explains its feature.
15. What is meant by thermo couple? And explain.

PART – C

Answer any one from each question   **5 x 10 = 50**

16. (a) State and explain Super position theorem.
                          (or)
    (b) State and explain Norton's theorem.

17. (a) Find out the impedance and Admittance of RL & RC parallel circuit.
                          (or)
    (b) Explain the condition for resonance and compare series and parallel resonance circuits.

18. (a) Explain in details of OC & SC test on transformer.
                          (or)
    (b) Explain the principle of operation of capacitor start induction motor.

19. (a) With a diagram, explain the construction features and working of PMMC instrument.
                          (or)
    (b) Explain the operation of vertical deflection system and mention the applications of CRO.

20. (a) Explain the operation of LVDT and mention its applications.
                          (or)
    (b) Explain the principle of operation of digital frequency counter.

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14032 - ELECTRIC CIRCUITS AND INSTRUMENTATION
MODEL QUESTION PAPER – II

Time : Three Hours   **Max. Marks: 75**
PART – A

Answer all the questions.   **10 x 1= 10**

1. State the ohm's law.
2. Define energy.
3. Define impedance and admittance.
4. Define bandwidth.
5. Define efficiency of the transformer.
6. Define regulation of transformer.
7. What is meant by voltmeter sensitivity?
8. State any two uses of maxwells bridge.
9. What is meant by transducer?
10 State differences between XY recorder and strip chart recorder..

PART – B

Answer all the questions.   **5 x 3= 15**

11. State the KVL and KCL and explain.
12. Define susceptance and conductance and impedance.
13. Explain various losses in transformer?
14. Explain various forces required in indicating instruments?
15. What is meant by strain gauge and load cell?

PART – C

Answer any one from each question.   **5 x 10 = 50**

16. (a) State and explain Thevenin's theorem.
                              (or)
    (b) State and explain maximum power transfer theorem.

17. (a) Derive the relation between line and phase voltage in star connection.
                              (or)
    (b) Derive an expression for the impedance of an RLC series circuit.

18. (a) Explain the working principle of a transformer.
                              (or)
    (b) Explain the principle of operation of a single phase induction motor.

19. (a) Draw the block diagram of CRO and explain its operation.
                              (or)
    (b) Explain wheatstone's bridge circuit and list out the applications.

20. (a) With a diagram, explain the working principle of stripchart recorder.
                              (or)
    (b) With the block diagram, explain the working of successive approximation
        type DVM.

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14033 – "C" PROGRAMMING & OOPS

Total No. of Hrs. / Week	:	5	
Total No. of Weeks / Semester	:	16	
Total No. of Hrs. / Semester	:	80	

Scheme of Instruction and Examination

Subject	Instruction		Examination		
	Hrs/ Week	Hrs/ Semester	Assessment Mark		
"C" Programming & OOPS			Internal	Board Exam	Total
	5	80	25	75	100

Topics and allocation

Unit	Topic	Time (Hrs)
I	Keywords, Constants, Variables and Datatypes	14
II	Decision Making, Branching and Looping and Arrays	14
III	Character String and Functions	14
IV	Pointers and File Management	14
V	Object oriented programming	14
	Revision, Test	10
Total		80

OBJECTIVES:

⇨ To understand various data types

⇨ To understand various operators

⇨ To understand various functions

⇨ To understand various decision making statements

⇨ To understand various loops

⇨ To understand different types of arrays

⇨ To understand functions of strings

⇨ To understand the operations of structure and union

⇨ To understand functions of pointer

⇨ To understand various file management techniques

⇨ To understand object oriented programming Techniques

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14033 – "C" PROGRAMMING & OOPS
<u>DETAILED SYLLABUS</u>

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UNIT – I KEYWORDS, CONSTANTS, VARIABLES AND DATATYPES:

Character Set – Constants – Integer Constants – Character Constants – String Constants; Variables – Declaration of Variables; Assigning value to Variables.

Operations and Expressions:

Arithmetic, Relational, Logical, Assignment, Increment, Decrement, Conditional, Bitwise Operator, Arithmetic Expressions, Evaluation of Expression.

I/O Statements:

Printf() and Scanf() functions (Unformat and formatted), getchar() and putchar() functions.

Functions:

Predefined functions – isdigit, isupper, islower and ispunct functions in header file<ctype.h> ; cos, tan, exp, ceil, floor, abs, pow and sqrt functions in header file <math.h>; Strlen, strcpy, strcmp and strcat in header file <string.h>.

UNIT – II DECISION MAKING, BRANCHING AND LOOPING AND ARRAYS:
Introduction:

Simple if statement.

Decision Making & Branching:
The if…else statement; Nesting of if…else statement; else…if ladder; switch case statement; goto statement.

Looping:

While statement; do…while statement; for statement, break & continue statement.

Arrays:

One Dimensional Arrays; Two Dimensional Arrays – Initializing One dimensional & Two-Dimensional Arrays; Multidimensional Arrays.

UNIT - III CHARACTER STRING AND FUNCTIONS:

Character Strings:

Introduction – declaring & initializing string variables; Reading Strings; Writing Strings; Comparison of two Strings; String handling functions; User defined functions.

Functions:

Function – declaration, function – definition, function call, passing arguments, returning values, return statement.

Structures & Unions:

Structure definition; Structure Initialization; Arrays of Structures; Structures within structures; Unions.
UNIT – IV POINTERS AND FILE MANAGEMENT:

Macro Substitution; File Inclusion; Compiler Controlled Directives.

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Pointers:

Understanding Pointers: Accessing the address of Variables; Declaring and Initializing Pointers; Accessing a variable through its pointer; Pointer Expressions; Pointer Increments; Pointers and Arrays; Pointer and character Strings; Pointer and functions; Pointers and Structures.

File Management:

Introduction; Defining and Opening a file; closing a file; Input / Output Operations on files (getc, putc,getw, putw, fprintf and fscanf functions); Error handling during I/O operation; Random Access files; Command line arguments; Appending items to a file.

UNIT - V OBJECT ORIENTED PROGRAMMING:

Introduction to OOPS:

Limitation of Procedural Languages; Object Oriented approach – Analogy; Approach to Organisation, characteristics of Object Oriented Languages – Objects, Classes, Inheritance, Reusability, Structure of C++ Programs, Creating New Data types, Polymorphism, Inheritance and Overloading (Simple Programs) – Application of OOPs.

Text Book:
1.	Programming in 'C' (withCD)	Balagurusamy E Tata McGrow Hill Publishing Company, New Delhi.

Reference Books :

1	Object Oriented Programming with C++	Balagurusamy E	Tata McGrow Hill Publishing Company, New Delhi.
2	Computer Programming in C	Rajaraman V	Prentice Hall of India (P) Ltd., New Delhi

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14033 – "C" PROGRAMMING & OOPS
MODEL QUESTION PAPER I

Time : 3 Hrs.   Max. Marks: 75
PART – A

Answer all questions   **10 X 1=10**

1. Define term identifier.
2. What is meant by header file?
3   What is meant by looping?
4. State any two difference between Do-while statement and while statement.
5. What is meant by a string?
6. state any two difference between structure and union.
7. What is called macro substitution?
8. State the difference between getc and putc function.
9. Define inheritance.
10. Define object.

Part - B

Answer all questions.   **5 X 3=15**

11. State various functions available in math.h header file.
12. Discuss the syntax of while statement and do – while statement.
13. What are the various application of structures and unions?
14. Differentiate between the content of variable and address of a variable.
15. Explain the term polymorphism and class.

Part - C

Answer any one from each question   **5 X 10 = 50**

16. (a) Explain the use of printf() and scanf() function with example
                              (or)
    (b) Write a program in "c" to solve a quadratic equation.

17. (a) Write down the syntax of while and do… while statement and explain. Write
       example.
                              (or)
    (b) With suitable examples explain how one dimensional and two dimensional arrays
        declared and initialized.

18. (a) What are the different ways of passing arguments to a function? Explain with
        suitable examples.
                              (or)
    (b) With the help of a suitable example explain structure within a structure.

19. (a) Write a function named swap to interchange the values stored in two locations.
                              (or)
    (b) Explain how an array of storage is handled using pointers.

20. (a) Explain the characteristics of object oriented programming.
                              (or)
    (b) Explain input/output operations on files.
                              * * *

14033 – "C" PROGRAMMING & OOPS

MODEL QUESTION PAPER II

Time : 3 Hrs.   Max. Marks: 75

PART – A

Answer all questions   **10 X 1 = 10**

1. What are bitwise operators?
2. What is meant by predefined function?
3. What is meant by a subscript?
4. Differentiate between one-dimensional and two dimensional array.
5. What is union?
6. State use of return statement.
7.   What is called pointer?
8. What is meant by compiler controlled directive?
9. Define classes.
10. Define polymorpohism.

Part-B

Answer all questions   **5 X 3 = 15**

11. What is meant by predefined function? and explain scanf function
12. Discuss the syntax of if…else statement and switch statement.
13. How to declare a string variable and explain compare of two string.
14. How to declare and initialize pointer.
15. State the advantage of object oriented approach and list the application of OOPS.

Part-C

Answer any one from each question   **5 X 10 = 50**

16. (a) Explain the use of functions available in <math.h> and <ctype.h> header files.
                                           (or)
    (b) Explain various operations available in "C" with example.

17. (a) Explain switch statement and for statement with example.
                                           (or)
    (b) Write a "C" program to count the number of characters in a given word.

18. (a) Write a "C" program to find the factorial of a number using function.
                                           (or)
    (b)   Write a "C" program to arrange the given N names in alphabetical order.

19. (a) Explain in detail about compiler controlled directives.
                                           (or)
    (b) What is the use of pointers in function? How are they used.

20. (a) Show how a file can be opened, used and closed in "C" with example.
                                           (or)
    (b) Write a c program to copy the contents from one file to another.

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14034 - ELECTRONIC DEVICES AND CIRCUITS LAB

1. VI Characteristics of PN JN Diode

2. VI Characteristics of Zener diode.

3. HW, FW with and without filter.

4. Bridge Rectifier with and without filters.

5. VI characteristics of Regulator.

6. Input/output characteristics of CE Transistor.

7. Frequency response of RC coupled amplifier.

8. Emitter follower.

9. Negative feedback amplifier.

10. RC phase shift oscillator.

11. Hartley and Colpitts oscillator.

12. JFET characteristics.

13. Common source amplifier.

14. UJT characteristics.

15. UJT relaxation oscillator.

16. SCR characteristics.

17. DIAC and TRIAC characteristics.

18. Clipper, clamper and voltage doubler.

19. LDR, Photo diode and Photo transistor characteristics.

20. Solar cell and opto coupler.

EQUIPMENT REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Dual Power Supply	0 – 15V	10
2	High voltage power Supply	0 – 250 V	2
3	Signal Generator	1 Mhz	10
4	Dual Trace CRO	30 MHz	10
5	Transformer	12-0-12	5
6	Digital Multimeter		10

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14035 - CIRCUIT THEORY AND INSTRUMENTATION LAB

LIST OF EXPERIMENTS

1. Verification of Ohm's Law
2. Verification of Kirchoff's Voltage and current Law
3. Verification of Superposition theorem
4. Verification of Thevenin's theorem
5. Verification of Norton's Theorem
6. Verification of maximum Power transfer theorem
7. To Conduct OC and SC test to determine the efficiency of transformer
8. To Calibrate of ammeter and Voltmeter
9. To Construct and test the performance of Wheatstone bridge
10. To Construct and test the performance of Wien bridge
11. To Construct RLC bridge to measure R , L and C
12. To measure the amplitude and frequency using dual trace CRO
13. To measure frequency and phase angle using CRO by Lissajous Figure
14. To Construct and test the performance of photoelectric transducer
15. To measure displacement using LVDT
16. To measure the strain using load cell
17. To measure the strain using strain gauge
18. To measure the temperature using thermistor

EQUIPMENT REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Dual Power Supply	0 – 15V	10
3	Signal Generator	1 Mhz	10
4	Dual Trace CRO		10
5	Digital Multimeter		5

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14036 - 'C' PROGRAMMING LAB.

On completion of the experiment students should be able to write programs in C and execute it.

1. Program to calculate simple and compound instrest.

2. Solution of a Quadratic Equation.

3. Program for Pay bill calculation.

4. Program to compute sum of series using While loop.

5. Printing of multiplication table using Do…While loop.

6. Program to find whether the given number is a positive number, negative number or zero.

7. Program to sort a list of numbers

8. Program to sort the strings.

9. Preparation of the rank list of a class of students.

10. Program to implement Matrix addition & multiplication.

11. Program to implement Fibannoci series.

12. Program to find factorial of given N numbers with out recursion.

13. Program to find factorial of given N numbers with recursion.

14. Program to tabulate a survey data.

15. Program to count number of characters, words & lines in a text.

16. Program to develop a pattern (eg.: pyramid, square)

17. write a function to swap the values of to variables to illustrate the concept of pass by reference.

18. write a program to add five numbers by getting the values through command line argument .

REQUIREMENTS:

Software:

- C Compiler with editor

Hardware:

- Pentium IV Computer 20 Nos

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14041 - ANALOG AND DIGITAL ELECTRONICS

Total No. of hours/Week : 6

Total No. of Weeks/Semester : 16

Total No. of Hours/Semester : 96

Scheme of Instruction and Examination

Subject	Instruction		Examination		
	Hours/ Weeks	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
Analog and Digital Electronics	6	96	25	75	100

Topics and Allocation

Unit	Topic	Time (Hrs)
Unit 1	Linear Ics : Op. amp. Timer and their applications	16
Unit 2	Boolean Algebra	16
Unit 3	Combinational Logic	18
Unit 4	Sequential Logic	18
Unit 5	D/A, A/D and Memory	16
	Revision and Test	12
Total		96

Objectives:

On completion of the following units of syllabus contents, the students must be able to

⇨ Explain the characteristics of op. amp.

⇨ Explain the various applications of op.amp.

⇨ Explain the functional block diagram of 555 Timer.

⇨ Explain Astable and Monostable Multivibrator using 555.

⇨ Explain the various number systems binary, BCD, Octal, Hexadecimal

⇨ State and explain Demorgan's Theorems

⇨ Write the Truth Table and symbol of Logic gates OR, AND, NOT, NAND NOR, Ex-OR.

⇨ Simplication of Logic functions using karnaugh's map.

⇨ Explain the operation of Half-Adder, Full Adder, Half Subtractor, Full Subtractor.

⇨ Explain parity Generator, and checkers.

⇨ Explain decoder and encoder

⇨ Explain Demultiplexer and Multiplexer

⇨ Explain various Digital Logic families

⇨ Explain various FFS, D, T, SR, and MSJK.

⇨ Explain Asnchronous Binary counter, Decode Counter, synchronous counter

⇨ Explain the shift Register

⇨ Explain weighted register and R-2R Ladder Tpe D/A convertor

⇨ Explain simultaneous, Ramp, successive approximation, Dual slope

⇨ Explain memories, Expanding memories.

14041 - ANALOG AND DIGITAL ELECTRONICS

DETAILED SYLLABUS

UNIT – 1 LINEAR ICS: OP-AMPS, TIMERS AND THEIR APPLICATIONS:

Operational amplifier – Ideal Op.Amp – Block diagram and characteristics – (Minus input follows Plus input and No current through Minus and Plus input) – Op-amp parameters – CMRR – Slew rate – Virtual ground – Applications of op-amp – Inverting amplifier – Summing amplifier – Non inverting amplifier – Voltage follower – Comparator – Zero crossing detector – Integrator – Differentiator – Op.Amp Specifications. 555 Timer – Functional Block diagram – Astable, Monostable and Schmitt Trigger – Sequence timer. IC voltage regulator – 3 pin IC regulators – 78 xx, 79 xx, LM 317.

UNIT – 2 BOOLEAN ALGEBRA:

Number systems – Decimal – Binary – Octal – Hexadecimal – BCD – Conversion from one number system to other – Boolean Algebra – Basic laws and Demorgan's Theorems – Logic gates – OR – AND – NOT – NOR – NAND – EX-OR Symbols, Truth table and Boolean expression – Realization of gates using universal gates NAND, and NOR – Problems using 2, 3, and 4 variables – Boolean expression for outputs – Simplification of Boolean expression using karnaugh map (upto 4 variable)- Constructing logic circuits for the Boolean expressions.

UNIT – 3 COMBINATIONAL LOGIC:

Arithmetic circuits – Binary addition – Binary Subtraction – 1's complement and 2's complement – Signed binary numbers – Half adder – Full adder – Half subtractor – Full subtractor – Parity Generator and checker – Digital comparator – Arithmetic Logic Unit – Decoder – 3 to 8 decoder – BCD to seven segment decoder – Encoder – Multiplexer – Demultiplexer – Digital Logic families – TTL – CMOS – LS series – Fan in – Fan out – Propagation delay – Noise immunity for the above families.

UNIT – 4 SEQUENTIAL LOGIC:

Flip-flops – RS – D – T – JK – Master Slave Flip Flops – Edge triggered FF – Asynchronous Binary Counter – Decade counter – Mod n counter – Up Down Counter – Presettable counter – Ring counter – Johnson counter – Synchronous counter – State diagram – Shift register – 4 bit shift register – Serial in Serial out – Serial in Parallel out – Parallel in serial out.

UNIT – 5 D/A, A/D AND MEMORY:

D/A Converter – Basic concepts – Weighted Resistor D/A converter – R-2R Ladder D/A converter – Specification of DAC IC Sampling and quantization – Analog to digital conversion using Ramp method – Successive approximation method – Dual slope method, simultaneous method voltage to frequency converter – Frequency to voltage converter specification of A/D converter.

Memory – Static Memory – Dynamic Memory – Static Memory organization in terms of address lines, control lines and data lines – Expanding memory (say 8k to 16k) – SDRAM – DDR RAM.

Text Book: R.P. Jain – Modern Digital Electronics – TMH 2003.

Reference books:

1. Albert Paul Malvino and Donold P. Leach – Digital Principles and applications – TMH – 1991.

2. Roger L. Tokheim Macmillan – Digital Electronics – McGraw – Hill – 1994.

3. William H.Goth Mann – Digital Electronics – An introduction to theory and practice – PHI 1998.

4. Satnam P.Mathur and others – Electronic devices, Applications and Integrated Circuits – Umesh Publications – 1982.

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14041 - ANALOG AND DIGITAL ELECTRONICS
MODEL QUESTION PAPER I

Time : 3 Hrs.   Max. Marks: 75

PART – A

I.   Answer all questions   **10 X 1 = 5**

1. What is op-amp?
2. Define slew rate.
3. Convert decimal 9 to binary
4. State Demorgan theorem
5. What is a Demulti plexer?
6. What is decoder?
7. How may FFS are required to construct a Decade counter?
8. What is race around condition?
9. What is a volatile memory?
10. What is meant by quantization?

PART – B

II.   Answer all questions   **5 X 3 = 15**

11. State the characteristics of an ideal op. amp.
12. Draw the Logic diagram for the Boolean f unction AB + C.
13. State the Truth Table of a HALF Adder and FULL Adder.
14. What are the differences between Ring counter and Johnson counter?
15. Draw the circuit diagram of a 4 bit weighted – Resistor D/A converter.

PART – C

III. Answer any one from each question   **5 X 10 = 50**

16. (a) Explain with neat diagram op. amp as (i) summer
        (ii) Zero crossing detector.
                            Or
    (b) Draw the Functional Block diagram of 555 Timer and explain its
         operation.

17. (a) State and prove Demorgan's Theorems
                            Or
    (b) Construct i. AND ii. Ex-OR gates using NOR gates and explain its
        operation

18. (a) Draw the Logic diagram of a Full Adder and explain its working.
                            Or
    (b) Explain with a neat diagram 1 of 8 Multiplexer.

19. (a) Explain the working of a 4 bit Binary up counter with a neat
        diagram and waveforms.
                            Or
    (b) Explain the working of JK MS Flip-Flop with a neat diagram.

20. (a) Explain the working of a 4 bit R-2R Ladder D/A converter with
        a neat diagram.
                            Or
    (b) Explain with a neat diagram, the successive approximation type
        A/D converter.

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14041 - ANALOG AND DIGITAL ELECTRONICS
MODEL QUESTION PAPER II

Time : 3 Hrs.   Max. Marks: 75

PART – A

I   Answer all questions   **10 X 1 = 10**

1. Define CMRR of op.amp.
2. What is virtual groung?
3. Convert binary 011011_2 to Hexadecimal.
4. State logic equation for EX-OR gate
5. Define a multiplexer
6. State difference between Half adder and full adder
7. What is a D-Type Flip-Flop?
8. State difference between Synchronous and assynchronous counter
9. How many comparators are required for a 4 bit parallel comparator (simultaneous) A/D converter?
10. State difference between static and dynamic memory.

PART – B

II. Answer all questions   **5 X 3 = 15**

11. What is virtual Ground of an op.amp? and explain Op amp as invertor.
12. Give the Truth Table of 2 input Ex-OR gate and NOR gate.
13. Define fan in and fan out of a logic gate.
14. Give the logic diagram and Truth Table of JKMS FF.
15. Draw the circuit diagram of a 4 bit R-2R Ladder D/A converter

PART – C

Answer any one from each question   **5 X 10= 50**

16. (a) (i) Explain the working of a Comparator using op-amp.
        (ii) With a neat diagram and Waveforms, explain Zero Crossing
             detector using op. amp.
                                    Or
     (b) (i) Explain a monostable Multivibrator using 555 IC
        (ii) Explain the working of an integrator using op. amp.
17. (a) Simplify the Boolean expression by using karnaugh's map

$$F = AB\overline{C}\overline{D} + AB\overline{C}D + ABCD + AB\overline{C}D$$
                                    Or

     (b) Construct i) NOR ii) Ex-OR gates using NAND gates and explain its operation.

18. (a) Draw the Logic diagram of a Half-Adder and explain its working
                                    Or
     (b) Explain with a neat diagram, BCD to seven segment Decoder.
19. (a) Explain the working of a Decade counter with a neat diagram and waveforms.
                                    Or
     (b) Explain with a neat diagram serial in serial out 4 bit shift register.
20. (a) Explain the working of a 4 bit weighted Register D/A Converter
         with a neat diagram.
                                    Or
     (b) Explain with a neat diagram, the Dual slope A/D converter.

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14042- INDUSTRIAL ELECTRONICS

Total No of hours / week   :   6

Total No of week / semester :   16

Total No of hours / semester :   96

Scheme of Instructions and Examination

Subject	Instruction		Examination		
	Hours / Week	Hours / Semester	Assessment Mark		
Industrial Electronics			Internal	Board Exam	Total
	6	96	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (Hrs)
UNIT I	Power Devices and Phase Control Circuits	16
UNIT II	Converters and Choppers	18
UNIT III	Inverters, SMPS & UPS	16
UNIT IV	PLC and Programming	18
UNIT V	CNC	16
	Revision Test	12
Total		96

OBJECTIVES:

After learning this subject, the student will be able to understand about

⇨ The characteristics & various applications of SCR

⇨ The characteristics & various applications of some of Power Devices.

⇨ The various methods and for cooling are protection of Power devices.

⇨ The basics principle of operation of various single phase and three phase converter.

⇨ The principle of operation of various types of single phase and three phase inverters

⇨ The principle of Operation of various UPS.

⇨ The working principles of Chopper.

⇨ The various principles of Chopper.

⇨ The various control circuit used in Industrial using VJT, PLL oscillator circuit and Micro Controller.

⇨ The principle of Operation of PLC.

⇨ The programming of PLC's using Ladder logic

⇨ The various applications of PLC.

⇨ The working principle of Numerical control of Machines.

⇨ The principle of operations of CNC & Its Programming.

⇨ The basic concept of Robotics.

DETAILED SYLLABUS

UNIT – I POWER DEVICES AND PHASE CONTROL CIRCUITS:

Working Principles of SCR, MOSFET, IGBT, SIT and GTO – Switching Characteristics – Specification of above power devices. Gate Trigger Circuits – DC triggering, AC Triggering, Pulze gate triggering – Pulse transformer in trigger circuit – Electrical isolation by opto isolator – Resistance fixing circuit and waveform – Resistance capacitor fixing circuit and waveform, synchronized UJT triggering (ramp triggering) – Ramp and pedestal trigger circuit for ac load.

UNIT – II CONVERTERS AND CHOPPERS (QUALITATIVE TREATMENT ONLY):

Single phase semi converters with R, RL and fly wheel diode – Single phase full converters with R, RL and fly wheel diode. Input and output characteristics of bridge circuit – Effect of source inductance – Discontinuous current operation – Effect of overlap angles – Line commutation.
        (a) Self Commutation
        (b) Forced commutation (mention of types only)
Polyphase converters with resistive load only
3 phase Half and full converters – Control circuit and Power circuit – Dual converter.
DC Chopper and DC Drives – Principles of chopper operation – Types – Typical Chopper – Circuit Diagram – Working Principle – Applications – Rotor ON – OFF control – Control of DC Motors – AC Chopper – Chopper using MOSFET – PWM control circuit for driving MOSFET in chopper.

UNIT – III INVERTERS, SMPS & UPS:

Inverters – Single phase inverters using thyristors with R, RL loads – Output voltage control in inverter – Methods of obtaining sine wave output from an inverter – Typical inverter circuit – Three phase inverter circuit – Inverter characteristics through pass inverter circuit – Applications of inverters – DC transmission – Block diagram – Parallel inverter using MOSFET & IGBT's – Advantages.

SMPS – Types – Circuit description – Working principles – Control circuits for SMPS – Application – UPS – Types – Comparison – Circuit description of on line & off line UPS – Working principles.

UNIT – IV PLC AND PROGRAMMING:

Introduction to PLC – Relays – Parts of PLC – Processor – Memory – Input and Output modules – Digital and Analog I/O's – Communication with PLC – Logice functions (OR, AND, NAND & EX-OR) – Ladder programming Bit instruction – Timer / counter – Program control instruction – Data handling instruction math instruction – Simple ladder diagrams for DOL, Star-Delta starter.

UNIT – V CNC:

Basic concept of numerical control – driving devices hydraulic systems – DC motors – Stepping motors – Data processing unit – Photoelectric type – Programming – Part programming – General information – Post processor elements – APT – syntax only (no programming exercise) – ADAPT/EXAPT, Autospot – Characteristics of N/C system – CNC / DNC – CNC typical system – Block diagram – Interfacing of CNC Machines – Programming of CNC – Adaptive control systems – ACC – ACO – Basic concepts of Robotics.

Reference Books:

1. Industrial and Power Electronics – Harish C. Rai Umesh Publication – 5th edition – 1994

2. Power Electronics – Dr. P.S. Bimbhra, Khanna Publications, 2nd edition – 1998

3. Power Electronics – M.H. Rashid, PHI Publication Pvt. Ltd., 3rd edition – New Delhi – 2005.

4. Power Electronics – M.D. Singh & K.B. Khan Cahndani, TMH, 1998.

5. Programmable Logic Controller – Pradeep Kumar & Srivashtava – BPB Publications.

6. Programmable Contollers – Richard A. Cox Vikas Publishing Houses – 2001.

7. Numerical Control of Machines Yoram Korean and Joseph Ben,.

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14042- INDUSTRIAL ELECTRONICS

MODEL QUESTION PAPER – I

Time : 3 Hrs.   Max. Marks: 75

Note: (1)   Answer all questions from Part-A and Part-B and all questions
                       (Either or type) from Part-C.
            (2)   Part-A carries one mark for each question and Part-B
                       carries each three marks and Part-C carries each ten marks.

PART – A

10X1=10

1. What is called SCR ?
2. State different types of triggering.
3. What is self commutation?
4. What is forced commutation?
5. Which controller used for precise control of power
6. State the advantage of DC transmission.
7. Draw the symbolic diagram of PLC.
8. State any two advantages of PLC.
9. Which is a popular program for positioning work such as drilling?
10. What is part programming?

PART-B

5X3=15

11. Define over voltage protection and over current protection.
12. Define Converters and forced commutation.
13. Explain the functions of snubber circuit.
14. State the features of PLC's.
15. Explain ADAPP and Auto spot.

PART – C

5X10=50

16.   (a) What is the purpose of isolation between the control and power?
                What are the devices used for isolation?

                                                    (or)

       (b) Mention the types of power electronic circuit. Discuss the input ofthe above
              circuits.

17.   (a) Explain the principles of operation of a single phase converter with a neat
              diagram.

                                                    (or)

       (b) Explain the working principle of a multiple PWM control circuit with waveforms.

18.   (a) Explain the working principle of a single phase inverter with circuit diagram.

                                                    (or)

       (b) With a neat diagram, explain the working principle of SMPS

19.   (a) Draw a block diagram of PLC system. Explain the functions of each block.

                                                    (or)

       (b) Develop a PLC program to simulate traffic light controller in ladder method.

20.   (a) What are the driving devices used in NC machine? Explain any one in detail.

                                                    (or)

       (b) Explain the tape formats used in NC Machines. Explain CNC and DNC.

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14042- INDUSTRIAL ELECTRONICS

MODEL QUESTION PAPER – II

Time : 3 Hrs.   Max. Marks: 75

Note: (1) Answer all questions from Part-A and Part-B and all questions
(Either or type) from Part-C.

(2) Part-A carries one mark for each question and Part-B
carries each three marks and Part-C carries each ten marks.

PART – A

(10X1=10)

1. Which is used as a Rectifier In emergency light?
2. State advantage of AC triggering.
3. Which is used in converters do protect the load from over load.
4. Define overlap angle.
5. What is called Inverter?
6. State difference between online and offline UPS.
7. What programming is used in simple system like traffic light   controller?
8. State AND logic function.
9. Which control system is used in CNC?
10. What are various post processor elements?

PART – B

(5X3=15)

11. Explain Integral Cycle triggering?
12. Explain self commutations?
13. Draw the circuit diagram of a typical DC Chopper.
14. Draw any four symbols used in PLC System.
15. What is the function of post processor element in numerical control?

PART – C

(5X10=50)

16.   (a)   Explain the circuit diagram of an automatic battery charging unit?

(or)

(b)   Explain the output characteristics of power MOSFET's with a neat
sketch.

17.   (a)   What is the principle of operation of a single phase converter?.
Explain it with a circuit diagram.

(or)

(b)   with a neat circuit diagram explain working of DC chopper.

18.   (a)   Explain the working of Through pass Inverter with a circuit diagram.

(or)

(b)   Explain the working of UPS with a circuit.

19.   (a)   Describe the evolution of PLC's

(or)

(b)   Develop a programme to the PLC System of a conveyor system
using ladder method.

20.   (a)   Explain the ADAPT system used in NC Machine

(or)

(b)   Explain a typical CNC system with a neat block diagram.

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14043 - COMMUNICATION ENGINEERING

Total No of Hours /week   :   6

Total No of Weeks/Semester   :   16

Total No pf Hours / Semester   :   96

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
	Hours/ Week	Hours/ Semester	Assessment Marks		
COMMUNICATION ENGINEERING			Internal	Board Exam	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME(HRS)
1	Networks, Antenna and Propagation	16
2	Amplitude Modulation	18
3	Angle and Pulse Modulation	16
4	Audio Systems	18
5	Telegraphy and TV	16
	Revision and test	12
Total		96

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to :

⇨ understand the basic principles of Symmetrical and asymmetrical networks. Equaliser , Attenuator, Filters.Transmission lines and Wave guides

⇨ understand the principle of working of antenna

⇨ understand the theory of Propagation

⇨ understand the concept of modulation

⇨ study amplitude modulation process

⇨ learn about different types of AM Transmitter and Receiver:

⇨ study the Frequency modulation process:

⇨ learn about different types of FM Transmitter and Receiver:

⇨ understand the concept of Phase modulation

⇨ understand the concept of Pulse modulation

⇨ learn different types of microphones

⇨ learn different types of Loud speakers:

⇨ understand different methods of audio recording and reproduction

⇨ learn basic concepts of Telegraphy

⇨ understand principles of Monochrome Television

⇨ understand principles of color TV and related topics

14043 - COMMUNICATION ENGINEERING

DETAILED SYLLABUS

UNIT – I NETWORKS, ANTENNA AND PROPAGATION:

Networks:
Symmetrical and asymmetrical networks. characteristic impedance and propagation constant Derivation of characteristic impedance for T and Pi networks using Zoc and Zsc, image and iterative impedances - Derivation of Z_{i1} and Z_{i2} for asymmetrical T and L networks using Zoc and Zsc, Derivation of iterative impedances for asymmetrical T network. Equaliser: types, applications: constant resistance equalizer. (No derivations)

Attenuator: types,-derivations for elements of symmetrical T and Pi networks - application.

Filters: types and definitions – derivations for circuit elements and cutoff frequencies of LPF, and HPF only.

Transmission lines (No equations and derivations): Transmission line equivalent circuit, primary and secondary constants, travelling and standing waves, SWR, Wave guides: types, advantages.

Antennas:
Basic antenna principle, directive gain, directivity, radiation pattern, broad-side and end - fire array, Yagi antenna, Parabolic antenna.

Propagation (short theory only)
Ground wave propagation, space waves, ionospheric propagation

UNIT II AMPLITUDE MODULATION:

Modulation :
Electromagnetic Frequency spectrum. Need for modulation, types of modulation.

Amplitude modulation:
expression, AM spectrum and side bands, types of AM - balanced modulator.
SSB generation – phase shift and filter methods, advantages and disadvantages of   SSB.
AM VSB system. Diode detector.

AM Transmitter:
Types of transmitters, Block diagram - high level AM transmitter and low level AM transmitter. SSB transmitter, ICW and MCW principles.

AM Receiver:
TRF receiver, superheterodyne radio receiver- explanations of individual stages –
AGC types, SSB receiver.

UNIT III ANGLE AND PULSE MODULATION:

Frequency modulation:
Expression, wave forms, frequency spectrum, effects of noise in FM, comparison of AM and FM, varactor diode modulator. FM detectors – slope detector, phase discriminator, ratio detector (no Derivation)

FM Transmitters:
Direct and Indirect methods- stereophonic FM transmitter.

FM receiver:
Block diagram – AFC-stereophonic FM receiver.

Phase modulation :
Principles, phase modulator circuit, comparison between FM and PM

Pulse modulation
Types, sampling theorem. Generation and detection of PAM, PWM and PPM.
PCM – transmitter, receiver; quantizing noise - companding.

UNIT IV AUDIO SYSTEMS:

Microphones: (Qualitative treatment only) Construction and performance of the following microphones: carbon, condenser, piezo-electric, moving coil and velocity ribbon.

Loud speakers:
Constructional details of :dynamic cone type, Horn type and electro-static loud speakers, woofer, midrange and tweeter ;cross-over network. surround-sound systems

Audio recording and reproduction :
Magnetic system- Compact disc system- MP3 system - DVD system- stereophonic system - Hi-Fi system principles- Dolby –DTS.

UNIT V – TELEGRAPH AND TV FUNDAMENTALS:

Telegraphy:
Basic principle – Morse code (concept only) – Telegraph transmitter telegraph receiver – merits and demerits of telegraph systems Radio Telephone transmitter.

Monochrome Television :
Scanning principles- aspect ratio- composite video signal- TV standards.
TV transmitter- TV receiver.

Colour TV :
Principles of colour transmission and reception- color CCD camera. PAL colour TV receiver (IC details not required) Digital Colour TV receiver LCD display unit – plasma display - principle of Handy cam LCD projector Principles of CCTV and cable TV.

Reference books:

1. Networks lines and fields – John D.Ryder, PHI
2. Electronic communication Systems – Kennedy – TMH
3. Electronic Communication – Dennis Roddy and John colen – PHI
4. Radio Engineering – Terman – MGH
5. Fundamentals of Acoustics – Kingsler & frey – Wiley Eastern ltd.
6. Transmission lines & Networks – Umesh sinha – Sathya prakashan publications
7. Radio engineering – G.K.Mithal – Khanna publishers.
8. TV and Video engineering – Arvind M.Dhake – TMH.

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14043 - COMMUNICATION ENGINEERING
MODEL QUESTION PAPER – I

Time : 3 Hrs.   Max. Marks: 75

PART- A

I   Answer all questions   **10x 1 = 10**

1. Give the expression for propagation constant of symmetrical network.
2. Differentiate between symmetrical and asymmetrical network
3. Expand SSB-SC.
4. State advantages of VSB
5. Give the formula for the frequency deviation in FM.
6. State advantage of FM over AM
7. Expand DTS.
8. State different types of CD recording system
9. Define aspect ratio in TV.
10. What are advantages of interlaced scanning?

PART- B

II   Answer all questions   **5 x 3= 15**

11. Explain SWR in transmission line and state its significance.
12. Draw the AM spectrum and draw the AM wave form.
13. Compare FM and PM signals.
14. Draw the construction of electrostatic type loud speaker.
15. Write the concept of Morse code to represent characters.

PART - C
III Answer all questions choosing either (a) or (b) part of each   5 x 10 = 50

16. (a) Draw the equivalent circuit of transmission line and explain the primary
           and secondary constants of transmission line.
                                            (or)
    (b) Explain ionosphenic propagation.

17. (a) Derive the expression for AM signal.
                                            (or)
    (b) Draw the block diagram of SSB receiver and explain.

18. (a) Draw the block diagram of indirect FM transmitter and explain.
                                            (or)
    (b) Draw the PCM transmitter block diagram and explain.

19. (a) Explain the working of condenser microphone and draw its characteristic.
                                            (or)
    (b) Explain the working of stereophonic system and Hi-Fi system.

20. (a) Draw the block diagram of radiotelegraph transmitter and explain.
                                            (or)
    (b) Explain the working of Digital colour TV receiver.

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14043 - COMMUNICATION ENGINEERING
MODEL QUESTION PAPER – II

Time : 3 Hrs.   Max. Marks: 75

PART- A

Answer all questions   **10 X 1 = 10**

1. Give the expression for the characteristic impedance for symmetrical T network.
2. What are the various types of attenuator?
3. Write the formula of modulation index for AM signals.
4. Differentiate high level and low level AM transmitter.
5. Name any one type of FM detector.
6. What are the different types of pulse modulation
7. Write any one advantage of velocity ribbon microphone.
8. State any two difference between woofer and tweeter
9. Expand PAL.
10. What is the purpose of blanking pluse?

PART- B

Answer all questions   **5 X 3 = 15**

11. Find Zoc and Zsc for symmetrical T network.
12. State any four advantages of SSB system.
13. Draw the frequency spectrum for FM.
14. Draw the three way cross over network.
15. Draw the composite video signal.

PART- C

Answer all questions choosing either (a) or (b) part of each   5 x 10 = 50

16. (a) Derive the iterative impedances of asymmetrical T network.

(or)

(b) Draw and explain broadside array and end fire array antennas.

17. (a) (i) Explain need for modulation.
        (ii) Draw and explain diode detector.

(or)

(b) Draw and explain super heterodyne radio receiver.

18 (a) Write in detail the effects of noise in FM.

(or)

(b) Explain how PWM signals are generated and demodulated.

19 (a) Explain the working of piezo-electric microphone.

(or)

(b) Explain the working of compact disc recording system.

20. (a) Explain progressive and interlaced scanning principles.

(or)

(b) Draw the block diagram of PAL colour TV receiver and explain.

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14044 - ANALOG AND DIGITAL ELECTRONICS LAB

1. Inverting Amplifier and Non inverting amplifier with dc and ac signal using op-amp.
2. Summing amplifier, Difference amplifier and voltage comparator using op-amp.
3. Integrator and Differentiator.
4. Astable and Monostable multivibrator using IC 555
5. IC voltage regular power supplys using IC 7805, IC 7912 and LH 317 for 1.2V to 12V.
6. Verification of Truth table of OR, AND, NOT, NOR NAND and XOR gate.
7. Realization of basic gates using NAND and NOR gates.
8. Realization of logic circuit for a given Boolean expression.
9. Half adder, full adder and 4 bit full adder using discrete ICs.
10. Half subtractor, full subtractor and 4 bit subtractor using discrete ICs.
11. Construction and verification of truth table for Decoder, Encoder
12. Multiplexer, Demultiplexer using CMOS 4051.
13. Parity generator and checker and parity encoder/checker using discrete ICs.
14. Construction and verification of truth table for D, T, JK, F/F
15. 4 bit ripple counter using Flip Flop with feedback.
16. Single digit counter using 7490, 7475, 7447 and seven segment LED.
17. Construct and test digital data generator using parallel to serial shift register IC 74165 and retrieving the serial data to parallel output using IC 74164.
18. DAC using R-2R Network, Binary weighted register network.
19. A/D convertor using ADC 0808 IC.
20. DAC using IC DAC 0808.

EQUIPMENTS REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Fixed Power Supply with multiple outputs	(+5), (-5), (+12), (-12)	10
2	Bread Board		10

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14045 - IE AND CE LAB

A. INDUSTRIAL ELECTRONICS EXPERIMENTS

Minimum TEN experiments to be conducted

1. Determine the phase control characteristics of SCR.
2. Construct and test commutation circuits of SCR.
3. Construct and test a single phase inverter.
4. Construct and test a MOSFET based PWM chopper circuit.
5. Construct and test a multiple pulse sine wave inverter.
6. Construct and test an IC based buck converter using PWM.
7. Write and implement a simple ladder logic program using digital inputs and outputs for PLC.
8. Write the implement a simple ladder logic program using timer and counter with branching and subroutines with PLC.
9. Write and implement a simple ladder logic program for interfacing a lift control with PLC.
10. Write and implement a simple ladder logic program for interfacing a conveyor control with PLC.
11. Write and implement a program for CNC lathe involving linerar position, circular interpolation and repeat cycle.
12. Write and implement a program for CNC milling for a simple component involving linear position and interpolation.

B. COMMUNICAITON ENGINEERING EXPERIMENTS

Minimum TEN experiments to be conducted

1. Construct and test symmetrical T and Pi attenuators.
2. Construct and test constant K active and passive LPF and HPF.
3. Construct and test an amplitude modulator and a detector circuit.
4. Observe and measure the outputs at different stages of a super heterodyne receiver.
5. Construct and test an FM modulator circuit.
6. Construct and test an FM transmitter and an FM receiver circuit.
7. Construct and test a PLL oscillator and determine.
   (i) VCO frequency (ii) Lock range (iii) Capture range
8. Construct and test PAM generation and detection circuits.
9. Construct and test PWM generation and detection circuits.

10. Construct and test PPM generation and detection circuits.

11. Construct and test PCM transmitter and receiver circuits.

12. Determine the frequency response of the following loudspeakers. (Minimum Three)

    a. Dynamic cone type
    b. Horn type
    c. Electrostatic type
    d. Woofer
    e. Tweeter

13. Determine the directional characteristics of the following microphones:

    (Minimum Three)

    a. Carbon
    b. Condenser
    c. Piezo-electric
    d. Moving coil
    e. Velocity ribbon

14. Construct and test a three way crossover network.

15. Observe and measure the outputs at different stages of magnetic tape recorder.

16. Observe and measure the outputs at different stages of a DVD player.

17. Observe and measure the outputs at different stages of a color TV system.

18. Construct and test telegraph transmitter and telegraph receiver circuits.

19. Construct and test a Dish antenna system for DTH reception.

20. Construct and test a TV projection system using plasma display and LCD projector.

21. Construct and test a cable TV distribution system.

22. Construct and test a CCTV system using color CCD video camera and color TV.

EQUIPMENT REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Dual Power Supply	0 - 30	5
2	PLC		5
3	Pentium IV		5
4	Signal Generator with AM and FM Facility	10 MHz	4
5	DVD Player		2
6	TV Demonstration Kit		2
7	Dish antenna system for DTH		2

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11011 – ENGLISH COMMUNICATION PRACTICAL
(Common to all Branches)
Curriculum Outline

The course on English Communication Practical will enable the learners develop their Communication skills in English, especially at a time when the Info-Tech Explosion on one side and the search for Communicational Exploration on the other have been taking the contemporary world by leaps and bounds.

Keeping in view the career requirements of the students at Diploma level, the course on English Communication Practical has been designed in such a way that it will enable the learners acquire the much needed proficiency in the art of Communication and this will go a long way in shaping and fine tuning the future career of the students.

Objectives:

1. To equip the learners with effective speaking and listening skills in English
2. To make them realize the communication potential of English language
3. To infuse in their minds the much-needed and all the more important 'CONFIDENCE'
4. To facilitate them to acquire a fairly acceptable skill in pronunciation
5. To train them to use language effectively to face interviews, group discussions and public speaking
6. To enable them to prepare their resume, curriculum vitae etc.,
7. To promote ethical values and inculcate organizational behaviour…

For achieving the objectives identified above, the following skills are to be developed to enhance the communicative potential of the students.

The Skills are:

I.   Listening
II.   Reading and Pronunciation
III.   Speaking and Presentation
IV.   Writing

SCHEME OF INSTRUCTION AND EXAMINATION

SUBJECT	INSTRUCTION		EXAMINATION			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGLISH COMMUNICATION PRACTICAL	4	64	25	75	100	3 Hrs.

TOPICS AND ALLOCATION

UNIT	INSTRUCTION	TIME (Hrs)
I	Listening	12
II	Reading	12
III	Speaking	14
IV	Writing	8
V	Professional Ethics & Organizational Behaviour	8
VI	Project Report Writing (Outline)	2
	Revision and Tests	8
	TOTAL	64

DETAILED SYLLABUS

UNIT I LISTENING

Listening to pre-recorded short episodes, conversations, passages, stories, (hard copy of the material and cassettes) news bulletin, speeches by famous personalities – Listening for general and specific information etc.,

NOTE: The exercises given to the students must be recorded in the Record Notebook.

UNIT II READING

Reading aloud – by students individually - reading rhymes – proverbs – passages on various topics of interest – Newspaper reading – Reading humorous passages – Anecdotes – Stories – tricky sounds (conditioners) – Reading manuals – Reading individual sentences with articulation, pronunciation, Tones, Punctuation, pauses etc…- Reading the titles of popular books, movies and poems.

NOTE: All the exercises given in Reading skills should be written in the Record Notebook.

UNIT III SPEAKING

i.   Self-introduction – introducing one self, one's family – one's friends and relatives, one's language – one's country etc…

ii.   Welcome Address, Vote of thanks

iii.   Extempore speeches.

iv.   Short speech on simple topics on simpler themes for about one minute.

v.   Role play – Group Discussion – Debate – Seminars – Machine Descriptions (depending upon branches) – Compering – Interviewing others by Asking Questions – Interview Techniques – Conversational Practice – Telephonic Conversation – Telephonic Interviews – How to establish conversation / dialogues – Entry Attempts/Admissions.

NOTE: Items taught in the Speaking skill should be written in the Record Notebook.

UNIT IV WRITING
i.   Writing Resume, preparing Curriculum Vitae.
ii.   Converting newspaper headlines into sentences.
iii.   Formation of Sentences – Using the table of Sentence-making and producing multiple sentences.
iv.   Framing Questions for the responses given
v.   Tips for better performance in interviews.
vi.   Describing Objects
vii.   Describing Situations.

NOTE: All the above topics must be taught to the students providing sufficient models and exercises and everything must be recorded in the Record Notebook.

UNIT V PROFESSIONAL ETHICS & ORGANIZATIONAL BEHAVIOUR:

Different kinds of Ethics – Ethics in different fields – Engineering Ethics – Senses of Engineering Ethics – Moral Values – Integrity & Loyalty – Work Ethics – Respect for others and authority – Empathy – Caring and Sharing – Honesty – Courage and Commitment – Valuing Time – Co-operation & Teamwork – Safety and Risk – Right Action – Professional ideals and virtues – Individual's Ambition – Conflict Resolution – Self-Confidence – Customs and Manners – General Behaviour – Etiquettes to be followed – Professional Responsibility – Accountability – Leadership Qualities – Effective Communication skills.

UNIT VI PROJECT REPORT WRITING (Outline):

Significant features of Project Report Writing – Organization – Presentation – Use of Impersonal Passives – Acknowledgements.

REFERENCES

UNIT I LISTENING:

Cassette with books:

1) Spoken English for you – Level I & Level II by Radha Krishna Pillai – Emerald Publishers.

2) Activity Sheets to be prepared.

3) BBC – Lingophone with Hard copy.

4) World Great Speeches – Book – Balaji's – Famous Speeches.

UNIT II READING:

1) Short story Books (Indian Writing – Panchathanthra)

2) Reading Illustrated Books (Gokulam – Wisdom – Chandamama – Amarchitrakatha) must be subscribed.

UNIT III SPEAKING:

Books / materials related to speaking skill.

UNIT IV WRITING:

1) Internet Browsing and collecting information for C.V.

2) Book materials / Cassettes for writing skill.

3) Guided composition in English Language Teaching – Alexander L.G. Longman, 1971.

4) The Language Laboratory and Language Learning – Dahim Longman, London, 1967.

PROFESSIONAL ETHICS

REFERENCE BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York 1996.
2. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004.
3. Charles E. Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics" – Concepts and Cases", Wordsworth Thompson Learning, United States, 2000.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for scientists and Engineers", Oxford University Press, Oxford, 2001.
5. G.E. Moore, "Elements of Ethics", Temple University Press, Philadelphia, 1991.
6. J.D. Mabbott, Hutchinson, "An Introduction to Ethics" Hutchinson University Library, London, 1969.
7. May Mothersill, "Ethics", The MacMillan, New York, 1965.
8. Raymond Bradley and Stephen Duguid, "Environmental Ethics", Vol I & II, Simon Fraser University, Canada 1989.
9. Kevin W. Bowyer, "Ethics and Computing – Living Responsibility in a computerized World", IEEE Computer Society Press, California, 1996.
10. Jayashree Suresh and B.S. Raghavan, "Professional Ethics", S.Chand & Company Ltd., New Delhi, 2005
11. James V. McGlynn, Jules J. Toner, "Modern Ethical Theories", The Bruce Publishing Company, Milwaukee, 1962.

11011 - ENGLISH COMMUNICATION PRACTICAL

(Common to all branches)

LABORATORY REQUIREMENT

1. An echo-free room.

2. Public Address System

3. A pair of collar microphones with amplifiers and speakers

4. Headphone units – 30 Nos. with one control unit with a facility

   to play and record in cassettes.

5. Colour Television (minimum size – 61")

6. DVD/VCD Player with Home Theatre speakers

7. Clip Chart, white board.

8. Necessary furniture's and comfortable chairs

11011 - ENGLISH COMMUNICATION PRACTICAL
(Common to all branches)
GUIDELINES

UNIT I LISTENING

a. The students must have been trained on a minimum of 10 Passages / stories / speeches / episodes / news bulletin (about 200-250 words each) and **all other topics given in the syllabus** during their course of study.
   In the examination a passage shall be played back for about 5 minutes from a pre-recorded cassette followed by 5 questions. Students may be allowed to take notes while listening and they shall answer the questions in writing and assessment shall be made depending upon their performance.

b. The students must have been trained on a minimum of 10 dialogues during their course of study. In the examination a dialogue (face-to-face conversation) running for about 5minutes shall be played back from a pre-recorded cassette (either Video or Audio) followed by 5 questions. The students may be allowed to take notes while listening and they shall answer the questions in writing. Assessment shall be made depending upon the performance of the students.

UNIT II READING

The Students should have been trained to read out / articulate at least 200 different types of sentences. They should also be trained to pronounce 200 words (monosyllabic, by-syllabic, tri-syllabic and polysyllabic words) and all other topics given in the syllabus. The words and sentences are to be chosen in such a way that the tongue is articulating the sounds in the manner peculiar to the English Language. The students should also be trained to read aloud newspaper headings, proverbs, rhymes, poems, (use of) minimal pairs and other items identified in the syllabus.

The students should also be exposed to 44 sounds in English language and their symbols with examples. However questions need not be asked in this in the end examinations.

UNIT III SPEAKING

The students should have been trained on a minimum of 10 topics / role play / group discussion / debate / seminar and **other topics given in the syllabus.** The students must also be trained to introduce themselves and others. Each student must speak at least 10 sentences. The students must be given guidelines for making their presentation / speech effective.

UNIT IV WRITING

The students should be thoroughly trained in **all the items identified in the syllabus** under writing.

UNIT V PROFESSIONAL ETHICS & ORGANIZATIONAL BEHAVIOUR

Around 50 questions dealing with PROFESSIONAL ETHICS & ORGANIZATIONAL BEHAVIOUR are given in the syllabus. In the examination the students will be given 15 questions (selected out of 50 questions) and they have to write short answers to any 10 questions. This carries 20 marks.
Teachers are requested to refer the reference books given in the syllabus and help the students to find out the answers for all the 50 questions.

UNIT VI PROJECT REPORT WRITING (Outline)

Elaborate guidelines must be given to the students as to how to write a Project Report. They must be exposed to the salient features in writing the Project Report. The students will be expected to submit **outline of a Project Report** relevant to their branches of study in a separate folder and this will be assessed at the time of End Examination and marks will be awarded accordingly.

11011 - ENGLISH COMMUNICATION PRACTICAL

(Common to all branches)

SCHEME OF EXAMINATION

END EXAMINATION (75 Marks)

1) End examination will be conducted for duration of 3 Hrs. covering all the six units identified in the syllabus.

2) The examination should be conducted in such a manner that there must be enough evidence regarding the performance of the students and the distribution of marks for the academic audit.

INTERNAL ASSESSMENT (25 Marks)

1) Students will maintain a 150-page Record Notebook for all the activities done in the English Communication Lab., for which 20 marks will be allotted.

2) 5 marks will be awarded for attendance.

Annexure: A statement of allocation of marks.

Time and Marks Allocation for each unit:

GROUP	UNIT	TIME	MARKS ALLOTTED
GROUP A (Written Test)	PROFESSIONAL ETHICS & ORGANIZATIONAL BEHAVIOUR (UNIT V)	30 Minutes	10
	WRITING (UNIT IV)	45 minutes	10
	LISTENING (UNIT I)	45 minutes	15
GROUP B (Oral Test)	READING (UNIT II)	30 minutes	10
	SPEAKING (UNIT III)	30 minutes	20
GROUP C (Report ubmission)	PROJECT REPORT WRITING (UNIT VI)		10

GROUP A

1. PROFESSIONAL ETHICS & ORGANIZATIONAL BEHAVIOUR (20 Marks)

The students will be asked to write brief answers, for any 10 questions out of 15 questions. The examiners will select the questions from the question bank given in the syllabus. Each question carries 2 marks. It will be a written practical.
Annexure: A question bank of 50 questions.

2. WRITING (5 + 5 = 10 Marks)

Out of 7 items identified in the syllabus under **Writing skills**, the students are required to answer for any two items out of four (i.e. 2 out of 4 questions). Each item carries 5 marks. There must be different questions for different batches.

3. LISTENING (5 + 5 = 10 Marks)

The students will be assessed on --

a) Auditory Comprehension (5 marks)

A pre-recorded cassette on short episodes / passages / stories / news bulletin / speeches by famous personalities (not exceeding 5 min.) will be played back only once. The Students are required to listen to this play-back with utmost attention.
After that, a sheet of paper containing 5 questions on the topic (that was played back to the students) with adequate space under each question (for the students to write the answers) will be supplied. The students are expected to write the answers in the space provided for each question.
Time for this exercise for the response of the students will be approximately 10 minutes.

b) Audio Visual Comprehension (5 marks)

A face - to - face conversation (not exceeding 5 minutes) will be played through a video or audio system (only once). The students are required to listen to this conversation with full attention.
After that, a sheet of paper containing 5 questions on this exercise shall be given with adequate space under each question for the students to write the answer. Fill in the blanks type of questions may also be given to assess the **Listening skills** of the students. Time to be taken by the students for this exercise will be approximately 10 minutes.
The selection of topics such as short episodes/passages/stories/news bulletins /speeches / dialogues etc… is left to the discretion of the internal and external examiners.

GROUP B

1. READING (5 + 5 = 10 Marks)

a) Each student will have to read aloud a passage of about 200 words. (5 Marks)

b) The Students will also be required to read individual sentences, rhymes, poems, newspaper headings, proverbs (use of) minimal pairs etc… (5 Marks)

NOTE:While reading, the students will be assessed based on their performance in pronunciation, articulation, intonation, punctuation, pauses etc…

The examiner needs to have as many passages / exercises as required, proportionate to the number of batches. The passage / exercises will be the same one to all the students of a particular batch. But it should not be repeated for other batches, there should be different passages / exercises for different batches.

2. SPEAKING (15 Marks)

a) Introducing one self / Introducing others and **all the other topics given in the syllabus** 5 Marks.

b) Short speech on simple topics on simpler themes for about 2 minutes – 5 Marks.

c) Assessing the performance of the students on any of the topics given in the syllabus in   sub division V under **Speaking skills. –** 5 Marks.

NOTE: The topics identified in the syllabus for Presentation (Speaking skills) need to be   written individually one by one by the examiners in separate papers or in separate cards.

The students will be allowed to choose a topic through lot system. They are expected to speak on the topic chosen by them for at least 2 minutes.The selection of the topics is left to the discretion of the examiner.

NOTE: Reading and Speaking:

For assessing the performance of the students in Reading and Speaking skills in the End Examination, each batch of students may be divided into two groups (if there are 30 students in a batch, they may be divided into 15 + 15) and both groups may be assessed simultaneously, one group by the external examiner (for **Reading skills**) and another by the internal examiner (for **Speaking skills**) and then vice versa. This process will enable the examiners to complete the practical on time i.e., in 3 Hrs. duration.

GROUP C

PROJECT REPORT WRITING (10 Marks)

The students will be expected to submit an **outline of a Project Report** relevant to their branches of study in a separate folder and this will be assessed at the time of End Examination and marks will be awarded accordingly.

PROFESSIONAL ETHICS & ORGANIZATIONAL BEHAVIOUR
QUESTION BANK

1) What do we understand by ethics?
2) What are the universally accepted ethical principles?
3) What is meant by engineering ethics?
4) What is the need for engineering ethics?
5) Define work ethics.
6) What is integrity?
7) 'Commitment' – what does it mean?
8) What do you mean by empathy?
9) What is professional ethics?
10) What is the similarity between ethics and morals?
11) What are the responsibilities of engineers?
12) What are the rights of the engineers?
13) What are codes of conduct?
14) Explain briefly the importance of ethics in engineering profession.
15) How can an engineer orient himself towards his ethical responsibilities?
16) What are the priorities of an engineer in a situation wherein which conflicting values are involved?
17) How can an engineer implement ethics of his profession in a multi-cultural/multi-national environment?
18) What are the professional obligations of an engineer?
19) What should be the ethics that an engineer should adhere to in both pre and post employment scenarios?
20) What is the ethical way of handling retrenchment?
21) What are the various aspects of empathy?
22) What are the salient features of commitment?
23) What is team-work?
24) What do you mean by profession and professionalism?
25) What is meant by accountability?
26) What is environmental ethics?
27) What is computer ethics?
28) Define the term 'morals'.
29) What do you mean by 'values'?
30) What are the main qualities of work ethics?
31) What is altruism?

32) What is sharing?

33) What is caring?

34) What is honesty?

35) What is courage?

36) What is meant by valuing time?

37) What is co-operation?

38) What are the objectives of co-operation?

39) What is meant by commitment?

40) In what way the effective communication skills shape the careers of an engineer?

41) What is self-confidence?

42) What is morality and etiquette?

43) What are the different models of engineering ethics?

44) What are the most fundamental moral principles?

45) What are the moral responsibilities of an employee towards his employer?

46) What are the moral responsibilities of an employer towards his employees?

47) What are the moral responsibilities of an organization towards community?

48) What are the advantages of team-work?

49) What is loyalty?

50) What do you mean by professional rights?

Example Questions for Writing Skill

Staff Member may prepare similar type of questions for Class works &

Examinations

WRITING

1. Your friend has asked for your advice for buying a birthday present. Write a letter to him/her suggesting which points he\she one should keep in mind like interest, age, need etc.while buying a birthday present. You are Shanty /Shanta of 1048 D, Gulabi Bagh, Delhi.

2. Children like to spend their pocket money on their favourite food items like chips, kurkures, hot dog, pizza and cold drinks. But they don't know that these things cause harm to their health. Write a paragraph describing the harmful effects of fast and junk food. Mention the health and other related problems caused by it in about 50 words.

3. You have to take part in a debate on the theme 'Examinations affect Teaching and Learning in schools' Write down your arguments in favour or against the motion in about 125 to 150 words

4. Recently you attended a fair of Eco clubs at Bal Bhawan where the students from different schools displayed eco friendly materials and ways to protect our earth through different models and charts. Write a report in about the fair in about 50-60 words.

5. Your cousin is a brilliant student but he is not keeping good health because he avoids homemade food and is very fond of eating outside. Write a letter telling him/her about the harmful effects of junk food and advising him/her how to maintain good health in not more than 100 words. You are Arpil/Arpita of C-8 Lawrence Road, Delhi.

6. Write a letter to the Principal of your school requesting him/her to introduce inter house activities like quiz programmes, debates, recitation, essay-writing, painting and sports explaining how it may be beneficial for all-round development of theirpersonality. You are Vineet/Vineeta, the head boy/girl of New Modern School, Amritsar.

7. You don't approve of the ways of people as they waste a lot of water in different activities. Even the taps in schools are not closed properly, thereby, wasting the valuable water due to negligence and carelessness. You wish to spread awareness among students about it. Write down your views appealing students of your school to
conserve water and to save it for future in an article for school magazine in about 50-60 words.

8. You recently visited the 'World Book Fair' organized at "Near your Locality " and found it quite   an enriching experience. Write a report in about 50-60 words so as to encourage other students to visit it.

11011 – ENGLISH COMMUNICATION PRACTICAL
(Common to all branches)
MODEL QUESTION PAPER

TIME : 3 Hrs   Max.Marks : 75
GROUP A

Answer any ten of the following:-   **(10 x 2 = 20)**

I   1)   What is team work?
     2)   'Commitment' – What does it mean?
     3)   What is code of conduct?
     4)   How can an engineer orient himself towards his ethical responsibilities?
     5)   What are the professional obligations of an engineer?
     6)   What is the ethical way of handling retrenchment?
     7)   What are the rights of the engineers?
     8)   What is environmental ethics?
     9)   What is sharing?
     10) What are the objectives of co-operation?
     11) What is morality and etiquette?
     12) What is loyalty?
     13) What are the moral responsibilities of an employee towards his employer?
     14) What do you mean by professional rights?
     15) What is altruism?

II   **(2 x 5 = 10)**
     1)   Imagine you are applying for a job. Write a resume for the same.
     2)   Religious extremism, matter of concern : PM

III   **(2 x 5 = 10)**
     1)   A short story to be played back (audio cassette).
     2)   A face to face communication to be played back (visual/audio)

GROUP B

I   **(2 x 5 = 10)**
     1)   Read the following passage aloud -
          A passage with tricky sounds to be given.
     2)   Read the following a loud -
          A conversational passage to be given.

II   **(3 x 5 = 15)**
     1)   Introduce yourself
     2)   Short speech - A religious fair
     3)   Any one of the topics given in the syllabus in sub-division v under **speaking skills**

GROUP C

                                                                                      10

Project Report – writing

The students will be expected to submit an **outline of a Project Report** relevant to their branches of study in a separate folder and this will be assessed at the time of End Examination.

11011 - ENGLISH COMMUNICATION PRACTICAL

Allocation & Statement of Marks

Duration : 3 Hrs.   Max. Marks : 100

Sl. No.	Reg .No.	Name of the Candidate	Communication Lab.						Internal Assessment		Total
			GROUP A			GROUP B		GROUP C			
			PE & OB (20)	Writing (10)	Listening (10)	Reading (10)	Speaking (15)	Project Report Writing (10)	Record (20)	Attendance (5)	(100)

14051 - MICROPROCESSOR AND MICROCONTROLLER

Total No. of Hrs / Week   :   6
Total No. of Weeks / Semester   :   16
Total No. of Hours / Semester   :   96

Scheme of Instruction and Examination

Subject	Instruction		Examination		
			Assessment Marks		
	Hours/ Week	Hours/ Semester	Internal	Board Exam	Total
Microprocessor and Microcontroller	6	96	25	75	100

Topics and Allocation

Unit	Topic	Time (Hrs)
Unit 1	Microprocessor and Applications	16
Unit 2	Architecture Of 8051	18
Unit 3	Instruction Set And Programming	18
Unit 4	I/O, Timer, Interrupt and Serial Programming	16
Unit 5	Interfacing External Device With 8051	16
	Revision and Test	12
Total		**96**

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- ⇨ Understand the history and need of Microprocessor.
- ⇨ Understand the internal architecture details of 8085 Microprocessor.
- ⇨ Know the instruction set of 8085.
- ⇨ Draw the timing diagrams for typical instructions
- ⇨ Understand Interrupt Structure of 8085
- ⇨ Explain Architecture of 8051 Microcontroller.
- ⇨ Explain the functions of various registers.
- ⇨ Understand interrupt structure of 8051.
- ⇨ Understand serial data communication concepts.
- ⇨ Understand the programming techniques.
- ⇨ Explain various addressing modes.
- ⇨ Write simple programs using 8051.
- ⇨ Understand the block diagram and control word formats for peripheral devices.
- ⇨ Understand how to interface with RS232C.
- ⇨ Understand how to interface with 8255.
- ⇨ Understand various application of 8051 Microcontroller

14051 - MICROPROCESSOR AND MICROCONTROLLER

DETAILED SYLLABUS

UNIT I MICROPROCESSOR & APPLICATIONS:

Evolution Of Microprocessors – 8085CPU- Architecture – Instruction Formats – Addressing mode – Instruction Set – Different types of Instructions - Instruction Cycle – Timing Diagram for LDA, MOVr1,r2, Call Instruction – ROM Organization – Interrupt Structure – Memory Mapping – Status Signals (Program not required)

UNIT - II ARCHITECTURE OF 8051:

Block diagram of Microcontroller – Comparison with Microprocessor and Microcontroller – Pin details of 8051 – ALU – Special function registers – ROM – RAM – RAM Memory Map (including registers and register banks) – Program Counter – PSW register –Stack - I/O Ports – Timer – Interrupt – Serial Port – External memory – Clock – Reset – Clock Cycle – Machine Cycle – Instruction cycle – Instruction fetching and execution – Overview of 8051 family

UNIT - III INSTRUCTION SET AND PROGRAMMING:

Assembling and running an 8051 program – Instruction set of 8051 – Data transfer instructions – Different addressing modes – Arithmetic Instructions – Signed number concepts and arithmetic operations – Logic and Compare instructions – Rotate instruction and data serialization – BCD, ASCII – Loop and jump instructions – Call instructions – Time delay routines – Program control – Assembler directives – Sample programs.

UNIT – IV I/O, TIMER, INTERRUPT AND SERIAL PROGRAMMING:

Bit addresses for I/O and RAM – I/O programming – I/O bit manipulation programming – Programming 8051 Timers – Counter programming – Basics of Serial programming – 8051 connection to RS 232 – 8051 Serial Port Programming – 8051 interrupt – Programming Timer Interrupt – Programming external hardware interrupts – Programming the serial communication interrupt – Interrupt priority in 8051

UNIT - V INTERFACING EXTERNAL DEVICE WITH 8051:

8051 interfacing to external memory – 8051 interfacing with the 8255 – (Programs are to be written in Assembly for the following interfacing applications) Relays and opto isolators – Sensors interfacing and signal conditioning – Parallel ADC and Serial ADC interfacing – DAC interfacing - Keyboard interfacing – Seven segment and LCD display interfacing – Stepper Motor interfacing – DC motor interfacing and PWM - RTC Interfacing.

TEXT BOOKS:

1. 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi, Mazidi and D.MacKinlay, 2006 Pearson Education Low Price Edition.

2. Microprocessor and Microcontroller by R.Theagarajan, Sci Tech Publication, Chennai

3. Microprocessor and Microcontroller by R.Theagarajan, Sci Tech Publication, Chennai

4. 8051 Microcontroller by Kenneth J.Ayala.

REFERENCE BOOKS:

1. Programming customizing the 8051 Microcontroller by Myke Predko, Tata McGraw Hill

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14051 - MICROPROCESSOR AND MICROCONTROLLER

Model question paper – I

Time : 3 Hrs.   Max. Marks: 75

Note: (1) Answer all questions from Part – A and any ten questions from part – B
        and all questions (Either or type) from Part - C

   (2) Part – A carries one mark for each question and part – B carries each
        Three marks and part – C carries each ten marks.

Part – A   **10x1=10**

1. Define Microprocessor?
2. What are the different type of addressing mode in 8085?
3. Mention the number of bytes in internal RAM and internal ROM of 8051?
4. State any two differences between microprocessor and microcontroller.
5. List the Addressing modes in 8051?
6. What is meant by assembler directives?
7. List the interrupts available in 8051?
8. What meant by interrupt priority in 8051?
9. State the modes of operation in 8255?
10. What is meant by signal conditioning?

Part – B   **5x3=15**

11. Classify the Instruction of 8085 according to their function?
12. Write notes on Instruction Cycle and machine Cycle.
13. Write notes on Assembler directives
14. List the Timer / Counter Control registers with their addresses
15. Write notes on memory interfacing?

Part – C   **5x10=50**

16.   (a) Draw and explain the architectures of 8085 microprocessor
                                (Or)
       (b) Draw and explain the Timing Diagram for LDA address instruction

17.   (a) Draw and explain the block Diagram of 8051 microcontroller
                                (Or)
       (b) (i) List the special function registers with their addresses and explain
             anyone of them
          (ii) Draw and explain the Structure of Internal RAM of 8051

18.   (a) Write an assembly language program to arrange the given set of 'n'
           numbers in ascending order
                                (Or)
       (b) a. Explain briefly about CALL instruction
            b. Explain briefly about Rotate instruction

19.   (a) Explain in details about the programming of 8051 timer
                                (Or)
       (b) Explain about the programming of 8051 serial port

20.   (a) Explain about 8051 interfacing with 8255
                                (Or)
       (b) Explain about stepper motor interfacing with 8051

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14051 - MICROPROCESSOR AND MICROCONTROLLER

Model question paper – II

Time : 3 Hrs.   Max. Marks: 75

Note: (1) Answer all questions from Part – A and any ten questions from part – B
            and all questions (Either or type) from Part - C
       (2) Part – A carries one mark for each question and part – B carries each
            Three marks and part – C carries each ten marks.

Part – A

10x1=10

1. What is function of stack Pointe?
2.   What are various flags in 8085?
3. What is the purpose of PSW register?
4. What is the purpose of special function register?.
5. State the function of SWAP instruction.
6. State the purpose of XCH A, Rn instruction.
7. State the purpose of RS232 serial interface.
8. State function of TXD terminal inRs232c
9. What is meant by BSR mode in 8255?
10. What is meant by RTC interfacing?

Part – B

5x3=15

11. Classify various interrupts in 8085
12. Explain fetch cycle and Execution cycle.
13. What are bit oriented instruction?
14. write notes on RS232c serial interface.
15. Write notes on interfacing of external memory.

Part – C

5x10=50

16.   (a) Explain various addressing mode in 8085 with example
                        (Or)
        (b) Draw and explain the Timing Diagram for STA address instruction

17.   (a) Draw and explain the pin details of 8051 microcontroller.
                        (Or)
        (b) Explain with a neat sketch the memory organization of 8051

18.   (a) Classify 8051 instruction based on function and explain with example.
                        (Or)
        (b)   a. Explain various addressing mode in 8051 with example.

19   (a)   Explain the interfacing of Rs232c with 8051.
                        (Or)
        (b)   With a program explain the usage of interrupts in 8051

20.   (a) Explain about ADC interfacing with 8051
                        (Or)
        (b) Explain about keyboard and display interfacing with 8051

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14052 - ADVANCED COMMUNICATION SYSTEMS

Total No. of Hrs. / Week   :   6

Total No. of Weeks / Semester   :   16

Total No. of Hrs. / Semester   :   96

Scheme of Instruction and Examination

Subject	Instruction		Examination		
			Assessment Mark		
	Hrs/ Week	**Hrs/ Semester**	**Internal**	**Board Exam**	**Total**
Modern Communication Systems	6	96	25	75	100

Topics and allocation

Unit	Topic	Time (Hrs)
I	Radar, Navigational Aids, Telephony and fax	18
II	Digital Communication	16
III	Optical Communication	16
IV	Satellite Communication	18
V	Mobile Communication	16
	Revision, Test	12
Total		96

OBJECTIVES:

⇨ To understand principles of Radar

⇨ To understand principles of navigational aids

⇨ To study Electronic Exchange and principles of facsimile   communication

⇨ To study basic digital communication system and discuss the characteristics of data transmission circuits.

⇨ To learn Error detection and correction codes and various digital modulation techniques.

⇨ To understand modems and their classifications

⇨ To understand optical communication system and discuss about fiber modes, configurations, losses.

⇨ To learn optical sources, optical detectors.

⇨ To discuss the applications of fiber optic communication

⇨ To Study satellite system, orbits, launching, Antennas

⇨ To Study earth segment and space segment components

⇨ To study about satellite services

⇨ To study fundamental cellular concepts such as frequency reuse, handoff

⇨ To learn multiple access techniques.

⇨ To learn digital cellular system - GSM

14052 - ADVANCED COMMUNICATION SYSTEMS
DETAILED SYLLABUS

UNIT – I RADAR AND NAVIGATIONAL AIDS

Radar – Fundamentals – Basic Radar System– Applications – Radar range equation (No derivation) – factors influencing maximum range – Target properties - Pulsed systems – Basic Pulsed Radar System – Block Diagram – Display methods – PPI Display - Automatic target detection.

Radio aids to navigation – Direction finding – Radio ranges – Radio compass – Radio telemetry - Instrument landing system – Ground controlled approach system.

Telephony and fax

Telephone system – Public Telephone network – Private Telephone Network - Electronic Switching System - Block diagram - cordless Phone - Block diagram— Video phone – Block diagram – ISDN – Architecture - Features.

Facsimile communication system – Introduction – facsimile sender-cylindrical scanning – Tape scanning- - facsimile receiver- synchronization – phasing-Index of cooperation (IOC) – Photographic recording – Direct recording

UNIT - II DIGITAL COMMUNICATION:

Fundamental block diagram and basic elements of digital communication system- Advantages, disadvantages of digital communication-characteristics of data transmission circuits-Bandwidth requirement – speed-Baud rate-Noise-crosstalk-Distortion – Equalizers – Echo compressors

Digital codes – Baudot code – ASCII Code – EBCDIC Code - Error detection codes – Parity check codes – Redundant codes – Constant ratio codes - Error correction codes – Retransmission, forward error correcting code – Hamming code.

Digital modulation techniques – ASK modulation / demodulation – FSk modulation / demodulation – PSK modulation / demodulation – only block diagram and operation.

Data sets and interconnection requirements – classification of modems – Modem Interfacing – serial interface standard – Rs.232.

UNIT- III OPTICAL COMMUNICATION:

Optical communication system – Block diagram – Need and advantages of optical fibers – principles of light transmission in a fiber using Ray Theory – Single mode fibers - multimode fibers   –   step   index   fibers   –   graded   index   fibers   – (Fabrication details not required) Attenuation in optical fibers – Absorption losses, scattering losses, bending losses, core and cladding losses- Dispersion – material Dispersion, waveguide dispersion, Intermodal dispersion   - optical sources – LED- semiconductor LASER – Principles – optical detectors – PIN and APD diodes - connectors and splices –

Optical cables - Couplers – optical transmitter – Block diagram using laser feedback control circuit – optical receiver - Block diagram using APD - Applications of optical fibers – civil, Industry and Military application (With Descriptive block diagram).

UNIT – IV SATELLITE COMMUNICATION

Satellite system – Kepler's I,II,II laws – orbits – types-Geostationary synchronous satellites-Advantages – LEO, MEO – Advantages - Apogee -Perigee-Active and passive satellite-Earth Eclipse of satellite-Launching orbit-Parabolic reflector antenna – cassegrain antenna

Space segment-power supply-Attitude control-station keeping – Transponders – TT and C subsystem – Thermal control – Antenna subsystem

Earth segment-Receive only Home TV system – Block diagram – Transmit receive earth station-Block Diagram.

Satellite services – INTELSAT - GPS - MSAT

UNIT – V MOBILE COMMUNICATION:

(Qualitative Treatment only)

Cellular telephone – Evolution - fundamental concepts – Simplified Cellular telephone system - frequency reuse – Interference – Co – Channel Interference – Adjacent Channel Interference – Improving coverage and capacity in cellular systems - cell splitting – sectoring - Roaming and Handoff.

Satellite multiple access techniques – TDMA, FDMA CDMA.

Digital cellular system – Global system for mobile communications (GSM) – GSM services - GSM System Architecture - Radio subsystem.

Reference Books

1. Electronic communication systems - Kennedy - Davis - fourth Edition - Tata McGraw Hill - 1999.

2. Electronics communication - Dennis Roddy and John coolen - Third Edition - PHI - 1988

3. Optical fiber communication - Gerd Keiser - Third Edition - McGraw Hill - 2000

4. Optical communication system - John Gower - Second Edition - PHI - 1995

5. Satellite communication - Dr. D.C. Agarwal - Third Edition - Khanna publishers - 1995

6. Satellite communication - Dennis Roddy - Third Edition - McGraw Hill - 2001

7. Electronic Communications systems - Fundamentals through Advanced - Wayne Tomasi - Fifth Edition - Pearson Education - 2005.

8. Wireless communication - Principles and practice - Theodore S. Rappaport - second edition - pearson education – 2002

9. Mobile communication - Jochen H. Schiller - second Edition - Pearson Education -2004.

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14052 - ADVANCED COMMUNICATION SYSTEMS
Model Question Paper – 1

Time : 3 Hrs.   Max. Marks: 75
Part – A

Answer all questions. Each question carries 1 Mark   **10X1=10**

1. What is Radar?
2. State the factors governing maximum range of Radar
3. Define Modem
4. State different types of equalizer
5. What is a fiber?
6. Differentiate between single mode and multimode fiber
7. Define Orbit
8. What is transponder?
9. What is GSM?
10. What is meant by adjacent channel interface?

Part – B

Answer all Questions Each question carries 4 marks   **5X3=15**

11. Explain simplex and Duplex systems
12. Give examples for Error detection code and error correction code
13. Mention advantages of fiber optic communication
14. What is station keeping? And Mention advantages of GEO
15. What is meant by multiple Access Techniques?

Part – C

Answer all questions. Each question carries 10 marks   **5X10=50**

16.   (a)Draw the block diagram of pulse radar and explain
                                    Or
        (b)Draw the block diagram of electronic exchange and explain

17.   (a)Explain FSK modulation and demodulation
                                    Or
        (b)Explain any three error detection and correction codes

18.   (a)Explain any one application of fiber optic communication
                                    Or
        (b)Explain with block diagram the working of optical receiver

19.   (a)with block diagram explain transmit-Receive earth station
                                    Or
        (b)Write short notes on global positioning system

20.   (a)Explain cell splitting and sectoring
                                    Or
        (b)Explain GSM system architecture
                                    * * *

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14052 - ADVANCED COMMUNICATION SYSTEMS
Model Question Paper – II

Time : 3 Hrs.   Max. Marks: 75

Part – A

Answer all questions   10X1=10

1. What is ISDN?
2. Define index of cooperation
3. What is Crosstalk?
4. Define baud rate
5. Give examples for optical sources and detectors
6. State various losses in fiber
7. What is INTELSAT?
8. Name different types of orbits.
9. What is interference?
10. Differentiate between TDMA and FDMA.

Part – B

Answer all questions   5X3=15

11. Explain the operation of cordless phone?
12. Mention advantages of digital communication
13. Explain the optical coupler?
14. State kepler's I law and II law
15. What are the advantages of digital cellular telephone?

Part – C

Answer all questions   5X10=50
16.   (a) With block diagram explain video phone
                              (or)
        (b) Explain cylindrical scanning method of facsimile transmission

17.   (a) Explain characteristics of data transmission circuits
                              (or)
        (b) Describe about PSK modulation with block diagram

18.   (a) Explain working of laser as a light source for f.o.c.
                              (or)
        (b) Explain the various losses in optical fibers

19.   (a) Explain receive only Home TV system with block diagram
                              (or)
        (b) Write short notes on (1) station keeping (2) parabolic reflector

20.   (a) Explain time division multiple access techniques
                              (or)
         (b)Explain concepts of cellular telephone system
                              * * *

ELECTIVE – I   14071 - DIGITAL SIGNAL PROCESSOR

Total No.of Hours / Week   :   5

Total No. of Weeks/Semester   :   16

Total No. of Hours/Semester   :   80

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
Digital Signal Processor			Internal	Board Exam	Total
	5	80	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
UNIT - I	Introduction to TMS320F2407	14
UNIT - II	Addressing Modes And Instruction Set	14
UNIT - III	System Configuration and Interrupts	14
UNIT - IV	Digital Input & Output and ADC	14
UNIT - V	Event Manager & PWM Generation	14
	Revision Test	10
Total		80

OBJECTIVES:

DIGITAL SIGNAL PROCESSOR

DSP, or Digital Signal Processing, as the term suggests, is the processing of signals by digital means. A *signal* in this context can mean a number of different things. Historically the origins of signal processing are in electrical engineering, and a signal here means an electrical signal carried by a wire or telephone line, or perhaps by a radio wave. More generally, however, a signal is a stream of information representing anything from stock prices to data from a remote-sensing satellite. The term "digital" comes from "digit", meaning a number (you count with your fingers - your digits), so "digital" literally means numerical; the French word for digital is *numerique*. A digital signal consists of a stream of numbers, usually (but not necessarily) in binary form. The processing of a digital signal is done by performing numerical calculations

On Completion of Following units of syllabus contents, the students must be able to

- ⇨ Familiarized with the basic of Digital signal Processor TMS320F2407
- ⇨ Explain about the architecture of 2407
- ⇨ Explain about CPU, Memory and Program exaction control
- ⇨ Explain about the different methods of Addressing Modes
- ⇨ Explain about Instruction set and Classification of Instruction
- ⇨ Explain about the Instruction Description and some Example instructions
- ⇨ Explain about the system configurations and Status Registers
- ⇨ Explain about basics of interrupts, Interrupt Priority and Vectors and interrupt operating sequence
- ⇨ Explain about PLL , Watchdog Timers and Power Down Modes
- ⇨ Explain about Handling of Digital Inputs and Outputs
- ⇨ Explain about Basics of Analog to Digital Converter
- ⇨ Explain about Handling of ADC
- ⇨ Explain about the Event Manager A and B
- ⇨ Explain about Timers and Compare Units.
- ⇨ Explain about PWM Generation using Timer and Compare Units

14071 - DIGITAL SIGNAL PROCESSOR

DETAILED SYLLABUS

UNIT – I INTRODUCTION TO TMS320F2407

Introduction to 2407 – **Architectural Overview** – Architecture Summary –C24X CPU Internal Bus Structure-Memory-CPU-Program Control-**Memory And IO Spaces** – Overview of Memory and IO Spaces - Program Memory – Data Memory – Global Data Memory - I/O Space – **Central Processing Unit** Input Scaling **-** Multiplier – Central Arithmetic logic – Auxiliary Register Arithmetic Unit – Status Registers - **Program Control** – Program Address Generation – Pipeline Operation – Branches, Calls and returns - Conditional Branches, Calls – Repeating a single instruction

UNIT – II ADDRESSING MODES AND INSTRUCTION SET

Addressing Modes – Immediate addressing modes – Direct Addressing Mode – Indirect Addressing Mode – **Instruction Set** - Instruction Set Summary - Accumulator and ALU Instruction - Auxiliary Register Instruction – TREG, PREG and Multiply Instructions - Branch Instructions - Control Instructions - IO and Memory Instructions-How to use Instruction Descriptions-syntax-operands-opcode-Execution-status bits-Description-words-cycles-study of instructions- ADD-SUB-MAC-BACC-BCND-SETC-CLRC-SPLK-IN-OUT

UNIT – III SYSTEM CONFIGURATION AND INTERRUPTS

System Configuration - Configuration Registers –System Control And Status Registers – **Interrupts**- Interrupt priority and Vectors - Peripheral Interrupt Expansion Controller – Interrupt operation sequence –CPU Interrupt Registers -Peripheral Interrupt registers – **Clocks and Low Power Modes –** Phased Locked Loop – Watchdog Timer Clock – Low Power Modes

UNIT – IV DIGITAL INPUT & OUTPUT AND ADC

Digital Input and Output Interface – Introduction – IO Implementation - IO Mux Control Registers - Data and Direction Control Registers – **Analog To Digital Converte**r –Features of ADC - ADC overview – ADC Input Channel Selection – ADC Trigger Source Input -ADC Clock pre scalar - Calibration of ADC - ADC Control Registers

UNIT – V EVENT MANAGER & PWM GENERATION

Event Manager Functional Blocks – Event Manager Registers - General Purpose Timer - Compare Units –PWM circuits associated with compare unit – Programmable Dead band unit- Output Control unit - PWM Wave form generation with compare units - Register Setup for PWM generation – Asymmetric Waveform generation – Symmetric PWM waveform Generation

Reference Books:

1. Texas Instruments Inc., TMS320F24x DSP Controller Reference Guide – CPU and Instruction Set - SPRU160C or www.ti.com

2. Texas Instruments Inc., TMS320F240x DSP Controller Reference Guide – Systems and Peripherals – SPRU357B or www.ti.com

3. Hamid. A Toliyat, Steven G. Campbell, DSP Based Electro-Mechanical Motion Control – CRC Press 2004, ISBN: 0-8493-1918-8

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14071 - DIGITAL SIGNAL PROCESSOR
Model Question Paper – I

Time : 3 Hrs.   Max. Marks: 75
Part-A
Answer all questions   (10x1=10 marks)

1. What is meant by program memory?
2. What is data memory?
3. What is the use of PREG instruction?
4. What is pipe lining ?
5. State the use of status register
6. What is vector interrupt?
7. State the use of clock pre scaler.
8. What is ADC calibration?
9.   What are the various Event manager Registers?
10. Draw the symmetric PWM wave form.
Part-B
Answer all questions   (5x3=15marks)

11. State the functions of Global data memory?
12. Explain indirect Addressing mode in 2407 processor
13. What are various vector interrupts in 2407 processor?
14. State the functions of Data & Direction control registers?
15. What are the functions of Event Manager Registers?
Part-C

Answer all questions   (5x10=50 marks)

16.   (a) Explain the Architecture of 2407 processor with a diagram
                                        (or)
        (b) Explain program address generator and pipeline operation

17.   (a) Explain various addressing modes in 2407 processor
                                        (or)
        (b) Classify & Explain various instruction set in 2407 processor

18.   (a) Explain the various interrupts in 2407 processor
                                        (or)
        (b) Explain watchdog time clock and low power mode in 2407 processor

19.   (a) Explain the operation of I/O MUX control register and Direction control register
                                        (or)
        (b) Explain the operation of ADC trigger source input and ADC clock per scaler

20.   (a) Explain the Event manager functional blocks
                                        (or)
        (b) Explain the generation of Asymmetric wave form generation

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ELECTIVE I – 14072 - VLSI

Total No.of Hours / Week   :   5

Total No. of Weeks/Semester   :   16

Total No. of Hours/Semester   :   80

SCHEME OF INSTRUCTION AND EXAMINATION

Subject	Instruction		Examination		
	Hours/ Week	Hours/Semester	Assessment Marks		
VLSI	5	80	Internal	Board Exam	Total
			25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
UNIT - I	Number System and Logic Gates	14
UNIT - II	Combinational and Sequential Logic design	14
UNIT - III	Programmable Logic Device	14
UNIT - IV	VHDL Programming	14
UNIT - V	CPLD & FPGA Architecture	14
	Revision Test	10
Total		80

VLSI
      To introduce the Digital design concepts, VHDL programing, design flow of VLSI and architectures of CPLD and FPGA front end devices.

OBJECTIVES:
On completion of the following units of syllabus contents, the students must be able to

- ⇨ Give basic digital number systems
- ⇨ Explain the logic Gates operations
- ⇨ Explain the basic idea about Arithmetic Operators
- ⇨ Explain the Different types of Coding Techniques like BCD, Grey etc.,
- ⇨ Give introduction about Combinational Circuits
- ⇨ Explain the Basic idea about Boolean Algebra

- ⇨ Explain the brief Idea About Binary Arithmetic's
- ⇨ Explain the Idea about State Machine Mealy and Moore Machines
- ⇨ Explain the basic idea about Memory Organization
- ⇨ Explain the basic structure of ROM.
- ⇨ Explain the Architecture of PAL
- ⇨ Explain the Architecture of PLA
- ⇨ Explain the Macro cell Concept
- ⇨ Explain about VHDL design flow
- ⇨ Explain about Concurrent Signals
- ⇨ Explain About Various Design Types like Structural , Behavioral and RTL
- ⇨ Explain About Data Flow Description
- ⇨ Explain About VHDL packages and Functions
- ⇨ Give schematic diagram introduction to CPLD (Complex Programmable Logic Device) architecture.
- ⇨ Give schematic diagram introduction to FPGA (Field Programmable Gate Array) architecture.
- ⇨ Explain the CLB's, LUT's, DCM units in FPGA.
- ⇨ Explain the XILINX FPGA & CPLD families.
- ⇨ Explain the Hierarchal Design flow

14072 - VLSI

DETAILED SYLLABUS

UNIT – I NUMBER SYSTEM & LOGIC GATES:

Number Systems - General Number Representation - Decimal Number System - Binary Number System - Octal Number System - Hexadecimal Number System - Converting numbers from One Base to Another - Unsigned and Signed Binary Numbers - Binary-Coded-Decimal Code - Alphanumeric Codes - Excess-3 Code - Gray Code – Unicode - fixed-Point and Floating-Point Representations - Arithmetic Operations - BCD Arithmetic - Error Correction and Detection - Basic Gates - Logic Value System – Transistors - CMOS Inverter - CMOS NAND - CMOS NOR - AND and OR gates - MUX and XOR gates - Three-State Gates

UNIT – II COMBINATIONAL & SEQUENTIAL LOGIC DESIGN:

Designing Combinational Circuits - Boolean Algebra - Karnaugh Maps - Don't Care Values - Iterative Hardware - Binary / BCD Adders and Binary Subtractors – Comparators - Multiplexers and Decoders - Enable / Disable Inputs - Storage Elements - Flip-Flops – Registers - Design of Synchronous Sequential Circuits - Design of Counters – Sequential Circuit Design - Finite State Machines - Designing State Machines - Mealy and Moore Machines - One-Hot Realization - Sequential Packages – Memories - Static RAM Structure - Bi-directional IO

UNIT - III   PROGRAMMABLE LOGIC DEVICES:

Read Only Memories - Basic ROM Structure - NOR Implementation - Distributed Gates - Array Programmability - Memory View - ROM Variations – PROM – EPROM – EEPROM - Flash Memory - Programmable Logic Arrays - PAL Logic Structure - Product Term Expansion - Three-State Outputs - Registered Outputs – Macrocells - Programmable Registers - Output Enable / Clock Select

UNIT – IV VHDL PROGRAMMING:

Brief History of HDL - Introduction to VHDL – Entity – Architectures - Concurrent Signal Assignment - Event Scheduling - Structural Designs - Sequential Behavior - Process Statements - Process Declarative Region - Process Statement Part - Process Execution - Sequential Statements - Architecture Selection - Configuration Statements - Behavioral Modeling - Sequential Processing - Data-Flow Description - Data Types - VHDL Subprograms and Packages

UNIT – V CPLD & FPGA ARCHITECTURE:

CPLDs and FPGAs - Generic PLD Architecture - Complex Programmable Logic Devices - Logic Array Blocks - Macrocells - Programmable Interconnect Array - I/O Control Blocks - CoolRunner-II CPLDs- CoolRunner-II CPLD Architecture Description - Function Block – Macrocell - Advanced Interconnect Matrix (AIM) - I/O Block - I/O Block - Output Banking – DataGATE - Generic FPGA Architecture - Spartan-3 FPGAs - Spartan-3 FPGA Attributes - Architectural Overview – Configuration - I/O Capabilities – Program design flow - Design Entry – Simulation – Compilation - Device Programming

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Text Book:

1. Fundamentals of Digital Logic and Microcomputer Design by M. Rafiquzzaman - Wiley-interscienc
2. VHDL Programming by Example " by Douglas L. Perry – Fourth Edition
3. Digital Design and Implementation with Field Programmable Devices by Zainalabedin Navabi
4. The Digital Consumer Technology Handbook - A Comprehensive Guide to Devices, Standards, Future Directions, and Programmable Logic Solutions *by Amit Dhir,* Xilinx, Inc.

References:

1. Digital Electronics with PLD Integration by Nigel P. Cook
2. Programmable Logic Design Quick Start Hand Book By Karen Parnell & Nick Mehta
3. Programmable Logic Handbook: PLDs, CPLDs, and FPGAs by Ashok K. Sharma
4. Digital Logic Simulation and CPLD Programming with VHDL by Steve Waterman
5. HDL Programming Fundamentals: VHDL and Verilog by Nazeih M. Botros
6. Spartan-3 Platform FPGA Handbook by Marc Baker, Kim Goldblatt, Steven Knapp
7. Stephen Brown and Zvonko Vranesic, " Fundamentals of Digital Logic Design with VHDL ". Second Edition McGraw Hill International, Singapore, 2000.

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14072 - VLSI
Model Question Paper

Time : 3 Hrs.   Max. Marks: 75

Part - A

Answer all questions   **10 x 1 = 10**
1. What is meant by three state gate?
2. What are various error correction codes/
3. What is multiplexar?
4. What is decoder?
5. What is Flash memory?
6. State any two advantages of programmable logic array.
7. What is meant by Event Sheduling?
8. What is meant by sequential behavior?
9. What is Simultion?
10. What is macrocell ?

Part - B

Answer all questions   **5 x 3 = 15**
11. State the logic diagram & truth table for XOR gate?
12. State any two differences between combinational circuit & Sequential circuit?
13. State the differences between PROM & EPROM?
14. Explain the Data flow   odeling?
15. State the use of I/O control blocks?

Part - C

Answer all questions   **5 x 10 = 50**

16.   (a) Explain CMOS Inverter and CMOS NOR circuit with a diagram
                        (or)
        (b) Explain CMOS NAND gate with a circuit diagram

17.   (a) Simplify the following function using Karnaugh Map
           f(A,B,C,D)=Em(0,1,2,3,11,12,14,15)
                        (or)
        (b) Explain BCD Adder and BCD Subtractor with a logic diagram

18.   (a) Explain Programmable logic array with a diagram
                        (or)
        (b) Explain Basic Rom structure with a diagram

19.   (a) What are different type of Modelling in VLSI design? Explain each with
            an example?
                        (or)
        (b) Write a VHDL program to design a Flip Flop?

20.   (a) Explain CPLD Architecture with a neat diagram
                        (or)
        (b) Explain FPGA Architecture

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ELECTIVE THEORY - I
14073 - ROBOTICS AND AUTO ELECTRONICS

Total No. of Hrs. / Week : 5
Total No. of Weeks / Semester : 16
Total No. of Hrs. / Semester : 80

Scheme of Instruction and Examination

Subject	Instruction		Examination		
	Hrs/Week	Hrs/Semester	Assessment Mark		
Elective theory – I Robotics and Auto Electronics			Internal	Board Exam	Total
	5	80	25	75	100

Topics and allocation

Unit	Topic	Time (Hrs)
I	Basic Configuration of Robotics and its Working	14
II	Robot Controller, Servo Systems	14
III	Robot Motion Analysis	14
IV	Robot Programming	14
V	Robot Application in Manufacturing and Auto Electronics	14
	Revision, Test	10
Total		80

OBJECTIVES:

⇨ To understand basic configuration of Robotics

⇨ To understand the various types of Robots

⇨ To understand the Robot controller

⇨ To understand the various servomotor

⇨ To understand the Robot kinematics

⇨ To understand the vision system

⇨ To understand the various Robot programming

⇨ To understand the application of Robots in various Industries

⇨ To understand the uses of various sensors and warning systems

14073 - ROBOTICS AND AUTO ELECTRONICS
DETAILED SYLLABUS

UNIT - I BASIC CONFIGURATION OF ROBOTICS AND ITS WORKING:

Introduction – definition – basic configuration of robotics and its working – robot components – manipulator, end effectors, drive system, controller, sensors – mechanical arm – degrees of freedom – links and joints – construction of links, types of joint – classification of robots – cartesian, cylindrical, spherical, horizontal articulated (SCARA), vertical articulated – structural characteristics of robots – mechanical rigidity – effects of structure on – control - work envelope and work volume - robot work volumes and comparison – wrist rotations – mechanical transmission, pulleys, belts, gears, harmonic drive – conversion between linear and rotary motion and its devices.

UNIT - II ROBOT CONTROLLER, SERVO SYSTEMSL:

Robot controller – level of controller – open loop and closed loop controller – servo systems – microprocessor based control system – robot path control – point to point – continuous path control – sensor based path control – controller programming – actuators – dc servo motors – stepper motors – hydraulic and pneumatic drives - feedback devices – potentiometers – optical encoders – dc tachometers.

UNIT - III ROBOT MOTION ANALYSIS:

Robot motion analysis – robot kinematics – robot dynamics - end effectors – grippers and tools - gripper design – mechanical gripper – vacuum gripper – magnetic grippers – sensors – transducers – tactile sensors – proximity sensors and range sensors – force and moment sensors and its applications and problems - photoelectric sensors – vision system – image processing and analysis – robotic applications – robot operation aids – teach pendent – MDI and computer control.

UNIT - IV ROBOT PROGRAMMING:

Robot programming – lead through methods and textual robot languages – motion specification - motion interpolation - basic robot languages – generating of robot programming languages – On-Line & Off-Line programming - robot language structure – basic commands – artificial intelligence and robotics.

UNIT - V ROBOT APPLICATION IN MANUFACTURING AND AUTO ELECTRONICS:

Robot application in manufacturing – material handling –assembly finishing – adopting robots to work station - requisite and non – requisite robot characteristics – stages in selecting robot for individual application – precaution for robot –future of robotics.

Sensors for fuel level in tank- Engine cooling water temperature sensor – engine oil pressure sensor – Speed sensor – Air pressure sensor – Engine oil temperature sensor – Oil pressure warning system – Engine over heat warning system – Air pressure warning system – Speed warning system – Door Lock Indicators.

Reference Books:

1. Industrial Robotics – Technology – Programming and Applications -
   Mikell P. Groover, Mite chell weiss, Roger Negal and Nicholes G. Odress.
2. Robotics – An Introduction – Doughales – R. Halconnjr.
3. JUDGE. AW – Modern Electric Equipments for Automobile – Chapman & Hall London 1975
4. Walter E Billet & Leslie. F GOINGS – Automotive Electric Systems

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14073 - ROBOTICS AND AUTO ELECTRONICS

Model Question Paper-I

Part-A

Answer all questions   **10X1=10**

1.   Define automation.
2.   What are different types of sensor?
3.   Define Stability.
4.   State any two use of optical encoder.
5.   Differentiate between sensor and transducer.
6.   State use of proximity sensor.
7.   Differentiate between online and offline programming.
8.   What are various motion specification?
9.   Differentiate between speed sensor and air pressure sensor.
10   State various precautions while handling robot.

Part-B

Answer all questions   **5X3=15**

11.   Differentiate between linear motion and rotary motion.
12.   State difference between hydraulic and pneumatic drives.
13.   Write short notes on vision systems?
14.   What are various motion specifications?
15.   What are various stages in selecting robot for individual application?

Part-C

Answer all questions   **5X10=50**

16.   (a) Explain the basic configuration of robotics at its working.
                        (Or)
       (b) Explain the various structural characters of robots.

17.   (a) Explain the working of stepper motor with a neat structure.
                        (Or)
       (b) Explain the works of dc tachometer with a diagram.

18.   (a) Explain the factors to be considered for selection of sensors.
                        (Or)
       (b) Explain the various grippers with diagram.

19.   (a) Explain OR logic function with ladder diagram.
                        (Or)
       (b) What is counter instruction? Draw a ladder logic counter program and
            explain.

20.   (a) Explain in detail the ergonomic factors for advanced manufacture system
                        (Or)
       (b) Explain the speed warning system with a block diagram.

14054 - MICROPROCESSOR AND MICROCONTROLLER LAB.

Minimum 12 Experiments to be conducted

1. Introduction of Microcontroller Kit

2. Addition, Subtraction

3. Multi-byte addition

4. Multiplication of two numbers

5. Finding the maximum value in an arry

6. Arranging the given data in Ascending order

7. BCD to Hex conversion

8. Hex to BCD conversion

9. Hex to ASCII

10. ASSCII to Binary

11. Square Rott of an given data

12. Least Common Multiple

13. Greatest Common Divisor

14. Parity bit generation

15. Program using I/Os in port 1

16. Counter using timer

17. Program using interrupt

INTERFACING WITH APPLICATION BOARDS

Minimum Six Experiments to be conducted

18. Digital I/O

19. Matrix keyboard

20. Seven segment displays

21. LCD Displays

22. Traffic light

23. 8 bit ADC and 8 bit DAC

24. STEPPER MOTOR CONTROL

25. DC motor control

26. Lift control

27. Sending data through serial port between controller kits

28. Printer Interfacing with Microcontroller kit

EQUIPMENT REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Microcontroller Kit		10
2	8085 Microprocessor Kit		6
3	Stepper motor Interface kit		2
4	DC motor Interface kit		4
5	Printer Interface kit		2

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14055 - ADVANCED COMMUNICATION SYSTEMS LAB

List of Experiments

1. To construct a transistor video amplifier and to find its frequency response characteristics.
2. To construct a sync separator circuit and test its performance.
3. To construct a sample and hold circuit and trace the waveforms.
4. PSK modulation – Trace the output waveform.
5. PSK demodulation – Trace the output waveform.
6. Setting up a fiber optic analog link.
7. Setting up a fiber optic digital link.
8. To measure the bending loss and propagation loss in fiber optics.
9. TDM of signals
10. Analog transmitter and receiver.
11. FSK transmitter and receiver.
12. ASK modulation - Trace the output waveform.
13. PWM modulation - Trace the output waveform.
14. To find Deflection sensitivity of CRT.
15. To measure the output at various points in sound section.
16. To measure the output at various points in video section.
17. To measure the output at various points in picture tube deflection section.
18. Assembling and testing of Yagi antenna.

EQUIPMENT REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	CRO	100 MHz	2
2	PSK Modulation Kit		2
3	PSK Modulation Kit		2
4	Fiber Optic Demonstration kit		1

* * *

14074 - DIGITAL SIGNAL PROCESSOR LAB

1. Write a program to add two 16 bit numbers

2. Write a program to subtract two 16 bit numbers

3. Write a program to multiply two 16 bit numbers

4. Write a program to glow LEDs by selecting switches using digital I/O

5. Write a program to read an analog input using analog to digital converter in start stop mode

6. Write a program to read an analog input using ADC in continuous conversion mode using ADC Interrupt

7. Write a program to read four analog inputs using auto sequencer using ADC of 2407

8. Write a program to generate a three phase fixed pwm using event manager

9. Write a program to generate a Fixed Sine PWM

10. Write a program to generate pwm and vary the frequency of PWM using Potentiometer

11. Write a program to vary the speed of DC motor by varying the duty cycle of PWM and tabulate the speed of the motor with respect to Duty cycle

EQUIPMENT REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	2407 DSP Kit		10

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14075 - VLSI LAB

1.   Write simple VHDL Codes for

       a.   Addition,
       b.   Subtraction
       c.   Multiplication
       d.   Division and implement on FPGA kit.

2.   Write a VHDL Code for
      a. 8 Bit Digital output using LEDs
      b. 8 Bit Digital inputs using

3.   Write VHDL Code for 4 x 4 matrix keypad interface.

4.   Write a VHDL Code for
      a.   Relay interface
      b.   Buzzer Interface

5.   Write a VHDL code for 7 Segment LED display interface

6.   Write a VHDL code for Stepper motor interface

7.   Write a VHDL code for Traffic light control

8.   Write a VHDL code for 4 bit binary counter an study all signals using simulation software

9.   Write a VHDL code for LCD display to display a text message.

10.   Write a VHDL code to generator PW M signals for DC Motor control

11.   Write a VHDL code & implement on FPGA kit for MUX & DEMUX

12.   Write a VHDL Program & implement on FPGA kit for Encoder, Decoder & Shift Register.

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ELECTIVE PRACTICAL – I

14076 - ROBOTICS LAB

1.   Robot system connection and component recognition

2.   Robot operation, moving the various axis continuous and intermittent motion.

3.   Writing programs off-line

    a. Homing operation

    b. Recording positions

    c. Writing programs for pick and place at least five programs

4.   Continue writing programs off-line with score base levels.

5.   Use of loops and subroutines with program

6.   Programs using XYZ Coordinates.

7.   Teaching positions via XYZ co-ordinates

8.   Measurement of Robot characteristics

    a. Measurement of Robot work envelope

    b. Measurement of Robot of motion

    c. Measurement of Repeatability

9.   Study of Vision system in Robot

10.   Use of Vision system for pick and place programming.

11.   Practicals connected with various Transducer

12.   Practicals connected with various solenoid

13.   Practicals connected with Photo sensor

14.   Practicals connected with proximity switch

15.   Practicals connected with stepper motor

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14061 - COMPUTER HARDWARE AND NETWORKING

Total No. of Hrs / Week   :   6
Total No. of Weeks / Semester   :   16
Total No. of Hours / Semester   :   96

Scheme of Instruction and Examination

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	**Assessment Marks**		
			Internal	Board Exam	Total
Computer Hardware and Network	6	96	25	75	100

Topics and Allocation

Unit	Topic	Time (Hrs)
Unit 1	Motherboards and processors	16
Unit 2	Peripherals	18
Unit 3	I/O ports and External peripherals	18
Unit 4	PC Assembling and Testing	16
Unit 5	Computer Network and Installation	16
	Revision and Test	12
Total		**96**

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

⇨ Familiarize themselves the evolution of PCs.

⇨ Familiarize with the motherboards, memory chips.

⇨ Familiarize with various Bus standards, chip sets and processors.

⇨ Understand the operation of Keyboard, Mouse and Displays.

⇨ Understand the concept of HDD, FDD and special devices.

⇨ Understand the operation of CD and DVD.

⇨ Familiarize with the working of video capture board, sound blaster cards.

⇨ Understand the different I/O ports and SMPS used in the PCs.

⇨ Understand the working of Modem, Digital camera, Printer and Scanners.

⇨ Acquire knowledge about assembling of PC.

⇨ Understand the concept of CMOS set up program & post diagnostics software and viruses.

⇨ Familiarize with the different computer networks, network media and hardware.

⇨ Understand the concept of installation & configuring network, network administration.

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14061 - COMPUTER HARDWARE AND NETWORKING

DETAILED SYLLABUS

UNIT – I:
Introduction - Evolution - PC through Pentium core2 Duo – comparison chart - PC system units – Front Panel / Rear side connectors, switches and indicators - specification parameters - Lap top PCs – Palm top PCs.

Mother Board: Evolution – Mother Board components - BIOS – CMOS RAM – Form Factor – Riser Architecture – Main Memory – memory chips (SIMM, DIMM, RIMM) – extended – expanded – cache – virtual Memories.

Bus Standards: PC BUS – ISA and Knowledge of other Busses – PCI – AGP – USB Architectures, important signals – comparison chart.

Chip sets: Introduction – Intel chipset 945 series and knowledge of other chip sets – AMD chipset series.

Processors: Introduction – CISC Basic structure – RISC basic structure – evolution – Intel CPUs(P IV, Dual core, Core DUO, Core2 DUO) – AMD CPUs(K6, ATHLON, DURON) – VIA Cyrix CPUs(6X86MX, VIA/CYRIX III, VIA SAMUEL II).

UNIT II :
Keyboard & Mouse: introduction – keyboard operation – key board signals – keyboard interface logic – wireless keyboard function – Mouse construction - principle operation of Mouse – optical mouse – wireless mouse – mouse signals – Mouse Installation – track pads.

Displays: Video basics – anatomy of CRT, LCD and TFT displays - resolution –interlacing - refresh rate – dot pitch – data projectors – touch screens.

HDD: introduction – HDD construction – parameters – operation- HDC block diagram – working principle – IDE, EIDE, SCSI, ultra ATA, and SATA series – installation – partitioning– partition table – formatting – FAT –data reading – data writing (FM, MFM) - Boot record - Directory structure.

FDD & Special Devices: Introduction – disk construction – types - FDD construction – drive operation – types – FDC operation – pen drives – flash drives – I pods.

CD &DVD: Introduction – construction – operation – formats – Technology DVD writer combo drive construction – read/write operation – DVD drive installation.

UNIT III:
Video Capture Board: Introduction – block diagram of an integrated video capture/ VGA card – connectors – capture process – audio and video capture and play back sequence – compression and de-compression techniques.

Sound Blaster Card: Basics of digital sound – audio compression and decompression – sound blaster card – installation – MIDI – 3D audio – EAX – MP3 – SDMI.

I/O Ports & SMPS: serial - parallel port - game port – controllers (Block Diagram) – operation – signals – SMPS – working – block diagram – AT & ATX connectors

Modem: Introduction – functional block of modem – working principle – types – installation.

Digital Camera: introduction – construction – operation – SLR camera– features.

Printer: introduction – types – dot matrix – inkjet – laser – operation – construction – features – installation – troubleshooting.

Scanner: Introduction – operation – scan resolution – color scanners – scan modes – file formats.

UNIT IV:
PC Assembly: Power supplies - Configuring mother board/jumper setting – connectors – cables -   Adding memory modules – assembling a computer – upgrading a PC.

CMOS setup program & POST: CMOS setup program - various setup options – POST definition – IPL hardware – POST test sequence – beep codes – error messages.

Diagnostic Software & Viruses: PC latest diagnostic software – bench mark programs – computer viruses – Precautions – Anti-virus software – signature of viruses – Fire walls.

UNIT V:
Computer Network Basics: Introduction – OSI layer model - network types – LAN- WAN – CAN – MAN – HAN – internet – intranet – extranet – uses – Blue tooth Technology.

Local Area Network: LAN topologies – star – ring – mesh – bus – Client/Server – peer to peer.

Network Media & Hardware: Twisted wire - Coaxial cable - fiber optic cable – flow control – Ethernet – Arc net – Router – active hub - passive hub – wireless network – blue tooth dongle.

Installing and configuring Network (Windows NT 2003): Network Components and Connectors – Installing NIC – Installing Cables – Hub – Setting up NIC – Network Setup Wizard – Working with Network resources – Sharing resources on Network – New Connection Wizard.

Network Administration(Windows NT 2003): User Accounts and Groups – Working with User Accounts & security – passwords - Group Membership Profiles – Working with Groups – Granting Permissions – Managing Shares – Switching Between Users.

Text Books:

1. D. Balasubramanian - Computer Installation and Servicing - TMH Publishing Company, New Delhi.

Reference books:

1. Govindarajulu - IBM PC and Clones - TMH Publishing Company, New Delhi.
2. M. Radhakrishnan & D. Balasubramanian - Computer Installation & Troubleshooting – ISTE Learning Material.
3. Peter Norton - Introduction to Computers - TMH Publishing Company, New Delhi.
4. Stephen J. Bigelow - Troubleshooting, Maintaining & Repairing PCs -TMH Publishing Company.
5. McNamara John. E - Local Networks – An introduction to the technology - PHI.

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14061 - COMPUTER HARDWARE AND NETWORKING
<u>**MODEL QUESTION PAPER – I**</u>

Time : Three Hours   Max. Marks: 75
PART – A

10 x 1 = 10

<u>**N.B:**</u> 1. Answer all the questions.
1. Mention any two functions of CPU.
2. Define formfactor.
3. List any two DVD data format.
4. State any two advantages of interlaced scanning.
5. Write any two features of digital camera.
6. State advantages of compression technique.
7. What is SCAN DISK?
8. Define POST
9. What are the different types of computer network?
10. State any two difference between LAN and WAN
PART – B

5 x 3 = 15

<u>**N.B:**</u> 1. Answer all question.
11. Mention the various types of bus standards.
12. What is the importance of FAT?
13. What are the various compression techniques used in Video Card?
14. List any four audio error codes generated by the POST.
15. Explain the ring topology.
PART – C

10 x 5 = 50

<u>**N.B:**</u> 1. Answer all the questions by choosing either (a) or (b).
     2. All question carry equal marks.
16. (a) Distinguish between the RISC and CISC processors.

(or)

    (b) Explain about any four essential units of a Personal Computer.

17. (a) Explain the working of Keyboard with block diagram.

(or)

    (b) Draw the construction of floppy disk. Briefly explain about is organization.

18. (a) Define scan resolution in scanners. What is the significance of it?

(or)

    (b) Describe the layout of a standard sound card.

19. (a) Write the diagnosis procedure for the following keyboard error.
        (i) Keyboard interface problem (ii) Non-operation of some of keys in the keyboard.

(or)

    (b) Explain the precautions to avoid viruses in computer systems.

20. (a) Describe the details of new connection wizard.

(or)

    (b) What is the uses of granting permission to the user? How will you grant
        permission to the users?

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14061 - COMPUTER HARDWARE AND NETWORKING
MODEL QUESTION PAPER – II

Time : Three Hours   Max. Marks: 75
PART – A

10 x 1= 10

N.B: 1. Answer all the questions.
1. Define Cache memory.
2. Define virtual memory.
3. What are the uses of pen drive?
4. State advantages of TFT Monitor.
5. What is MIDI?
6. State different types of Modem.
7. List the various types of computer viruses.
8. What is meant by Benchmark program?
9. Write the different types of network topologies.
10. State different types of layer in OSI model.

PART – B

5x 3= 15

N.B: 1. Answer all question.
11. Explain the Riser Architecture?
12. What are the differences between CRT and LCD displays?
13. Draw the pin details of a serial port.
14. How do you upgrade the memory (RAM) of a computer?
15. What is Bluetooth Technology?

PART – C

5 x 10= 50

N.B: 1. Answer all the questions by choosing either (a) or (b).
    2. All question carry equal marks.
16.   (a) Explain about AMD chipset series.

(or)

(b) Draw a PC motherboard layout and mark some important units.

17.   (a) Explain the installation procedure of a Mouse.

(or)

(b) Draw the block diagram of HDC. Explain its working principle.

18.   (a) Draw the sub-assemblies of dot-matrix printer and explain its working
       principle.

(or)

(b) Compare serial port, parallel port and game port.

19.   (a) What are the signatures of viruses?

(or)

(b) Write the trouble shooting method for the following FDD problem.
      (i) FDC controller failure, (ii). Write fault error, (iii). General failure error.

20.   (a) Explain the working environment with user accounts and security.

(or)

(b) Briefly explain Network interface card and network hub.

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14062 - EMBEDDED SYSTEM

Total No.of Hours / Week   :   6

Total No. of Weeks/Semester   :   16

Total No. of Hours/Semester   :   96

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
Embedded System			Internal	Board Exam	Total
	6	96	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
UNIT - I	ARM INTRODUCTION	16
UNIT - II	LPC 2148 ARM CPU	18
UNIT - III	LPC 2148 PERIPHERALS	16
UNIT - IV	OPERATING SYSTEM OVERVIEW	18
UNIT - V	μC/OS-II	16
	Revision Test	12
Total		96

<u>OBJECTIVE</u>

EMBEDDED SYSTEMS

Each day, our lives become more dependent on **'Embedded Systems**', digital information technology that is embedded in our environment. This includes not only safety-critical applications such as automotive devices and controls, railways, aircraft, aerospace and medical devices, but also communications, 'mobile worlds' and 'e-worlds', the 'smart' home, clothes, factories etc. All of these have wide-ranging impacts on society, including security, privacy and modes of working and living. More than 98% of processors applied today are in embedded systems, and are no longer visible to the customer as 'computers' in the ordinary sense. New processors and methods of processing, sensors, actuators, communications and infrastructures are 'enablers' for this very pervasive computing. They are in a sense ubiquitous, that is, almost invisible to the user and almost omnipresent. As such, they form the basis for a significant economic push.

These applications are 'vision driven', as in the following examples:

- Automotive: Accident free driving
- Aerospace: A free, safe sky for all
- Medical Devices: Robotic surgeon
- Communications: Seamless connectivity

On completion of the following Units of syllabus contents, the students must able to

- ⇨ Students can understand the "Recent Trends in Embedded System"
- ⇨ Explain about Advanced RISC Architecture (ARM) and 32 bit microcontroller.
- ⇨ Explain about memory formats and Instruction set summary of ARM Processor
- ⇨ Explain about basic fundamentals of ARM7TDMI core
- ⇨ Explain the Debug and ICE-RT logics
- ⇨ Explain the Architecture overview about LPC2148 CPU
- ⇨ Give the Block diagram of system control Block
- ⇨ Explain , Handing of On Chip Analog to Digital Conversion
- ⇨ Explain the Handling of On chip Digital to Analog conversion
- ⇨ Give the idea about Interrupt Handling
- ⇨ Give detailed information about General Purpose input and Output (GPIO) logic levels of and Handling of GPIOs
- ⇨ Give Detailed information about Serial Communication
  - ⇨ UART
  - ⇨ I2C
  - ⇨ SPI
  - ⇨ USB
- ⇨ Learn about , need of an OS in Embedded systems

⇨ Give an advantage of RTOS

⇨ Learn about Different operating systems available for Embedded Systems

⇨ Give Detailed information about Kernel and Multitasking

⇨ Give detailed information about scheduling and Clock Ticks in RTOS.

⇨ Give brief idea about μC/OS – II

⇨ Give information about , Support Devices for μC/OS – II

⇨ Give Detailed Information about Task Management

⇨ Give Detailed Information about Time Management

⇨ Give Detailed Information about , Handling of OS delay in RTOS.

14062 - EMBEDDED SYSTEM

DETAILED SYLLABUS

UNIT – I   ARM INTRODUCTION

Introduction - The ARM Architecture Overview - Instruction set Summary - Processor operating states- Memory formats - Memory Interface - Bus interface signals - Addressing signals Addressing timing - Data Timed Signals - Debug interface - Debug systems - Debug interface signals - ARM7TDMI Core and system state - About Embedded ICE-RT Logic – Instruction Set.

UNIT – II   LPC2148 ARM CPU

Introduction: - Architectural Overview   - Memory Mapping -Block Diagram - **System control block functions:** PLL **-** Power Control - Reset - VPB Divider - Wakeup Timer - Memory Acceleration Module - Timer0 and Timer1- PWM - RTC - On Chip ADC - On Chip DAC- Interrupts- Vector Interrupt Controller.

UNIT –III LPC 2148 – PERIPHERALS

General Purpose Input/Output Ports (GPIO) - Universal Asynchronous Receiver/Trasmitter (UART) - I^{2}C Interface – Multimaster and Multislave communication - SPI Interface - SSP Controller – USB 2.0 Device Controller.

UNIT – IV   OPERATING SYSTEM OVERVIEW

Introduction OS –   Function of OS – Defining an RTOS –   Differences in Embedded Operating Systems – Introduction to Kernel – Resources – Shared Resources - Defining a Task – Task States -Multitasking - Scheduling and Scheduling Algorithms -   Context Switching – Clock Tick – Timing of Task.

UNIT – V   μC/OS – II

Introduction – Features and Goals of μC/OS – II – Requirements of μC/OS – II   - Support Devices for μC/OS – II – File Structure in μC/OS – II   - Task Management Functions – Creating a Task -   Time Management Functions – OS Delay Functions - Implementation of Scheduling and rescheduling.

Reference Books:
1. Embedded Systems Architecture - Tammy Noergaard
2. ARM System Developer's Guide – Andrew N.Sloss
3. ARM Architecture Reference Manual - David Seal
4. **ARM System-on-Chip Architecture (2nd Edition) by Steve Furbe**
5. **MicroC/OS – II The Real Time Kernel Jean J. Labrosse**
6. **Real Time Concepts for Embedded Systems – by Qing Li and Caroline Yao**
7. **Embedded / Real Time Systems : Concepts , Design & Programming by Dr. K.V.K.K PRASAD**
    1. LPC 2148 User Manual

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14062 - EMBEDDED SYSTEM
MODEL QUESTION PAPER

Part – A

Time : Three Hours   Max. Marks: 75

Answer all questions   **10x1=10**
1. What is meant by ICE-RT logics?
2. State various memory formats in ARM architecture.
3. What is the function of memory Acceleration Module?
4. State various interrupts in LPC 2148 ARM CPU.
5. What is meant by IIC interface?
6. State various I/O port in LPC 2148
7. What is meant by Task States?
8. What is meant by scheduling?
9. What are the functions of Task Management?
10. State any two functions of time management.

Part – B

Answer all Questions.   **5x3=15**
11. Classify the ARM instruction set based on function?
12. What are the advantages of advanced RISC Architecture?
13. What is various General Purpose I/O ports in LPC 2148?
14. List out different operating systems available for embedded system?
15. Write a short note on time management?

Part – C

Answer all questions   **5x10=50**
16.   (a) Explain ARM Architecture with a diagram.
                                              Or
       (b) Explain Memory interface and Bus interface signals.

17.   (a) With a neat diagram explain LPC 2148 ARM CPU?
                                              Or
       (b) Explain various memory format and instruction set of LPC 2148 ARM CPU.

18.   (a) With a neat block diagram explain Universal Asynchronous
            Receiver/Transmitter?
                                              Or
        (b)Explain SPI interface and SSP controller with a diagram.

19.   (a) Explain in detail about kernel and multitasking.
                                              Or
       (b) Explain scheduling and scheduling algorithm.

20.   (a) Explain in detail about time management in micro controller.
                                              Or
       (b) Explain in detail about task management in micro controller.

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ELECTIVE II
14081 – DIGITAL IMAGE PROCESSING

Total No. of Hrs / Week   :   5
Total No. of Weeks / Semester   :   16
Total No. of Hours / Semester   :   96

Scheme of Instruction and Examination

Subject	Instruction		Examination		
	Hours / Week	Hours / Semester	Assessment Marks		
			Internal	Board Exam	Total
Digital Image Processing	5	80	25	75	100

Topics and Allocation

Unit	Topic	Time (Hrs)
Unit 1	Data Compression	14
Unit 2	Fundamentals of Image Processing	14
Unit 3	Image Enhancement	14
Unit 4	Image Compression	14
Unit 5	Image Segmentation	14
	Revision and Test	10
Total		**80**

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- ⇨ Various codes used for data compression.
- ⇨ Speech compression techniques.
- ⇨ Silence compression.
- ⇨ Steps in image processing.
- ⇨ Components of image processing systems.
- ⇨ Simple image fundamentals.
- ⇨ Various image Transformation.
- ⇨ Various image enhancement techniques.
- ⇨ Histogram processing.
- ⇨ Spatial filtering.
- ⇨ Study the basics of colour image processing.
- ⇨ Understand various compression models.
- ⇨ Study JPEG techniques.
- ⇨ Understand morphological image processing.
- ⇨ Detection of point, line, edges in image.

14081 – DIGITAL IMAGE PROCESSING

DETAILED SYLLABUS

UNIT I DATA COMPRESSION :

Introduction-Data Compression (A 12) Minimum Redundancy Coding, Shannon Fano Algorithm, Huffman Algorithm, (A 27-35) - Adaptive Huffman Coding - Updating, Swapping, Enhancement, Escape Code, Overflow, Rescalling, (A75-88), - Arithmetic Coding (A113-122), Dictionary Based Compression - Static Vs Adaptive, Where It Shows Up (A201- 207, 210) Speech Compression - Sampling Variables, Lossless Compression, Lossy Compression, Silence Compression (A294-304)

UNIT II FUNDAMENTALS OF IMAGE PROCESSING:

What Is Image Processing (B1-3)- Fundamental Steps In Digital Image Processing - Components Of Image Processing System (B25-28), Image Acquisition Using Sensor Array - Simple Image Fundamentals - Image Sampling And Quantization - Some Relationships Between Pixels (B49- 67)

UNIT III IMAGE ENHANCEMENT:

Backrgound - Gray Level Transformation - Image Negatives, Log Transformations, Power Law Transformations, Piecewise Linear Transormation Funcitons - Histograms Processing - (B76-94) Enhancement Using Arihtmentic/Logic Operations - Image Subtration, Image Averaging - Spacial Filtering (B108-110)

UNIT IV IMAGE COMPRESSION:

Basics Of Color Image Processing - Color Tranformation -Smoothing And Sharpening (B313-330) - Fundamentals - Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy, Fidelity Critieria - Image Compression Models- The Source Encoder And Decoder (B411-423) - Jpeg (B499-504)

UNIT V IMAGE SEGMENTATION:

Morphological Image Processing - Dilation And Erosion (B523-527) - Basic Morphological Algorithms (B534-549) - Detection Of Discontinuities, Point Detection, Line Detection, Edge Detection (B568-581)

REF BOOKS:

1. Mark Nelson And Jean Loup Gailly - The Data Compression
   Book - Bpb Publications Second Edition,
2. Rafael C. Gonzalez And Richard E Woods - Digital Image
   Processing - Second Edition, Pearson Education Pvt. Ltd, New Delhi.

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14081 – DIGITAL IMAGE PROCESSING
MODEL QUESTION PAPER – I
Part –'A'

Time : Three Hours   Max. Marks: 75

Answer all questions   **10x1=10**
1. Define speech compression.
2. What is loss-free(lossless) compression?
3. Explain morphological processing.
4. What is digital image processing?
5. Define Image subtraction.
6. Define gray level transformation.
7. What are the type's redundancy?
8. What is jpeg compression?
9. Explain the term Dilation.
10. Explain edge detection.

Part – 'B'
Answer all questions   **5x3=15**
11. Explain Minimum redundancy coding.
12. Explain the term Quantization.
13. Explain how histogram is used for enhancement of images ?
14. Explain basic morphological algorithm.
15. Explain subjective fidelity criteria.

Part – 'C'
Answer all the questions   **5x10 = 50**
16.   (a) Explain briefly Arithmetic coding.

(Or)
        (b) Distinguish Static Vs Adaptive compression, Where it shows up?

17.   (a) Explain briefly some basic gray level transformations.

(Or)
        (b) Describe briefly Piece-wise liner transformation.

18.   (a) Explain basic concepts of Sampling and Quantization.

(Or)
        (b) Describe a simple Image formation model.

19.   (a) Describe Image compression models.

(Or)
        (b) What are the types of redundancies, Explain.

20.   (a) Illustrate with suitable example how are gradient operators used for

        detecting of edges in digital images.

(Or)
        (b) Describe some of the point operations performed on images?

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14081 – DIGITAL IMAGE PROCESSING
MODEL QUESTION PAPER – II
Part –'A'

Answer all questions   10x1=10

1. What is the basic idea of data compression?
2. What is lossy compression?
3. What are fundamental steps in Digital Image processing?
4. Define image sampling.
5. Define background.
6. What is image subtraction?
7. What are the types of fidelity criteria?
8. What are image compression models?
9. Explain the term morphology.
10. Define basic morphological algorithms.

Part – 'B'

Answer all questions   5x3=15

11. Explain Shannon Fano Algorithm.
12. Explain Zooming and shrinking of Digital images.
13. Write notes on histogram modification and its uses.
14. Write notes on Interfixel redundancy.
15. Give a set of 3x3 mask that can be used to detect 1 pixel long breaks in straight lines oriented in H, V, $+45^0$, -45^0.

Part – 'C'

Answer all the questions   5x10 = 50

16. (a) Explain briefly Adaptive Huffman Coding.

(Or)

(b) Distinguish Lossy and lossless data compression.

17. (a) Explain the basic concepts of Sampling and Quantization.

(Or)

(b) Explain the components of Image proccesion system.

18. (a) Drive spatial filtering.

(Or)

(b) Describe briefly Piece-wise liner transformation.

19 (a) Describe tone and color corrections.

(Or)

(b) How do you define the Objective fidelity criteria of Images?

20. (a) Describe the some of the point operations performed on images.

(Or)

(b) Discuss how edges are linked?

14082 – TELEVISION ENGINEERING

Total No. of Hrs. / Week   :   5
Total No. of Weeks / Semester   :   16
Total No. of Hrs. / Semester   :   80

Scheme of Instruction and Examination

Subject	Instruction		Examination		
	Hrs/ Week	Hrs/ Semester	Assessment Mark		
Television Engineering			Internal	Board Exam	Total
	5	80	25	75	100

Topics and allocation

Unit	Topic	Time (Hrs)
I	TV Fundamentals	14
II	Camera and Picture tubes	14
III	Television Transmitted	14
IV	Television Receiver	14
V	Miscellaneous Topics	14
	Revision, Test	10
Total		80

OBJECTIVES:

⇨ To understand the various TV Fundamentals

⇨ To know about the composite video signal, standards in CCIR B system.

⇨ To study the mixing of colors to obtain the different color TV signals

⇨ To understand the working principle of different camera tubes.

⇨ To study the principle of operation of different picture tubes.

⇨ To understand the block diagram of colour TV camera tube.

⇨ To study the block diagram of TV transmitter.

⇨ To learn the performance of PAL colour coder.

⇨ To study the weighting factor of colour plexed composite video signal

⇨ To Study the block diagram of TV receiver

⇨ To Study the need for keyed AGC circuit

⇨ To study the working principle of typical video amplifier.

⇨ To study the horizontal output stage with various controls.

⇨ To know about different types of display methods.

⇨ To study the remote control IR transmitter and IR receiver.

⇨ To Study about modern cable TV system.

⇨ To know the operation of VCD and DVD players in play back mode.

14082 – TELEVISION ENGINEERING
DETAILED SYLLABUS

UNIT I   TV FUNDAMENTALS:

Simple block diagram of TV transmission and reception – Scanning process - sequential – Horizontal and vertical scanning – flicker and interlaced scanning – Need for synchronization, blanking and equalizing pulses and their details. Aspect ratio – vertical resolution and video Bandwidth – Relationship among them.

Composite video signal – serrated vertical symmetrical pulse. Positive and negative transmission – VSB transmission of video signal – merits and demerits. Inter carried sound system - TV broadcast channel allocation – Different TV standards – CCIR – B system in details.

Additive mixing of colors – color perception - chromaticity diagram – Luminance and Chrominance signal – I & Q signal – their polarity – Bandwidth for color transmission.

UNIT II CAMERA AND PICTURE TUBES:

Ideal characteristics of a camera tube – construction, working principle and characteristics of vidicon and plumbicon – Multidiode vidicon - constructional details and principle of operation – CCD image sensors – target – constructional details of saticon, newvicon and chalnicon – comparison of different camera tubes. Camera tube deflection and focusing methods – processing of camera signal. Block diagram of color TV camera tube and explanation. Picture tubes – specification – working principle of monochrome picture tubes – phosphor screen – screen burns – aluminium layer –picture tube mounting for picture tubes – including yoke. Types of color picture tubes – working principle of delta gun, precision inline and Trinitron color picture tubes – color convergence – static and dynamic – color purity – pincushion distortion – Automatic degaussing.

UNIT III TELEVISION TRANSMITTER:

Block diagram of a low level IF modulated TV transmitter – visual exciter - visual modulator and CIN diplexer working principle .aural exciter - Block diagram of color TV transmission – color compatibility – color synchronization – colorplexed composite video signal and weighting factor – TV transmitter layout – PAL color coder – functional blocks and working of each block – output waveforms.

UNIT IV TELEVISION RECEIVERS:

Block diagrams of monochrome TV receiver function of each block – Types of RF tuner – Block diagram of frequency synthesized Electronic tuner - Requirements of video IF amplifier and AGC – keyed AGC circuit operaion –video amplifier circuit operation with HF and LF compensation – Block diagrams of IC TA 7611 – and IC LA1190 – function alone - Block diagram of PAL color receiver. Need for sync pulse separator – sync separator circuit with noise gate -   need for trapezoidal voltage for deflection coils- Block diagram of horizontal output stage , horizontal ATC block diagram with anti hunt network – A typical horizontal output circuit with EHT – various controls in vertical and horizontal output stage block diagrams of PAL chroma Decoder IC TA7699 and IC TA 7680 functions only.

UNIT V MISCELLANEOUS TOPICS:

Flat panel display – Large screen display methods - Plasma display – Block diagram of a digital color TV receiver – schematic diagram of a remote control IR Transmitter and IR receiver – synthesis of remote control signals – synchronization of receiver – Functions of remote transmitter and receiver IC – M 50463p and M 50142p – function of system control IC MN15287.

Modern cable TV system schematic diagram – scrambling – descrambling – basic block diagram of descrambler – Digital CCD telecine system – steps involved in VCD making process – Block diagram of VCD player in play back mode – Advantages of DVD over laser disc and video tape,VCD – DVD player block diagram in play mode.

TEXT BOOKS:

1. TV and video Engg   -   Aravind M.Dhake

2. Modern TV practice principles of -

   Technology and servicing   -   R.R. Gulati

REFERENCE BOOKS:

1. color television and video technology   - A.K. Maini

2. Modern VCD – video CD player Introduction,

    servicing and trouble shooting   - Manohar Lotia

                                                                        pradeep Nair,

14082 – TELEVISION ENGINEERING

Model Question Paper – I

Time : Three Hours   Max. Marks: 75

Part – A

Answer all questions   **10 x 1 = 10**

1. What are the values of horizontal and vertical scanning frequencies?
2. Define flicker.
3. What is the working principle of vidicon camera tube?
4. Define sensitivity of camera tube.
5. What is the value of cd or sub-carrier frequencies?
6. What is meant by weighting factor?
7. Name the type of AGC used in TV receiver.
8. What is meant by hunting?
9. What is the laser used in plasma display?
10. State advantages of DVD over Laser disk.

PART – B

Answer all questions   **5 x 3 = 15**

11. Sketch a composite video signal with all details.
12. Draw the target construction of a saticon camera tube.
13. Explain the need for color sync burst?
14. Draw a typical video IF amplifier response curve.
15. Explain the noise gate amplifier.

PART – C

Answer all the questions   **5 x 10 = 50**

16. (a) i. Compare positive and negative transmission
        ii. Explain additive mixing of colors.

                                    (or)

    (b) i. Explain Inter-carrier sound system.
        ii. Explain Luminance and chrominance signals.

17. (a) Explain the construction and operation of plumbicon camera tube.

                                    (or)

    (b) Explain the construction and working principle of a Trinitron color
         picture tube.

18. (a) Draw and explain the block diagram of an IF modulated TV transmitter.

                                    (or)

    (b) Explain the working of fundamentals blocks of a PAL coder.

19. (a) Explain the block diagram of a monochrome TV receiver.

                                    (or)

    (b) Explain the operation of horizontal AFC with anti-hunt circuit.

20. (a) Explain the schematic diagram of a remote control IR transmitter and
         IR receiver.

                                    (or)

    (b) Explain the block diagram of VCD player in playback mode.

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14082 – TELEVISION ENGINEERING
Model Question Paper – II
Part – A

Answer all questions   **10 x 1 = 10**

1. What are the values of horizontal and vertical sync frequencies?
2. What are values of picture frequency and field frequency?
3. What is the expression for y signals?
4. Define dark current in vidicon.
5. What are values of picture IF and sound IF?
6. State any two advantages of IF modulation over direct modulation.
7. Why is vertical hold control used?
8. What is color killer circuit?
9. Where are the flood beam CRT displays are used?
10. What is meant by scrambling?

PART – B

Answer all questions   **5 x 3= 15**

11. Explain.vestigial sideband transmissio.
12. Draw the block diagram to obtain U and V signals.
13. Draw the block diagram of chrominance modulation.
14. Draw the block diagram of Pal chroma Decoder IC 7A7699.
15. Draw the block diagram of digital color TV receiver.

PART – C

Answer all the questions   **5 x 10 = 50**

16.(a) Explain VSB signal Transmission and Reception and merits and
    demerits.

(or)

(b) Explain in details the chromaticity diagram for obtaining different
    chrominance signal.

17.(a) i. What the ideal characteristic of a camera tube?
    ii. Explain the constructional details of a Multidiode vidicon.

(or)

(b) i. Explain the block diagram of color TV camera tube.
    ii. Explain color purity of picture tube.

18 (a) i. Explain the working principle of CIN diplexer.
    ii. What are the stages in aural Exciter.

(or)

(b) i. Explain the block diagram of color TV transmission.
    ii. Explain color plexed composite video signal.

19. (a) Explain a Video amplifier circuit with low frequencies and high
    frequency compensation.

(or)

(b) Explain the horizontal output stage of a TV receiver.

20. (a) Explain the functions of remote transmitter and receiver IC M504639.

(or)

(b) Explain the schematic diagram of a modern cable TV system.

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ELECTIVE II

14083 - BIO – MEDICAL INSTRUMENTATION

Total No of hours / week   :   5

Total No of week / semester   :   16

Total No of hours / semester   :   80

Scheme of Instructions and Examination

Subject	Instruction		Examination		
	Hours / Week	Hours / Semester	Assessment Mark		
Bio – Medical Instrumentation			Internal	Board Exam	Total
	5	**80**	**25**	**75**	**100**

Topics and Allocation

UNIT	TOPIC	TIME (Hrs)
UNIT I	Physiological & Clinical Measurement	14
UNIT II	Bio - Medical Recorders	14
UNIT III	Therapeutic Instruments	14
UNIT IV	Bio – Telemetry And Patient Safety	14
UNIT V	Modern Imaging Techniques	14
	Revision Test	10
Total		80

OBJECTIVES:

After learning this subject, the student will be able to understand about

⇨ The generation of Bio potential and its measurement using various Electrodes.

⇨ The measurement of Blood pressure.

⇨ The measurement of Respiration rate.

⇨ The principle of operation of ECG recorders

⇨ The principle of operation of EEG & EMG recorders

⇨ The working principle of Audio meter.

⇨ The principle of operation of pacemakers.

⇨ The basic principle of Dialysis.

⇨ The principle of operation of Endoscopy.

⇨ The working principle of telemetry.

⇨ The various method of accident prevention

⇨ The basic principle of Telemedicine.

⇨ The basic principle of various types of lasers.

⇨ The basic principle of CT Scanners.

⇨ The principle of operations of various Imaging techniques used in medical field.

14083 - BIO – MEDICAL INSTRUMENTATION

DETAILED SYLLABUS

UNIT - I PHYSIOLOGICAL & CLINICAL MEASUREMENT:

Bio – potential and their generation – resting and action potential – propagation of action potential.

Electrodes – Micro – Skin – surface – needle electrodes

Measurement of Blood pressure (direct, indirect) – instantaneous flow (Electro magnetic flow meter, ultrasonic blood flow meter) – blood pH

Measurement of Respiration rate – lung volume – heart rate – Temperature (body temperature & Skin temperature)

Chromatography, Photometry, Flurometry.

UNIT - II BIO - MEDICAL RECORDERS:

Electro cardiograph (ECG) – Lead system – ECG electrodes – ECG amplifiers – ECG recording units – analysis of ECG curves.

Nervous system – EEG recorder – 10-20 lead system – recording techniques – EEG wave types – Clinical use of EEG – brain tumour

Electro – myograph (EMG) – EMG waves – measurement of conduction velocity – EMG recording techniques – Electro – retinograph (ERG)

Audiometer – principle – types – Basics audiometer working

UNIT - III THERAPEUTIC INSTRUMENTS:

Cardiac pacemaker – classification – External pace makers – implantable pacemaker – pacing techniques – programmable pacemaker – power source of implantable pacemakers (Hg batteries, nuclear batteries, Lithium cells) Cardiac defibrillators – types – AC – DC defibrillators Heart lung machine – Oxygenators – Blood pumps – peristaltic pump – Heart valves – Problems of artificial heart valves. Dialysis – Hemo dialysis – peritoneal dialysis.Endoscopy – principle of working and applications.

UNIT - IV BIO – TELEMETRY AND PATIENT SAFETY:

Introduction – physiological – adaptable to bio – telemetry – components of a bio telemetry system – application of telemetry in patient care – problems associated with implantable telemetry.Fluid balance – electrolytic balance – acid base balance.

Physiological efforts of electric current – Micro and macro shock – leakage current – shock hazards from electrical equipment.

Methods of Accident Prevention – Grounding – Double Insulation – Protection by low voltage – Ground fault circuit interrupter – Isolation of patient connected parts – Isolated power distribution system.

Safely aspects in electro surgical units – burns, high frequency current hazards, Explosion hazards

Telemedicine – Introduction – working – applications

UNIT - V MODERN IMAGING TECHNIQUES:

LASER beam properties – block diagram – operation of CO_2 and NDYag LASER – applications of LASER in medicine.

X ray apparatus – block diagram – operation – special techniques in X-ray imaging – Tomogram – computerized Axial tomography – Ultrasonic imaging techniques – Echo cardigraphy – Angiography – CT scanner - Magnetic resonance imaging techniques.

Reference Books

1. Leslie Cromwell – Fred.J. Weibell, Erich A.P Feither – Biomedical Instrumentation and measurement, II edition.
2. B.R. Klin – Introduction to Medical Electronics.
3. Kumara doss – Medical Electronics.
4. Jacobson and Webstar – Medicine and Clinical Engineering.
5. R. S. Khandpur – Handbook of Bio – Medical Instrumentation.

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14083 - BIO – MEDICAL INSTRUMENTATION

Model Question Paper

Time:3hrs
Max.marks:75

Part – A

Answer all questions. All question carry equal marks.

10 X 1 =10

1. What are the salts responsible for action and nesting potential?
2. What is blood PH?
3. What instrument is used to analysis the working of brain?
4. What is speech audiometry?
5. Give one application of Audiometer.
6. What is fibrillation?
7. State one problem associated with implementable telemetry.
8. What is macro shock?
9. What is the acronym(expansion) for LASER?
10. List the various special techniques in X-ray imaging.

Part – B

Answer all questions.

5x3=15

11. What is nesting potential?
12. Trace a normal ECG waveform and range the salient points?
13. What do you mean by dialysis? And state various methods.
14. Differentiate micro and macro shock.
15. Mention any four medical application of LASER?

Part C

5x10=50

16. (a)Explain the different types of electrode used to measure biopotential.
    (Or)
    (b)Draw the block diagram of Electromagnetic flowmeter and explain its construction and application w.r.t biomedical.
17. (a)Draw the block diagram of ECG and explain its working.
    (Or)
    (b)How conduction velocity muscle is measured.
18. (a)What is a pace maker? List and explain the various power sources used for implantable pacemaker.
    (Or)
    (b)Draw the block diagram of heart machine and explain its working.
19. (a)List the various methods of accident prevention and explain each.
    (Or)
    (b)Draw the block diagram of Biotelemetry system and explain.

20 (a)Explain the operation of CO2 LASER.
    (Or)
    (b)Explain the working of magnetic resonance using a block diagram.

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14064 - COMPUTER HARDWARE & NETWORK LAB

1. Switches, Indicators and connectors of PC: Identification of front panel indicators and switches in a computer system of table top/ tower case model and also identification of rear side connectors.

2. PC system layout: Draw a Computer system layout and Mark the positions of SMPS, Mother Board, FDD, HDD, and CD-Drive/DVD-Drive add on cards in table top / tower model systems.

3. Mother Board Layout: Draw the layout of Pentium IV or Pentium Dual core or Pentium Core2 DUO mother board and mark Processor, Chip set ICs. RAM, Cache, Xtal, cooling fan, I/O slots and I/O ports and various jumper settings.

4. CMOS Setup Program: 1. Changing the Standard settings

                                         2. Changing advanced settings (BIOS and
                                                     Chipset features)

5. Installation of FDD: 1. Install and configure an FDD in a computer
                                  system.
                                  2. Floppy drive diagnostics/servicing.

6. USB pen drives and I-pods.

                                1. Connect and enable a pen drive or I-pod in a PC.

                                2. Format the pen drive or I-pod.

                                3. Copy files and folders from pen drive I-pod to HDD.

                                4. Copy files and folders from HDD to pen drive or
                                I-pod.

7. HDD Installation: 1. Install the given HDD.

                           2. Configure in CMOS-Setup program.

                           3. Partition the HDD using fdisk.

                           4. Format the Partitions.

8. Printer Installation & Troubleshooting:

                        1. Installing and checking a Dot-Matrix Printer.

                        2. Installing and checking an Ink jet / Laser Printer.

                        3.Possible problems and troubleshooting.

9. Modem Installation: 1. Install and configure a Modem in a windows PC.

                           2. Check the working condition of modem with PC.

10. DVD Multi-recorder drive installation:

1. Install a DVD Multi-recorder drive in a PC.

2 Configure using device driver.

3. Check the read / write operation using a cd / dvd.

11. Installation of Scanner:

1. Connect the given scanner with a PC.

2. Configure the scanner with driver.

3. Check the scanner by scanning a page / a portion in a page.

12. Familiarize   : Scandisk, recent Anti-virus software and recent PC Diagnostic software.

13. Assembling a PC: Assemble a Pentium IV or Pentium Dual Core Pentium Core2 Duo system with necessary peripherals and check the working condition of the PC.

14. Install and Configure Windows NT2003 operating system in a PC.

15. Construct Network by connecting one or two computer with a Windows NT2003 Server.

16. Install and Configure LINUX operating system in a PC.

17. Construct Network by connecting one or two computer with a LINUX Server.

18. Configure the network for an Internet server.

19. Add / Remove devices using Hardware Wizard.

20. Add and Manage User Profile, Set permission to the users both in Windows NT 2003/ LINUX.

EQUIPMENT REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Pentium IV		5
2	Pentium Dual Core		2
3	IPod		4
4	USB Pen drive		4
5	Printer Inkjet / Laser		2
6	DVD RW		5
7	Scanner		1
8	Windows server 2003		1
9	Linux		1

14065 - EMBEDDED SYSTEM LAB

1. Write a Simple Assembly Programs for
        a. Addition b. Subtraction b. Multiplication d. Division

2. Write a Programs for
        a.   Bit Digital Output -LED Interface
        b.   8 Bit Digital Inputs (Switch Interface)

3. Write a Programs for
        a.   4 × 4 Matrix Keypad Interface
        b.   Buzzer Interface
        c.   Relay Interface
4. Write a Program for character based LCD Interface
5. Write a Program for Analog to Digital Conversion(On chip ADC)
6. Write a Programs for I^2C Device Interface:
        a.   Serial EEPROM
        b.   Seven Segment LED Display Interface
        c.   Real Time Clock
7. Interfacing With Temperature Sensor
8. Stepper Motor Interface

    Hands on Exercise Based on RTOS.

9   To Study and Implement Multitasking .Write a Simple Program with Two
    Separate LED Blinking Tasks.
10. Study and Implement Priority Scheduling and OS TimeDelay Functions by writing 3
    different UART Transmitting Tasks.
11. Implement OS Real Time Multitasking by writing a multitasking program with the
    tasks.
        a. Interface RTC and Display on LCD First Line Continuously.
        b. Interface ADC and Display on LCD second line Continuously.

12. Implement OS Real Time Multitasking by Implementing three tasks
        a.   Read the Key input and display on seven segment LED
        b. Read the ADC Analog input and Plot the Corresponding signal on a
        graphical LCD.
        c. Generate a PWM signal with Xon Time and Yoff Time.

13. Interface a Stepper motor and Control the speed of rotation by implementing RTOS
    delay functions

14066 – PROJECT WORK AND ENTREPRENEURSHIP
ENVIRONMENTAL MANAGEMENT & DISASTER MANAGEMENT

SYLLABUS:

1. ENVIRONMENTRAL MANAGEMENT:
   (a) Introduction – Environmental Ethics – Assessment of Socio Economic Impact – Environmental Audit – Mitigation of adverse impact on Environment – Importance of Pollution Control – Types of Industries and Industrial Pollution.
   (b) Solid waste management – Characteristics of Industrial wastes – Methods of Collection, transfer and disposal of solid wastes – Converting waste to energy – Hazardous waste management Treatment technologies.
   (c) Waste water management – Characteristics of Industrial effluents – Treatment and disposal methods – Pollution of water sources and effects on human health.
   (d) Air pollution management – Sources and effects – Dispersion of air pollutants – Air pollution control methods – Air quality management.
   (e) Noise pollution management – Effects of noise on people – Noise control methods.

2. DISASTER MANAGEMENT:

   (a) Introduction – Disasters due to natural calamities such as Earthquake, Rain, Flood, Hurricane, Cyclones etc – Man made Disasters – Crisis due to fires, accidents, strikes etc – Loss of property and life.
   (b) Disaster Mitigation measures – Causes for major disasters – Risk Identification – H azard Zones – Selection of sites for Industries and residential buildings – Minimum distances from Sea – Orientation of Buildings – Stability of Structures – Fire escapes in buildings - Cyclone shelters – Warning systems.
   (c) Disaster Management – Preparedness, Response, Recovery – Arrangements to be made in the industries / factories and buildings – Mobilization of Emergency Services - Search and Rescue operations – First Aids – Transportation of affected people – Hospital facilities – Fire fighting arrangements – Communication systems – Restoration of Power supply – Getting assistance of neighbours / Other organizations in Recovery and Rebuilding works – Financial commitments – Compensations to be paid – Insurances – Rehabilitation.

List of Questions

1. ENVIRONMENTRAL MANAGEMENT:

1. What is the responsibility of an Engineer-in-charge of an Industry with respect to Public Health?
2. Define Environmental Ethic.
3. How Industries play their role in polluting the environment?
4. What is the necessity of pollution control? What are all the different organizations you know, which deals with pollution control?
5. List out the different types of pollutions caused by a Chemical / Textile / Leather / Automobile / Cement factory.
6. What is meant by Hazardous waste ?
7. Define Industrial waste management.
8. Differentiate between garbage, rubbish, refuse and trash based on their composition and source.
9. Explain briefly how the quantity of solid waste generated in an industry could be reduced.
10. What are the objectives of treatments of solid wastes before disposal ?
11. What are the different methods of disposal of solid wastes ?
12. Explain how the principle of recycling could be applied in the process of waste minimization.
13. Define the term 'Environmental Waste Audit'.
14. List and discuss the factors pertinent to the selection of landfill site.
15. Explain the purpose of daily cover in a sanitary landfill and state the minimum desirable depth of daily cover.
16. Describe any two methods of converting waste into energy.
17. What actions, a local body such as a municipality could take when the agency appointed for collecting and disposing the solid wastes fails to do the work continuously for number of days?
18. Write a note on Characteristics of hazardous waste.
19. What is the difference between municipal and industrial effluent ?
20. List few of the undesirable parameters / pollutants anticipated in the effluents from oil refinery industry / thermal power plants / textile industries / woolen mills / dye industries / electroplating industries / cement plants / leather industries   (any two may be asked)
21. Explain briefly the process of Equalization and Neutralization of waste water of varying characteristics discharged from an Industry.
22. Explain briefly the Physical treatments "Sedimentation" and "Floatation" processes in the waste water treatment.
23. Explain briefly when and how chemical / biological treatments are given to the waste water.
24. List the four common advanced waste water treatment processes and the pollutants they remove.
25. Describe refractory organics and the method used to remove them from the effluent.
26. Explain biological nitrification and de-nitrification.
27. Describe the basic approaches to land treatment of Industrial Effluent.
28. Describe the locations for the ultimate disposal of sludge and the treatment steps needed prior to ultimate disposal.
29. List any five Industries, which act as the major sources for Hazardous Air Pollutants.

30. List out the names of any three hazardous air pollutants and their effects on human health.
31. Explain the influence of moisture, temperature and sunlight on the severity of air pollution effects on materials.
32. Differentiate between acute and chronic health effects from Air pollution.
33. Define the term Acid rain and explain how it occurs.
34. Discuss briefly the causes for global warming and its consequences
35. Suggest suitable Air pollution control devices for a few pollutants and sources.
36. Explain how evaporative emissions and exhaust emissions are commonly controlled.
37. What are the harmful elements present in the automobile smokes? How their presence could be controlled?
38. What is the Advantage of Ozone layer in the atmosphere? State few reasons for its destruction.
39. Explain the mechanism by which hearing damage occurs.
40. List any five effects of noise other than hearing damage.
41. Explain why impulsive noise is more dangerous than steady state noise.
42. Explain briefly the Source – Path – Receiver concept of Noise control.
43. Where silencers or mufflers are used ? Explain how they reduce the noise.
44. Describe two techniques to protect the receiver from hearing loss when design / redress for noise control fail.
45. What are the problems faced by the people residing along the side of a railway track and near to an Airport? What provisions could be made in their houses to reduce the problem?

2. DISASTER MANAGEMENT:

1. What is meant by Disaster Management? What are the different stages of Disaster management?
2. Differentiate Natural Disasters and Man made Disasters with examples.
3. Describe the necessity of Risk identification and Assessment Surveys while planning a project.
4. What is Disasters recovery and what does it mean to an Industry?
5. What are the factors to be considered while planning the rebuilding works after a major disaster due to flood / cyclone / earthquake? (Any one may be asked)
6. List out the public emergency services available in the state, which could be approached for help during a natural disaster.
7. Specify the role played by an Engineer in the process of Disaster management.
8. What is the cause for Earthquakes ? How they are measured ? Which parts of India are more vulnerable for frequent earthquakes ?
9. What was the cause for the Tsunami 2004 which inflicted heavy loss to life and property along the coast of Tamilnadu ? Specify its epicenter and magnitude.
10. Specify the Earthquake Hazard Zones in which the following towns of Tamilnadu lie : (a) Chennai (b) Nagapattinum (c) Coimbatore (d) Madurai (e) Salem.
11. Which parts of India are experiencing frequent natural calamities such as (a) heavy rain fall (b) huge losses due to floods (c) severe cyclones
12. Define basic wind speed. What will be the peak wind speed in (a) Very high damage risk zone – A, (b) High damage risk zone, (c) Low damage risk zone.
13. Specify the minimum distance from the Sea shore and minimum height above the mean sea level, desirable for the location of buildings.
14. Explain how the topography of the site plays a role in the disasters caused by floods and cyclones.

15. Explain how the shape and orientation of buildings could reduce the damages due to cyclones.
16. What is a cyclone shelter ? When and where it is provided ? What are its requirements ?
17. What Precautionary measures have to be taken by the authorities before opening a dam for discharging the excess water into a canal/river ?
18. What are the causes for fire accidents ? Specify the remedial measures to be taken in buildings to avoid fire accidents.
19. What is a fire escape in multistoried buildings ? What are its requirements ?
20. How the imamates of a multistory building are to be evacuated in the event of a fire/Chemical spill/Toxic Air Situation/ Terrorist attack, (any one may be asked).
21. Describe different fire fighting arrangements to be provided in an Industry.
22. Explain the necessity of disaster warning systems in Industries.
23. Explain how rescue operations have to be carried out in the case of collapse of buildings due to earthquake / blast / Cyclone / flood.
24. What are the necessary steps to be taken to avoid dangerous epidemics after a flood disaster ?
25. What relief works that have to be carried out to save the lives of workers when the factory area is suddenly affected by a dangerous gas leak / sudden flooding ?
26. What are the difficulties faced by an Industry when there is a sudden power failure? How such a situation could be managed?
27. What are the difficulties faced by the Management when there is a group clash between the workers? How such a situation could be managed?
28. What will be the problems faced by the management of an Industry when a worker dies because of the failure of a mechanical device due to poor maintenance? How to manage such a situation ?

29. What precautionary measures have to be taken to avoid accidents to labourers in the Industry in a workshop / during handling of dangerous Chemicals / during construction of buildings / during the building maintenance works.
30. Explain the necessity of medical care facilities in an Industry / Project site.
31. Explain the necessity of proper training to the employees of Industries dealing with hazardous products, to act during disasters.
32. What type of disaster is expected in coal mines, cotton mills, Oil refineries, ship yards and gas plants?
33. What is meant by Emergency Plan Rehearsal? What are the advantages of such Rehearsals?
34. What action you will take when your employees could not reach the factory site because of continuous strike by Public Transport workers?
35. What immediate actions you will initiate when the quarters of your factory workers are suddenly flooded due to the breach in a nearly lake / dam, during heavy rain?
36. What steps you will take to avoid a break down when the workers union of your Industry have given a strike notice?
37. List out few possible crisis in an organization caused by its workers? What could be the part of the middle level officials in managing such crisis?
38. What types of warning systems are available to alert the people in the case of predicted disasters, such as floods, cyclone etc.
39. Explain the necessity of Team work in the crisis management in an Industry / Local body.
40. What factors are to be considered while fixing compensation to the workers in the case of severe accidents causing disability / death to them?

41. Explain the legal / financial problems the management has to face if safely measures taken by them are found to be in-adequate.
42. Describe the importance of insurance to men and machinery of an Industry dealing with dangerous jobs.
43. What precautions have to be taken while storing explosives in a match/ fire crackers factory?
44. What are the arrangements required for emergency rescue works in the case of Atomic Power Plants?
45. Why residential quarters are not constructed nearer to Atomic Power Plants ?