DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEEING

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

REGULATIONS

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.

or

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

Or

The Matriculation examination conducted in Tamil Nadu.

Or

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 sessional 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/ other related Practical Work	:	10 Marks
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

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:

FIRST CLASS WITH DISTINCTION

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.

FIRST CLASS

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.

SECOND CLASS

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).

ANNEXURE – I

CURRICULUM OUTLINE (FULL TIME)
(With effect from 2008-2009)

III SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/ Week	Practical Hours/ Week
1	ECK 310	Electronic Devices and Circuits	6	
2	ECK 320	Electric Circuits and Instrumentation	6	
3	ECK 330	'C' Programming and OOPS	5	
4	ECK 340	Electronic Devices and Circuits Lab		6
5	ECK 350	Electric Circuits & Instrumentation Lab		6
6	ECK 360	'C' Programming Lab		6

IV SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/Week	Practical Hours/ Week
1	ECK 410	Analog and Digital Electronics	6	
2	ECK 420	Industrial Electronics	6	
3	ECK 430	Communication Engineering	5	
4	ECK 440	Analog and Digital Electronics Lab		6
5	ECK 450	IE and CE Lab		6
6	ECK 460	ISAP (Soft Skill) Lab		6

V SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/ Week	Practical Hours/ Week
1	ECK 510	Microprocessor and Microcontroller	6	
2	ECK 520	Advanced Communication Systems	6	
3	 ECK 531 ECK 532 ECK 533	Elective - I 1. Digital Signal Processor 2. VLSI 3. Robotics and Auto-Electronics	5	
4	ECK 540	Microprocessor and Microcontroller Lab		6
5	ECK 550	Advanced Communication Systems Lab		6
6	 Eck 561 Eck 562 Eck 563	Elective - I Lab Digital Signal Processor Lab VLSI Lab Robotics and Auto-Electronics Lab		6

VI SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/ Week	Practical Hours/ Week
1	ECK 610	Computer Hardware and Networking	6	
2	ECK 620	Embedded Systems	6	
3	 ECK 631 ECK 632 ECK 633	Elective - II 1. Digital Image Processing 2. Television Engineering 3. Bio-Medical Instrumentation	5	
4	ECK 640	Computer Hardware and Networking Lab		6
5	ECK 650	Embedded Systems Lab		6
6	ECK 660	Project Work & Entrepreneurship		6

ANNEXURE – II

SCHEME OF EXAMINATION

III SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 310	Electronic Devices and Circuits	25	75	100	40	3
2	ECK 320	Electric Circuits and Instrumentation	25	75	100	40	3
3	ECK 330	'C' Programming and OOPS	25	75	100	40	3
4	ECK 340	Electronic Devices and Circuits Lab	25	75	100	50	3
5	ECK 350	Electric Circuits & Instrumentation Lab	25	75	100	50	3
6	ECK 360	'C' Programming Lab	25	75	100	50	3

IV SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 410	Analog and Digital Electronics	25	75	100	40	3
2	ECK 420	Industrial Electronics	25	75	100	40	3
3	ECK 430	Communication Engineering	25	75	100	40	3
4	ECK 440	Analog and Digital Electronics Lab	25	75	100	50	3
5	ECK 450	IE and CE Lab	25	75	100	50	3
6	ECK 460	ISAP (Soft Skill) Lab	25	75	100	50	3

V SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 510	Microprocessor and Microcontroller	25	75	100	40	3
2	ECK 520	Advanced Communication Systems	25	75	100	40	3
3	ECK 531 ECK 532 ECK 533	Elective - I 1. Digital Signal Processing 2. VLSI 3. Robotics and Auto-Electronics	25	75	100	40	3
4	ECK 540	Microprocessor and Microcontroller Lab	25	75	100	50	3
5	ECK 550	Advanced Communication Systems Lab	25	75	100	50	3
6	ECK 560	Elective - I Lab	25	75	100	50	3

VI SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 610	Computer Hardware and Networking	25	75	100	40	3
2	ECK 620	Embedded Systems	25	75	100	40	3
3	ECK 631 ECK 632 ECK 633	Elective - II 1. Digital Image Processing 2. Television Engineering 3. Bio-Medical Instrumentation	25	75	100	40	3
4	ECK 640	Computer Hardware and Networking Lab	25	75	100	50	3
5	ECK 650	Embedded Systems Lab	25	75	100	50	3
6	ECK 660	Project Work & Entrepreneurship	25	75	100	50	3

ANNEXURE – III

CURRICULUM OUTLINE (PART TIME)
(With effect from 2008-2009)

III SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/Week	Practical Hours/Week
1	ECK 310	Electronic Devices and Circuits	6	
2	ECK 320	Electric Circuits and Instrumentation	6	
3	ECK 340	Electronic Devices and Circuits Lab		6
4	2005	Engineering Graphics	6	
5	2008	Computer Application Lab		6

IV SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/Week	Practical Hours/Week
1	ECK 330	'C' Programming & OOPS	6	
2	ECK 410	Analog and Digital Electronics	6	
3	ECK 350	Electric Circuit and Instrumentation Lab		6
4	ECK 360	'C' Programming Lab		6
5	ECK 440	Analog and Digital Electronics Lab		6

V SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/Week	Practical Hours/Week
1	ECK 420	Industrial Electronics	6	
2	ECK 430	Communication Engineering	6	
3	ECK 450	Communication Engineering Lab		6
4	ECK 460	ISAP (Soft Skill) Lab		6

VI SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/Week	Practical Hours/Week
1	ECK 510	Microprocessor & Microcontroller	6	
2	ECK 520	Advanced Communication Systems	6	
3	ECK 540	Microprocessor & Microcontroller Lab		6
4	ECK 550	Advanced Communication Systems Lab		6

VII SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/Week	Practical Hours/Week
1	ECK 610	Computer Hardware & Networking	6	
2	 ECK 531 ECK 532 ECK 533	Elective - I 1. Digital Signal Processor 2. VLSI 3. Robotics and Auto-Electronics	6	
3	ECK 640	Computer Hardware & Networking Lab		6
4	ECK 560	Elective – I Lab		6

VIII SEMESTER

Sl. No.	Subject Code	Subject Name	Theory Hours/Week	Practical Hours/Week
1	ECK 620	Embedded Systems	6	
2	 ECK 631 ECK 632 ECK 633	Elective - II 1. Digital Image Processor 2. Television Engineering 3. Bio-Medical Instrumentation	6	
3	ECK 650	Embedded Systems Lab		6
4	ECK 660	Project Work and Entrepreneurship		6

ANNEXURE – IV

SCHEME OF EXAMINATION

III SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 310	Electronic Devices and Circuits	25	75	100	40	3
2	ECK 320	Electric Circuits and Instrumentation	25	75	100	40	3
3	ECK 340	Electronic Devices and Circuits Lab	25	75	100	40	3
4	2005	Engineering Graphics	25	75	100	50	3
5	2008	Computer Application Lab	25	75	100	50	3

IV SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 330	'C' Programming & OOPS	25	75	100	40	3
2	ECK 410	Analog and Digital Electronics	25	75	100	40	3
3	ECK 350	Electric Circuits and Instrumentation Lab	25	75	100	40	3
4	ECK 360	'C' Programming Lab	25	75	100	50	3
5	ECK 440	Analog and Digital Electronics Lab	25	75	100	50	3

V SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 420	Industrial Electronics	25	75	100	40	3
2	ECK 430	Communication Engineering	25	75	100	40	3
3	ECK 450	Communication Engineering Lab	25	75	100	40	3
4	ECK 460	ISAP (Soft Skill) Lab	25	75	100	50	3

VI SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 510	Microprocessor & Microcontroller	25	75	100	40	3
2	ECK 520	Advanced Communication Systems	25	75	100	40	3
3	ECK 540	Microprocessor & Microcontroller Lab	25	75	100	40	3
4	ECK 550	Advanced Communication Systems Lab	25	75	100	50	3

VII SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 610	Computer Hardware & Networking	25	75	100	40	3
2	ECK 531 ECK 532 ECK 533	Elective - I 1. Digital Signal Processing 2. VLSI 3. Robotics and Auto-Electronics	25	75	100	40	3
3	ECK 640	Computer Hardware & Networking Lab	25	75	100	40	3
4	ECK 560	Elective – I Lab	25	75	100	50	3

VIII SEMESTER

Sl. No.	Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam/ Hours
			Internal assessment Marks	Board Exam Marks	Total Marks		
1	ECK 620	Embedded Systems	25	75	100	40	3
2	ECK 631 ECK 632 ECK 633	Elective - II 1. Digital Image Processing 2. Television Engineering 3. Bio-Medical Instrumentation	25	75	100	40	3
3	ECK 650	Embedded Systems Lab	25	75	100	40	3
4	ECK 660	Project Work and Entrepreneurship	25	75	100	50	3

ECK310 - 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 Semiconductor Devices	16
2	Special Devices and Optoelectronic devices	16
3	Bias ,bias stability and amplifiers	18
4	Oscillators and waveshaping circuits	16
5	Power supplies and voltage regulators	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 FET
- Study the performance of special devices like UJT,SCR etc
- Know the construction and working principle of optoelectronic devices
- Study the performance of solar cell
- Explain the concept of biasing and stability
- Give the various types of biasing in BJT and FET
- Differentiate various types of amplifiers
- Explain the concept of feedback and types of feedback
- List out the effects of negative feedback in amplifiers
- Explain the concept of oscillators and wave shaping circuits
- Study the working principle of clippers and clampers
- Explain the principle of rectifiers , filters and voltage multipliers
- List out the different types of voltage regulators

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.

ECK320 - 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

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.

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.

ECK 330 – "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		
			Assessment Mark		
"C" PROGRAMMING & OOPS	Hrs/ Week	Hrs/ Semester	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

DETAILED SYLLABUS

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.

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.

Reference Books :

Sl.No.	Name of the Book	Author	Publisher
1	Programming in 'C' (withCD)	Balagurusamy E	Tata McGrow Hill Publishing Company, New Delhi.
2	Object Oriented Programming with C++	Balagurusamy E	Tata McGrow Hill Publishing Company, New Delhi.
3	Computer Programming in C	Rajaraman V	Prentice Hall of India (P) Ltd., New Delhi

ECK 340-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.

ECK350 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

ECK 360 - '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 .

ECK 410 - 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		Examinations		
			Assessment Marks		
	Hours/ Weeks	Hours/ Semester	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

Objections:

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.

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 Subrtraction – 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.

ECK 420 - 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		
			Internal	Board Exam	Total
Industrial Electronics	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 & ROBOTICS	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 & ROBOTICS

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,.

ECK430 - COMMUNICATION ENGINEERING

Total No of Hours /week : 5

Total No of Weeks/Semester : 16

Total No pf Hours / Semester : 80

Scheme of instruction and examination

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

Topics and Allocation

UNIT	TOPIC	TIME(HRS)
1	Networks, Antenna and Propagation	14
2	Amplitude Modulation	14
3	Angle and Pulse Modulation	14
4	Audio Systems	14
5	Telegraphy and TV	14
	Revision and test	10
	Total	80

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

DETAILED SYLLABUS

Unit I- Networks, Antenna and Propagation

1.1 **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.

1.2 **Antennas**

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

1.3 **Propagation** (short theory only)

Ground wave propagation, space waves, ionospheric propagation

Unit II Amplitude Modulation

2.1 Modulation :

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

2.2 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.

2.3 AM Transmitter:

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

2.4 AM Receiver:

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

UNIT III Angle and Pulse Modulation

3.1 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)

3.2 FM Transmitters:

Direct and Indirect methods- stereophonic FM transmitter.

3.3 FM receiver:

Block diagram – AFC-stereophonic FM receiver.

3.4 Phase modulation :

Principles, phase modulator circuit, comparison between FM and PM

3.5 Pulse modulation

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

UNIT IV Audio systems

4.1 Microphones: (Qualitative treatment only)

Construction and performance of the following microphones: carbon, condenser, piezo-electric, moving coil and velocity ribbon.

4.2 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

4.3 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

5.1 Telegraphy:

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

5.2 Monochrome Television :

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

5.3 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.

ECK 440 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.

ECK 450 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 single phase inverter.
5. Construct and test a MOSFET based PWM chopper circuit.
6. Construct and test a multiple pulse sine wave inverter.
7. Construct and test an IC based buck converter using PWM.
8. Write and implement a simple ladder logic program using digital inputs and outputs for PLC.
9. Write the implement a simple ladder logic program using timer and counter with branching and subroutines with PLC.
10. Write and implement a simple ladder logic program for interfacing a lift control with PLC.
11. Write and implement a simple ladder logic program for interfacing a conveyor control with PLC.
12. Write and implement a program for CNC lathe involving linerar position, circular interpolation and repeat cycle.
13. 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.

ECK 460 – INFORMATION SEEKERS ANALYSIS AND PRESENTATION

(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
ENGLISH COMMUNICATION PRACTICAL	4	64	Internal Assessment	Board Examination	Total	
			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.

INFORMATION SEEKERS ANALYSIS AND PRESENTATION 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

INFORMATION SEEKERS ANALYSIS AND PRESENTATION 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.

INFORMATION SEEKERS ANALYSIS AND PRESENTATION

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 Submission)	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.

INFORMATION SEEKERS ANALYSIS AND PRESENTATION
PRACTICAL
(Common to all branches)
MODEL QUESTION PAPER

TIME : 3 Hrs **Max.Marks : 100**

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.

INFORMATION SEEKERS ANALYSIS AND PRESENTATION

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	Writing	Listening	Reading	Speaking	Project Report Writing	Record	Attendance	
			(20)	(10)	(10)	(10)	(15)	(10)	(20)	(5)	(100)

ECK 510 - 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		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			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	8051 Microcontroller	18
Unit 3	Programming concepts	18
Unit 4	Peripheral devices and Interfacing	16
Unit 5	Microcontroller applications	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

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

ECK 520 - 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

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-IV 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.

ELECTIVE – I ECK 531 - 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		
			Internal	Board Exam	Total
DIGITAL SIGNAL PROCESSOR	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

OBJECTIVE

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

UNIT - I

- Familiarized with the basic of Digital signal Processor TMS320F2407
- Explain about the architecture of 2407
- Explain about CPU, Memory and Program exaction control

UNIT - II

- 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

UNIT – III

- 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

UNIT – IV

- Explain about Handling of Digital Inputs and Outputs
- Explain about Basics of Analog to Digital Converter
- Explain about Handling of ADC

UNIT – V

- Explain about the Event Manager A and B
- Explain about Timers and Compare Units.
- Explain about PWM Generation using Timer and Compare Units

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

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

ELECTIVE I – ECK 532 - 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		
			Internal	Board Exam	Total
VLSI	5	80	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.

OBJECTIVE

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

UNIT - I

- 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.,

UNIT -II

- 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

UNIT - III

- Explain the basic structure of ROM.
- Explain the Architecture of PAL
- Explain the Architecture of PLA
- Explain the Macro cell Concept

UNIT - IV

- 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

UNIT - V

- 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

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

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.

ELECTIVE THEORY - I
ECK 533 – 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		
			Internal	Board Exam	Total
ELECTIVE THEORY – I ROBOTICS AND AUTO ELECTRONICS	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**

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 Systems

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

ECK 540 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

ECK 550 - 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.

ECK 561 - 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

ECK 562 - 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.

ELECTIVE PRACTICAL – I

ECK 563 - 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

ECK 610 - 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		
			Assessment Marks		
	Hours/ Week	Hours/ Semester	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.

DETAILED SYLLABUS

Unit – 1

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.

ECK 620 - 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		
			Internal	Board Exam	Total
Embedded System	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

OBJECTIVE

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

Unit - I

- 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

Unit – II

- 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

UNIT – III

- 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

Completion of this Unit , they can have such knowledge in the field of Wired serial communication Protocols.

UNIT – IV

- 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.

UNIT – V

- 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.

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^2C 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
2. 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

ELECTIVE II
ECK 631 – 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.

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.

ELECTIVE II
ECK 632 – 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		
			Assessment Mark		
Television Engineering	Hrs/ Week	Hrs/ Semester	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.

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,

ELECTIVE II

ECK 633 - 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		
Bio – Medical Instrumentation	Hours / Week	Hours / Semester	Assessment Mark		
	5	80	Internal	Board Exam	Total
			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.

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.

ECK 640 - 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.

ECK 650 - 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

ECK660 – 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 evacuted 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 ?