GOVERNMENT OF TAMILNADU
DEPARTMENT OF TECHNICAL EDUCATION

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

C SCHEME

SYLLABUS

For

DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

(FULL TIME AND PART TIME COURSES)

CENTRAL POLYTECHNIC COLLEGE

THARAMANI, CHENNAI-113.

(AN AUTONOMUS INSITUTION)

CENTRAL POLYTECHNIC COLLEGE
AUTONOMOUS INSTITUTION
CHENNAI – 113

Central Polytechnic College, Tharamani, Chennai – 113 is one of the oldest and most prestigious Technical Institutes in Tamil Nadu. The students studying in this Institution are meritorious and at the same time most of the students hail from villages with poor background, but academically they are bright and sound. Presently, two shifts of following Diploma Programmes are being conducted by this Institute from the academic year 2009-2010 onwards

Branch	1st Shift intake	2nd Shift intake
Civil Engineering	60	60
Mechanical Engineering	160	160
Electrical and Electronics Engineering	60	60
Electronics and Communication Engineering	120	60
Computer Engineering	60	60
Mechanical Engineering (Sandwich)	40	-
Marine Engineering	40	-
Total	540	400

This Institution is functioning as an autonomous Institution from the academic year 2009-2010 onwards. Academic autonomy shall be a means to achieve higher standards with more academic freedom and greater creativity in future.

Admission of students in this Institution is purely based on merit and as per the Government of Tamil Nadu's communal reservation basis.

During the year 1916, the Institution was started under the name and style of the "The Madras Trades School" for imparting Training to apprentices in Mechanical Engineering and Plumbing Trades with an intake of 20 trainees in each course. Gradually, the numbers of courses conducted were increased and also correspondingly admission capacity rose. In the year 1931, the name of the Trade School was changed to "The Government School of Technology" and the courses in the Mechanical and Electrical Engineering subjects were recognized and made full time courses leading to the award of Diploma.

In the year 1946, the name of the Institution was changed to "The Central Polytechnic College". In the beginning, the Madras Trade school was functioning in a rented building and in the course of time, a separate building was constructed at Broadway and the Institution

moved to its own building at Broadway. Till the academic year 1957-1958, the institution was functioned at Broadway.

During the year 1958-1959 the Institution had been shifted to Guindy near the Industrial Estate. Since the land available in Guindy was not sufficient to construct additional buildings and also to create additional infrastructure for further development of the Institution, lands to the extent of 40 hectares initially and further 3221 hectares were acquired in the present premises where the Polytechnic is functioning presently.

Central Polytechnic College was selected on the basis of merit for the implementation of TEQIP and this Institution is functioning under Block Grant system with effect from 1st October 2008.

DIPLOMA COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING

(Implemented from 2016-2017)

C – SCHEME

REGULATIONS

1. Description of the Course:

a. Full Time (3 years)

The Course for the full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters* and the First Year is common to all Engineering Branches.

b. Sandwich (3½ years)

The Course for the Diploma in Engineering (sandwich) shall extend over a period of three and half academic years, consisting of 7 semesters* and the First Year is common to all Engineering Branches. The subjects of three years full time Diploma course being regrouped for academic convenience.

During 4th and/or during 7th semester the students undergo industrial training for six months / one year. Industrial training examination will be conducted after completion of every 6 months of industrial training

c. Part Time (4 years)

The course for the Diploma in Engineering shall extend over a period of 4 academic years containing of 8 semesters*, the subjects of 3 year full time Diploma Courses being regrouped for academic convenience.

Each Semester will have 15 weeks duration of study with 35 hrs. /Week for Regular Diploma Programme and 18hrs/ week (21 hrs. / Week I year) for Part-Time Diploma Programmes.

The Curriculum for all the 6 Semesters of Diploma courses (Engineering) have been revised and revised curriculum is applicable for the candidates admitted from 2016 – 2017 academic year onwards.

2. Condition for Admission:

Condition for admission to the diploma courses shall be required to have passed in

The S.S.L.C Examination of the Board of Secondary Education, TamilNadu. (Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in TamilNadu.

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examination recognized as equivalent to the above by the Board of Secondary Education, TamilNadu.

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.

3. Admission to Second year (Lateral Entry):

A pass in HSC (Academic) or (Vocational) courses mentioned in the Higher Secondary Schools in TamilNadu affiliated to the TamilNadu Higher Secondary Board with eligibility for university Courses of study or equivalent examination, & Should have studied the following subjects.

Courses	H.Sc Academic	H.Sc Vocational		10th Standard + 2 Years ITI
	Subjects Studied	Subjects Studied		
		Related subjects	Vocational subjects	Subjects Studied
Engineering Courses	Maths, Physics & Chemistry	Maths / Physics / Chemistry	Related Vocational Subjects Theory & Practical	Related Trade

- For the diploma Courses related with Engineering/Technology, the related / equivalent subjects prescribed along with Practical may also be taken for arriving the eligibility.

- Branch will be allotted according to merit through counseling by the respective Principal as per communal reservation.

4. Age Limit: No Age limit.

5. Medium of Instruction: English

6. 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 any institution affiliated to the State Board of Technical Education and Training, TamilNadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Courses are as given below:

Diploma Course	**Minimum Period**	**Maximum Period**
Full Time	3 Years	6 Years
Full Time(Lateral Entry)	2 Years	5 Years
Sandwich	3½ Years	6½ Years
Part Time	4 Years	7 Years

7. Subjects 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 is given in Annexure **- I**

8. Examinations:

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

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

9. Continuous Internal Assessment:

A . For Theory Subjects:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i. Subject Attendance **5 Marks**

(Award of marks for subject attendance to each subject theory/practical will 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

ii) Test # **10 Marks**

2 Tests each of 2 hours duration for a total of 50 marks are to be conducted. Out of which the best one will be taken and the marks to be reduced to:	05 marks
The Test – III is to be the Model test covering all the five units and the marks so obtained will be reduced to :	05 marks
Total	**10 marks**

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	Unit – I & II	End of 6th week	60	2 Hrs
Test II	Unit – III & IV	End of 12th week	60	2 Hrs
Test III	**Model Examination** - **Compulsory** Covering all the 5 Units. (Autonomous Board Examination-question paper- pattern).	End of 15th week	75	3 Hrs

 # - From the Academic year 2016-2017 onwards.

Question Paper Pattern for the Periodical Test :(Test - I & Test- II)
With no choice:

PART A type questions:	8 Questions X 4 mark	**... ...**	32 marks
PART B type questions:	4 Questions X 7 marks	**... ...**	28 marks
	Total		60 marks

iii) Assignment **10 Marks**

For each subject Three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 10 marks

All Test Papers and assignment notebooks after getting the signature with date from the students must be kept in the safe custody in the Department for verification and audit. It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

B. For Practical Subjects:

The internal assessment mark for a total of 25 marks which are to be distributed as follows:-

a) Attendance : **5 Marks** (Award of marks as same as Theory subjects)

b)	Procedure/ observation and tabulation/ Other Practical related Work	:	**10 Marks**
c)	Record writing	:	**10 Marks**
	TOTAL	:	**25 Marks**

- *All the Experiments/exercises indicated in the syllabus should be completed and the same to be given for final board examinations.*
- 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 to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)
- The students have to submit the duly signed bonafide record note book/file during the Practical Board Examinations.
- *All the marks awarded for assignment, Test and attendance should be entered in the Personal Log Book of the staff, who is handling the subject. This is applicable to both Theory and Practical subjects.*

10. Life and Employability Skill Practical:

The Life and Employability Skill Practical with more emphasis is being introduced in IV Semester for Circuit Branches and in V Semester for other branches of Engineering.
Much Stress is given to increase the employability of the students:

Internal assessment Mark **..... 25 Marks**

11. Project Work:

The students of all the Diploma Programmes have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamilnadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester.**

a) Internal assessment mark for Project Work & Viva Voce:

Project Review I	...	**10 marks**
Project Review II	...	**10 marks**
Attendance	...	**05 marks** (award of marks same as theory subjects pattern)
Total	...	**25 marks**

Proper record to be maintained for the two Project Reviews, and It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

b) Allocation of Mark for Project Work & Viva Voce in Board Examination:

Viva Voce	...	**30 marks**
Marks for Report Preparation, Demo	...	**35 marks**
Total		**65 marks**

c) Written Test Mark (from 2 topics for 30 minutes duration): $

i) Environment Management	2 questions X 2 ½ marks	= **5 marks**
iI) Disaster Management	2 questions X 2 ½ marks	= **5 marks**
		10marks

$ - Selection of Questions should be from Question Bank, by the External Examiner. No choice need be given to the candidates.

Project Work & Viva Voce in Board Examination	--	**65 Marks**
Written Test Mark (from 2 topics for 30 minutes duration)	--	**10 Marks**
TOTAL	--	**75 Marks**

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual during the Project Work & Viva Voce Board examination.

12. Scheme of Examinations:

The Scheme of examinations for subjects is given in **Annexure - II.**

13. 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 curriculum.

2. A candidate shall be declared to have passed the examination in a subject if he/she secures not less than *40% in theory subjects* and *50% in practical subject* out of the total prescribed maximum marks including both the internal assessment and the Board Examination marks put together, subject to the condition that he/she secures at least a minimum of *30 marks out of 75 marks* ***in the Board's Theory examinations and a minimum of 35 marks out of 75*** *marks in the Board Practical Examinations.*

14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2019 onwards (Joined in first year in 2016-2017) will be done as specified below.

First Class with Superlative Distinction:

A candidate will be declared to have passed in **First Class with Superlative Distinction** if he/she secures not less than 75% of the marks in all the subjects and passes all the semesters in the first appearance itself and passes all subjects within the stipulated period of study 3/ 3½/ 4 years (Full Time/Sandwich/Part Time) without any break in study.

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 of marks in all the semesters put together and passes all the semesters except the I and II semesters in the first appearance itself and passes all the subjects within the stipulated period of study 3/ 3½/ 4 years (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 and passes all the subjects within the stipulated period of study 3/ 3½ / 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 classifications are also applicable for the Sandwich / Part-Time students who pass out Final Examination from October 2018 /April 2019 onwards (both joined in First Year in 2015-2016)

15. Duration of a period in the Class Time Table:

The duration of each period of instruction 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 periods of instruction (Theory & Practical).

16. Seminar:

For seminar the total seminar 15 hours(15 weeks x 1hour) should be distributed equally to total theory subject per semester(i.e 15 hours divided by 3/4 subject). A topic from subject or current scenario is given to students. During the seminar hour students have to present the paper and submit seminar material to the respective staff member, who is handling the subject. It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

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Syllabus Committee Members

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Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Full Time)

III Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC310	Electronic Devices and Circuits	6	3	25	75	100	40
2	ECC320	Electric Circuits and Instrumentation	6	3	25	75	100	40
3	ECC330	Programming in C	5	3	25	75	100	50
4	ECC340	Electronic Devices and Circuits Practical	4	3	25	75	100	50
5	ECC350	Electric Circuits & Instrumentation Practical	4	3	25	75	100	50
6	ECC360	Programming in C Practical	5	3	25	75	100	50
7	ECC370	Computer Applications Practical for Electronics	4	3	25	75	100	50
		Seminar	1	-	-	-	-	-

Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Full Time)

IV Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC410	Industrial Electronics	5	3	25	75	100	40
2	ECC420	Communication Engineering	6	3	25	75	100	40
3	ECC430	Digital Electronics	5	3	25	75	100	50
4	ECC440	Linear Integrated Circuits	4	3	25	75	100	50
5	ECC450	IE and CE Practical	5	3	25	75	100	50
6	ECC460	Integrated Circuits Practical	5	3	25	75	100	50
7	30001	Life and Employability Skills Practical	4	3	25	75	100	50
		Seminar	1	-	-	-	-	-

Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Full Time)

V Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC510	Advanced Communication Systems	6	3	25	75	100	40
2	ECC520	Microcontroller	6	3	25	75	100	40
3	ECC530	VLSI	5	3	25	75	100	40
4	Elective – I		5	3	25	75	100	40
	ECC541	1. Biomedical Instrumentation						
	ECC542	2. Digital Communication						
	ECC543	3.Electronic Systems Design						
5	ECC550	Advanced Communication Systems Practical	4	3	25	75	100	50
6	ECC560	Microcontroller Practical	4	3	25	75	100	50
7	ECC570	VLSI Practical	4	3	25	75	100	50
		Seminar	1	-	-	-	-	-

Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Full Time)

VI Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC610	Computer Hardware and Networking	6	3	25	75	100	40
2	ECC620	Embedded Systems	6	3	25	75	100	40
3	Elective – II		5	3	3	25	75	100
	ECC631	1. Mobile Communication						
	ECC632	2. Television Engineering						
	ECC633	3. Programmable Logic Controller						
4	ECC640	Computer Hardware and Networking Practical	4	3	25	75	100	50
5	ECC650	Embedded Systems Practical	5	3	25	75	100	50
6	ECC660	Simulation Practical	4	3	25	75	100	50
7	ECC670	Project Work	4	3	25	75	100	50
		Seminar *	1	-	-	-	-	-

@ Minimum of 30 marks out of 75 marks in Theory Examination

Minimum of 35 marks out of 75 marks in Practical Examination

* - It is mandatory to conduct 4 hours seminar on Awareness in Entrepreneurship Development

Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Part Time)

III Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC310	Electronic Devices and Circuits	4		25	75	100	40
2	ECC320	Electric Circuits and Instrumentation	4		25	75	100	40
3	CBE15	Engineering Graphics-I	4		25	75	100	40
4	ECC340	Electronic Devices and Circuits Practical		3	25	75	100	50
5	ECC350	Electric Circuits and Instrumentation Practical		3	25	75	100	50

IV Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC330	Programming in C	4		25	75	100	40
2	ECC430	Digital Electronics	4		25	75	100	40
3	CBE26	Engineering Graphics-II	4		25	75	100	40
4	ECC360	Programming in C Practical		3	25	75	100	50
5	ECC370	Computer application practical for Electronics		3	25	75	100	50

Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Part Time)

V Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC410	Industrial Electronics	4		25	75	100	40
2	ECC420	Communication Engineering	4		25	75	100	40
3	ECC440	Linear Integrated Circuits	4		25	75	100	40
4	ECC450	IE & CE Practical		3	25	75	100	50
5	ECC460	Integrated Circuits practical		3	25	75	100	50

VI Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC510	Advanced Communication Systems	4		25	75	100	40
2	ECC520	Microcontroller	4		25	75	100	40
3	ECC550	Advanced Communication Systems Practical		4	25	75	100	40
4	ECC560	Microcontroller Practical		3	25	75	100	50
5	30001	Life and Employability Skills Practical		3	25	75	100	50

Curriculum and Scheme of Examination
Diploma in Electronics and Communication Engineering (Part Time)
VII Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC530	Very Large Scale Integration	4		25	75	100	40
2	ECB541 ECB542 ECB543	Elective – I Biomedical Instrumentation Digital Communication Electronic Systems Design	4		25	75	100	40
3	ECC610	Computer Hardware Servicing and Networking	4		25	75	100	40
4	ECC570	Very Large Scale Integration Practical		3	25	75	100	50
5	ECC640	Computer Hardware Servicing and Networking Practical		3	25	75	100	50

VIII Semester

Sl. No.	Subject Code	Subject Name	Hours per Week	Duration of Exam (Hours)	Examination Marks			
					Allocation of Marks			Min. Marks for Pass
					IA	BE @	Total	
1	ECC620	Embedded Systems	4		25	75	100	40
2	ECC631 ECC632 ECC633	Elective – II 1. Mobile Communication 2. Television Engineering 3. Programmable Logic Controller	4		25	75	100	40
3	ECC650	Embedded Systems Practical		4	25	75	100	40
4	ECB660	Simulation Practical		3	25	75	100	50
5	ECB670	Project Work		3	25	75	100	50

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

III SEMESTER

ECC310 – ELECTRONIC DEVICES AND CIRCUITS

Total No of Hours / Week : 6
Total No of Weeks / Semester : 15
Total No of Hours / Semester : 90

SCHEME OF INSTRUCTION AND EXAMINATION

SUBJECT	INSTRUCTION		EXAMINATION		
Electronic Devices and Circuits	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
	6	90	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME (HRS)
1	Semiconductor Diodes and Rectifiers	16
2	Bipolar Junction Transistor and Amplifiers	15
3	FET, UJT and Oscillators	17
4	SCR, DIAC, TRIAC and MOSFET	16
5	Opto Electronic Devices and Wave Shaping Circuits	16
	Revision and Test	10
Total		90

RATIONALE:

Every Electronics Engineer should have sound knowledge about the components used in Electronics Industry. This is vital in R&D Department for chip level troubleshooting. To meet the industrial needs, diploma holders must be taught about the most fundamental subject, Electronic devices and Circuits. By studying this subject, they will be skilled in handling all types of electronic devices and able to apply the skill in electronics system.

OBJECTIVES:

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

- Study the working principle of PN junction diode and transistor
- Understand the working principle of different types of rectifiers, different transistor configurations and differentiate various types of amplifiers
- Study the performance of special devices like UJT, FET
- Study the performance of different transistor oscillators
- Study the performance of SCR, DIAC, and TRIAC
- Study the performance and types of MOSFET
- Study the different modes of operations of MOSFET
- Know the construction and working principle of optoelectronic devices
- Study the performance of solar cell with principle and applications
- Explain the concept of wave shaping circuits
- Study the working principle of clippers and clampers

DETAILED SYLLABUS

UNIT I : Semiconductor Diodes and Rectifiers:

Semiconductor: Definition - Classification - Intrinsic and Extrinsic N type & P type – Drift current & Diffusion current.

Diodes: PN junction diode – Construction - Forward and Reverse bias characteristics - Avalanche break down – Specifications (IN4001) – Zener diode - Construction - Forward and Reverse bias characteristics - Zener break down – Specifications (IZ 5.1) – Applications - Zener Diode as a voltage regulator.

Rectifier: Introduction – Types of Rectifiers - Half wave rectifier - Full wave Rectifier (using center tapped transfer, bridge) - (no mathematical equations) - Comparison- Filters – C and LC filters.

UNIT II : Bipolar Junction Transistor and Amplifier:

Transistor: NPN and PNP transistor – Construction - Operation - Transistor biasing – Fixed bias, Collector base bias, Self bias – CB,CE and CC configurations – Characteristics - Comparison between three configurations in terms of input impedance, output impedance, current gain, voltage gain – Transistor as a Switch.

Amplifier: Transistor as an Amplifier - Classification of amplifiers - RC coupled amplifier – Emitter follower – Negative feedback Concept - Effect of negative feedback – Types of negative feedback connections - Specifications of small signal transistors (BC147/157), Medium signal Transistors (TIP 122/127) and Power Transistors (2N3055/2955).

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UNIT III : FET, UJT and Oscillators

Field Effect Transistor: Construction – Working principle of FET – Difference between FET and BJT – Classification of FET – Characteristics of FET – Specifications (BFW10/11)- Applications – FET amplifier (Common Source amplifier).

Uni Junction Transistor: Construction – Equivalent circuit – Operation – Characteristics – Specification (2N2646) - UJT as a relaxation oscillator.

Transistor Oscillator: Classifications – Condition for Oscillations (Barkhausen criterion) – General form of LC oscillator – Hartley Oscillator – Colpitts Oscillator – RC Phase shift oscillator- Crystal oscillator.

UNIT IV : SCR, DIAC, TRIAC and MOSFET:

SCR: Introduction – Working – VI-characteristics - Comparison between SCR and Transistor – SCR as a Switch, Controlled Rectifier. TRIAC working principle Characteristics – DIAC – Characteristics – DIAC as bidirectional switch.
MOSFET – Types & Characteristics of N channel MOSFET and P channel MOSFET- Characteristics of Enhancement and Depletion mode MOSFET – MOSFET as a switch.

UNIT V : Opto Electronics Devices and wave shaping circuits:
Opto Electronic devices: Classification– Symbols- Characteristics- Working Principle of LDR, LCD– Opto coupler – Opto Interrupter-Photo Diode-Photo transistor. – Solar Cell – Characteristics, Specifications. LED- Working Principle –types- 7 segment LED- Organic LED.
Wave Shaping Circuits: Clipper, Clamper Circuits and waveforms only.

Text Books:
1. Electronics Devices & Circuits by Salivahanan S, N.Suresh Kumar, A.Vallavaraj, Tata McGraw Publication, 3rd Edition 2016.
2. Electronics Devices and circuit theory by Boyestad & Nashelsky, PHI , New Delhi 2009.

Reference Books:
1. Electronic Principles by Malvino,-Tata McGraw Hill Publication 2010.
2. Electronic Devices & Circuits by Allen Mottershed *An Introduction*, PHI
3. Electronics Devices & Circuits by Jacob Millman and Halkias3rd Edition 2010, Tata McGraw – Hill publication
4. Optical Fiber Communication by GerdKeise 5th Edition, Tata McGraw – Hill Publication

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ECC320 - ELECTRIC CIRCUITS AND INSTRUMENTATION

Total No of Hours /week : 6
Total No of Weeks/Semester : 15
Total No of Hours / Semester : 90

SCHEME OF INSTRUCTION AND EXAMINATION

SUBJECT	INSTRUCTION		EXAMINATION		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
Electric Circuits and Instrumentation	6	90	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	15
5	Transducers, Sensors & Digital test instruments	15
	Revision and test	12
Total		90

RATIONALE:

This subject enables the students with concepts of DC, AC circuits and fundamentals of Electrical Machines. The subject also deals with concepts, principles and working of analog and digital electronic measuring instruments. The introduction of this subject will enable the students to be well exposed to a wide area of various electronic measuring instruments and a thorough knowledge of the fundamentals of electrical circuits

OBJECTIVES:

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

- To study ohm's law and Kirchhoff' s laws.
- To study the circuit theorems
- To learn about series and parallel Circuits.
- To learn various terms related to AC circuits.
- To understand concept of AC circuits
- To learn about series and parallel resonance circuits.
- To study about transformer and its working.
- To understand the working of DC machine.

- To know about Induction motors and stepper motor.
- To understand the basic measuring instruments.
- To learn about bridge circuits.
- To discuss about CRO and its types.
- To learn about transducers and its various types.
- To study about sensors.
- To know about test instruments.

DETAILED SYLLABUS

UNIT I D.C. CIRCUITS AND THEOREMS

Definition and unit for Voltage, Current, Power, Resistance, Conductance, Resistivity- Ohm's law – Only simple problems in Ohm's law- Kirchoff's Current law and Voltage law. Series circuits –Parallel circuits, Series Parallel circuits. Mesh Method (simple problems), Theorems: Thevenin's Theorem - Norton's theorem- Super position Theorem- Maximum power transfer theorem – Statement and Explanation (simple problems)

UNIT II A.C. CIRCUITS AND RESONANCE

A.C. CIRCUITS:AC through single pure resistance, pure inductance, pure capacitance - Voltage and Current relationship and (to mention only) the equation for power and power factor in each case (only simple problems). Definition for impedance, reactance, admittance, conductance, impedance, Phase angle, power factor and power. AC circuits – Derivation for impedance and admittance, power and power factor in Series and Parallel R-L ,R-C ,R-L-C circuits. Analysis of Parallel R-L circuit, R-C circuit, R-L-C circuit (qualitative treatment only).
RESONANCE:Resonance- Series Resonance – Parallel Resonance – Condition for Resonance- Resonant Frequency-Q factor – Resonance curve-Bandwidth (only simple problems).

UNIT III TRANSFORMERS AND MACHINES

TRANSFORMERS:Transformer – Ideal transformer – Construction – Working Principle – EMF equation Losses in transformer- Core loss, Copper loss- Efficiency- Regulation OC, SC test on transformer -List of applications (qualitative treatment only)
MACHINES:D.C. Machines - DC–Generator –Working principle - Types- Applications DC motor- Working Principle - Types- Applications (qualitative treatment only), Single phase induction motor- Types- Construction and Principle of operation of capacitor start induction motor- Applications - Stepper motor-Working Principle-Uses (qualitative treatment only)- Universal Motor (qualitative treatment only), Difference between single phase and three phase supply**.**

UNIT IV MEASURING INSTRUMENTS AND CRO

MEASURING INSTRUMENTS: Definition for Measurement, Instrument- Errors in Measurement - Calibration- Indicating instruments – Basic forces for indicating instruments - Construction and operation of Permanent Magnet Moving Coil Instrument -

Advantages – Disadvantages of PMMC - Shunts and Multipliers – DC ammeter-DC Voltmeter-Voltmeter sensitivity. Bridges- Types - Wheat stone bridge - applications – Universal impedance bridge arrangements to measure R, L,C.

CRO:CRO- Block diagram and principle of operation of CRO- Operation of CRT - Electrostatic focusing- Electrostatic deflection (no derivation) - Vertical deflection system- Applications of CRO - Operation of dual trace CRO- Digital storage Oscilloscope - Block diagram- Advantage.

V TRANSDUCERS , SENSORS & TEST INSTRUMENTS

TRANSDUCERS: Transducers - Strain gauge – Working principle- Operation and Applications of Photo electric transducer, LVDT, and Load cell. Principle of working and Applications of- thermocouple –Thermistor –RTD- Piezoelectric transducer .

SENSORS: IR range sensor – IR proximity sensor- Ultrasonic range sensor- Touch Sensor.

TEST INSTRUMENTS: Analog multimeter-Working principle- Measurement of Current, Voltage and Resistance- Advantages of Digital Voltmeter

REFERENCE BOOKS:

1.Electrical Technology B.L. Theraja Division of Nirja constructions and development co. (P) Ltd., -1994.

2.Electric Circuit Theory Dr. M. Arumugam,N. PremkumaranKanna Publisher, Delhi-1997

3.Electronic Measurements and InstrumentationR.K.Rajput S. Chand (Third Edition)-2009

4.Electronic Measurements and Instrumentation Sanjay Talbar & Akhilesh Upadhyaya.

Dhanpat Rai Publications (p) Ltd-2004

5.Modern Electronic Instrumentation and Measurement Techniques Albert D.Hel frick

and Willam David cooper Prentice Hall of India Pvt. Ltd., 1996

6. Electrical and Electronic- Measurements and Instrumentation A.K.Sawheney Dhanpat rai and Sons -1993.

7. Electronic Instrumentation Kalsi Kalsi H S. Tata McGraw-Hill Education, 2004

8. Measurement systems- Application and Design Ernest O. Doebelin McGraw hill -2004

9.Transducers and Instrumentation D.V.S.Murty McGraw hill -2004 10.

10. Electrical & Electronics Measurements and instrumentation Umesh Sinha Satya prakashan Tech, 1992

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ECC330 PROGRAMMING IN C

Total No. of Hrs. / Week : 5
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 75

SCHEME OF INSTRUCTION AND EXAMINATION

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

TOPICS AND ALLOCATION

Unit	Topic	Time (Hrs)
I	Program Development & Introduction to C	12
II	C operators, I/O statement and Decision making	13
III	Arrays and String Functions	14
IV	Structure and Unions, Dynamic memory management	13
V	Pointers & File management	13
	Revision, Test	10
Total		75

RATIONALE

C' is the most widely used computer language, which is being taught as a core course. C is general purpose structural language that is powerful, efficient and compact, which combines features of high level language and low-level language. It is closer to both Man and Machine. Due to this inherent flexibility and tolerance it is suitable for different development environments. Due to these powerful features, C has not lost its importance and popularity in recently developed and advanced software industry. C can also be used for system level programming and it is still considered as first priority programming language. This course covers the basic concepts of C. This course will act as "Programming concept developer" for students. It will also act as "Backbone" for subjects like OOPS, Visual Basic, Windows Programming, JAVA etc.

OBJECTIVES:

At the end of the Course, the students will be able to:

- Define Program, Algorithm and flow chart
- List down and Explain various program development steps
- Write down algorithm and flow chart for simple problems.
- Describe the concepts of Constants, Variables, Data types and operators.
- Develop programs using input and output operations.
- Understand the structure and usage of different looping and branching statements.
- Define arrays and string handling functions.
- Explain user-defined functions, structures and union.
- To understand the dynamic data structure and memory management..
- Write programs using the concept of Pointers.
- Write programs using file handling functions.

DETAILED SYLLABUS

UNIT – I: Program Development & Introduction to C

1.1 Program, Algorithm & flow chart:- Program development cycle- Programming language levels & features. Algorithm – Properties & Classification of Algorithm, Flow chart – Symbols- Importance & Advantage of flow chart.
1.2 Introduction to C: - History of C – Features of C- Structure of C program – Compile, link & run a program- Diagrammatic representation of program execution process.
1.3 Variables, Constants & Data types:. C character set-Tokens- Constants- Key words – identifiers and Variables – Data types and storage – Data type Qualifiers – Declaration of Variables – Assigning values to variables- Declaring variables as constants-Declaring variables as volatile- Overflow & under flow of data

UNIT – II: C OPERATORS, I/O STATEMENT and DECISION MAKING

2.1 C operators:-Arithmetic, Logical, Assignment .Relational, Increment and Decrement, Conditional, Bitwise, Special Operator precedence and Associativity. C expressions – Arithmetic expressions – Evaluation of expressions- Type cast operator.
2.2 I/O statements: Formatted input, Formatted output, Unformatted I/O statements.
2.3 Branching:- Introduction – Simple if statement – if –else – else-if ladder , nested if-else- Switch statement – go statement.
2.4 Looping statements:- While, do-while statements, For loop, break & continue statement.

UNIT – III: ARRAYS and STRINGS FUNCTIONS

Arrays:- Declaration and initialization of One dimensional, Two dimensional and Character arrays – Accessing array elements – Programs using arrays.
3.2 Strings :- Declaration and initialization of string variables, Reading String, Writing Strings – String handling functions (strlen(),strcat(),strcmp()) – String manipulation programs.
3.3 Built –in functions: -Math functions – Console I/O functions – Standard I/O functions – Character Oriented functions.
3.4 User defined functions:- Defining functions & Needs-, Scope and Life time of Variables, , Function call, return values, Storage classes, Category of function – Recursion.

UNIT – IV: STRUCTURES AND UNIONS, DYNAMIC MEMORY MANAGEMENT

4.1 Structures and Unions:- Structure – Definition, initialization, arrays of structures, Arrays with in structures, structures within structures, Structures and functions – Unions – Structure of Union – Difference between Union and structure.
4.2 Dynamic Memory Management:- introduction – dynamic memory allocation – allocating a block memory (MALLOC) – allocating multiple blocks of memory (CALLOC) –releasing the used space: free – altering the size of a block (REALLOC).

UNIT – V: POINTERS & FILE MANAGEMENT

Pointers: Introduction – Advantages of pointers - Accessing the address of a variable, Declaring and Initializing pointers, Accessing a variable through its pointer - Pointers expressions, Increments and scale factor - Array of pointers -Relation between Pointers and Arrays - String manipulation using pointers –Limitation of array of pointers to strings - Pointers and functions, Pointers and structures –Function returning pointer and passing addresses to functions -Pointers to pointers.
File Management: Introduction – Defining and Opening a file - Closing a file.

Text book:
1. Programming in ANSI C 4E by Prof. E. BALAGURUSAMY, the TATA McGRAW –HILL publications.

Reference Book:
1 Programming and Problem solving using C ISRD Group, Lucknow Tata Mc- GrawHill, New Delhi Sixth Reprint 2010
2 Let us C Yeswanth Kanetkar BPB Publications Fourth Revised Edition
3 A TextBook on C E.Karthikeyan PHI Private Limited, New Delhi 2008
4 Programming in C D.Ravichandran New Age International Publishers C FirstEdition 1996 Reprint2011
5 Computer Concepts And Programming in C Dr.S.S.Khandare S.Chand & Company Ltd. New Delhi First Edition 2010
6 Complete Knowledge in C Sukhendu Dey, Debobrata Dutta Narosa Publishing House, New Delhi Reprint2010
7 Programming in C Reema Theraja Oxford University Press First Edition 2011
8 Practical C Programming Steve Oualline O'Reilly, Shroff Publishers Eleventh Indian Reprint Oct2000.

ECC340 ELECTRONIC DEVICES AND CIRCUITS PRACTICAL

Total No. of Hrs. / Week : 4
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 60

SCHEME OF INSTRUCTION AND EXAMINATION

Subject	**Instruction**		**Examination**			**Duration**
	Hrs/ Week	Hrs/ Semester	Assessment Mark			
			Internal	Board Exam	Total	
Electronic Devices and Circuits Practical	4	60	25	75	100	3 Hrs

ALLOCATION OF MARKS

CIRCUIT DIAGRAM : 20
CONNECTION : 25
EXECUTION & HANDLING OF EQUIPMENT : 15
OUTPUT / RESULT : 10
VIVA – VOCE : 05
TOTAL : 75

Note:
1. At least 5 experiments should be constructed using breadboard/soldering
STUDY EXPERIMENT (Not for Examination)
Identify and check the working condition of passive & active components and switches.

List of experiments to be conducted

1. Construct and plot the VI characteristics of PN junction diode and find the cut-in voltage.

2. Construct and plot the VI characteristics of Zener diode and find the break down voltage.

3. Construct and plot the regulation characteristics (by varying either load or line voltage) of Half wave rectifier with and without filters.

4. Construct and plot the regulation characteristics (by varying either load or line voltage) of Full wave rectifier with and without filters.

5. Construct and plot the regulation characteristics (by varying either load or line voltage) of Bridge rectifier with filters.

6. Construct and draw the Input and output characteristics of CE Transistor configuration and find its input & output resistance.

7. Construct and draw the frequency response of RC coupled amplifier and determine the 3-db bandwidth.

8. Construct and plot the regulation characteristics of SP regulator.

9. Construct and plot the drain characteristics of JFET and find its pinch off voltage.

10. Construct and plot UJT characteristics and find its Ip and Vv.

11. Construct and draw SCR characteristics and find its break over voltage.

12. Construct and plot the DIAC and TRIAC characteristics.

13. Construct and draw the waveforms of positive clipper and clamper.

14. Construct and draw the characteristics of LDR and a photo diode.

15. Construct and draw the characteristics of photo transistor.

EQUIPMENTS REQUIRED:

S.NO	**Name of the Equipments**	**Range**	**Required Nos.**
1.	DC Regulated power supply	0-30V, 1A	10
2.	High Voltage Power Supply	0-250V, 1A	2
3.	Signal Generator	1MHz	4
4.	Dual trace CRO	20 MHz / 30MHz	5
5.	Digital Multi meter -		10
6.	DC Voltmeter (Analog/Digital)	Different Ranges	15
7.	DC Ammeter (Analog/Digital)	Different Ranges	15

ECC350 ELECTRICAL CIRCUITS AND INSTRUMENTATION PRACTICAL

Total No. of Hrs. / Week : 4
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 60

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

Subject	**Instruction**		**Examination**			**Duration**
Electrical Circuits and Instrumentation Practical	Hrs/ Week	Hrs/ Semester	Assessment Mark			
			Internal	Board Exam	Total	
	4	60	25	75	100	3 Hrs

ALLOCATION OF MARKS

CIRCUIT DIAGRAM : 20
CONNECTION : 25
EXECUTION & HANDLING OF EQUIPMENT : 15
OUTPUT / RESULT : 10
VIVA – VOCE : 05
TOTAL : 75

LIST OF EXPERIMENTS

Note: Atleast 5 experiments should be constructed using breadboard/soldering.

1. Construct a circuit to verify Kirchoff's voltage and current law.

2. Construct a circuit to verify Super position theorem.

3. Construct a circuit to verify Thevenin's Theorem.

4. Construct a circuit to verify Norton's Theorem.

5. Construct a circuit to verify Maximum power transfer Theorem.

6. Extension of voltmeter and ammeter.

7. Construct and test the performance of series resonant circuit and parallel resonant circuit.

8. Calibrate the given ammeter and voltmeter.

9. Construct and test the performance of Wheatstone bridge.

10. Measure the amplitude and frequency of signals using dual trace CRO.

11. Measure the frequency and phase angle using CRO by Lissajous figure.

12. Test the performance of LVDT.

13. Measure strain using strain gauge.

14. Determine the characteristics of a thermistor/RTD.

15. Test the performance of a load cell.

MAJOR EQUIPMENT REQUIRED

S.No	**Name of the Equipments**	**Range**	**Required Nos**
1.	DC regulated power supply	(0-30V),1A	8
2.	Signal generators	1MHZs	3
3.	Dual trace CRO	20MHZ	4
4.	DC Voltmeter	(0-15V)	8
5.	DC Ammeter	(0-300μA)	6
6.	DC Ammeter	(0-100mA)	8
7.	Digital Multimeter	-	4
8.	Galvanometer	-	1
9.	Decade Resistance Box	-	1

ECC360 PROGRAMMING IN C PRACTICAL

Total No. of Hrs. / Week : 5
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 75

TEACHING AND SCHEME OFEXAMINATION:

Number of Weeks/Semester : 15 weeks

Subject	**Instruction**		**Examination**			**Duration**
C Programming Practical	Hrs/ Week	Hrs/ Semester	Assessment Mark			
			Internal	Board Exam	Total	
	5	75	25	75	100	3 Hrs

LIST OF EXPERIMENTS

1. Write C language program to find the solution of a quadratic equation.

2. Write C language program to find whether the given number is a positive number, negative number or zero.

3. Write C language program to find the sum of series using While loop.

4. Write C language program to perform the Arithmetic operation based on the numeric key press using switch case statement. (1-Addition, 2-Subtraction, 3 – multiplication, 4 - Division).

5. Write C language program to implement Ohms Law.

6. Write C language program to find factorial of given N numbers using function.

7. Write C language program to prepare the total marks for N students by reading the Name, Reg.No, Marks 1 to Marks 6 using array of structure.

8. Write C language program to swap the values of two variables.

9. Write C language program to calculate the equivalent resistance of three resistances connected in series and parallel.

10. Write C language program to calculate the equivalent Capacitance of three Capacitors connected in series and parallel.

11. Write C language program to find Resonant Frequency of RLC Series and Parallel Circuits.

12. Write C language program to find the power factor of series RL circuits.

13. Write C language program to find the Q factor for series and parallel resonant circuits.

14. Write C language program to draw the symbol of NPN transistor using Graphics.

15. Write C language program to draw the symbol of Diode using Graphics.

16. Program to read ten values to an array variable. Use pointers to locate and display each value.

17. Reverse the following using pointers (i) String (ii) N integer numbers stored in any array.

ALLOCATION OF MARKS

No.	**Allocation**	**Marks**
1	Writing Algorithm	20
2	Writing Program	20
3	Executing program	25
3	Result	05
4	Viva Voce	05
	Total	75

HARDWARE REQUIRMENT:
Desktop/laptop computers : 15 nos
Laser printer : 01 no

SOFTWARE REQUIREMENT:
C-compiler and editor

ECC370 COMPUTER APPLICATIONS PRACTICAL IN ELECTRONICS

TEACHING & SCHEME OF EXAMINATION:

No. of weeks per Semester: 15 Weeks

Subject	Instruction		Examination			Duration
	Hrs/ Week	Hrs/ Semester	Assessment Mark			
			Internal	Board Exam	Total	
Computer Applications Practical in Electronics	4	60	25	75	100	3 Hrs

RATIONALE:

The Computer Application Practical in Electronics facilitates the necessary knowledge and skills regarding creating, working and maintaining the documents, analyzing the data with charts manipulation of databases, presentation of documents with audio visual effects in a computer and provides the latest tools and technologies in helping the students to fetch better employment.

OBJECTIVES:

On completion of the following exercises, the students must be able to.

- Understand the Windows operating systems, word processing
- Analyze the data sheet
- Create and manipulate the database Prepare PowerPoint presentation
- Understand Internet concepts and usage of e-mail
- Understand simulation of characteristics of various electronic components using electronics device automation tools.

LIST OF EXPERIMENTS

SECTION I

Exercise in WINDOWS:

1. a. Install screen saver and change the monitor resolution by 1280X960
   b. Setting wall papers
   c. Creating, moving, deleting and renaming a folder
   d. Copying files into CD/DVD
   e. Recording and saving an audio file
   f. Set/Change the date and time.

Exercise in WORD PROCESSING:

2. Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database and generate labels for the applying organizations.

3. Create a news letter of three pages with two columns text. The first page contains some formatting bullets and numbers. Set the document background colour and add 'confidential' as the watermark. Give the document a title which should be displayed in the header. The header/ footer of the first page should be different from other two pages. Also, add author name and date/ time in the header. The footer should have the page number.
Exercises in SPREADSHEET

4. Create a table of records with columns as Name and Donation Amount. Donation amount should be formatted with two decimal places. There should be at least twenty records in the table. Create a conditional format to highlight the highest donation with blue colour and lowest donation with red colour. The table should have a heading.

5. Prepare line, bar and pie chart to illustrate the subject wise performance of the class for any one semester.

Exercise in DATABASE

6. Prepare a payroll for employee database of an organization with the following details:
Employee Id, Employee name, Date of Birth, Department and Designation, Date of appointment, Basic pay, Dearness Allowance, House Rent Allowance and other deductions if any. Perform simple queries for different categories.

Exercise in POWER POINT

7. Create a Presentation on a mini project with ten different slide transitions with sound effect.

Exercise in INTERNET

8. a. Create e-mail id and perform the following.
    i. Write an e-mail inviting your friends to your birthday party.
    ii. Make your own signature and add it to the email message.
    iii. Add a word attachment of the venue route
   b. Send the e-mail to at least 2 of your friends.

SECTION II

Exercises in SIMULATION TOOLS

9. Simulate VI characteristics of PN junction diode.

10. Simulate VI characteristics of LED.

11. Simulate VI characteristics of Zener diode.

12. Simulate VI characteristics of NPN transistor.

13. Simulate VI characteristics of FET.

14. Simulate VI characteristics of UJT.

15. Simulate VI characteristics of SCR.

ALLOCATION OF MARKS

CONTENT	Max. Marks Section I	Max. Marks Section II
Procedure	15	15
Execution	15	15
Result with printout	5	5
viva	5	
Total	75	

SOFTWARE REQUIREMENTS

SECTION I
Operating System : Windows XP or Windows Vista or Windows 7 / Linux
Office Package : Microsoft office 2000 or Office 2003 or Office 2007/Open Office

SECTION II
SPICE simulation tools : PSPICE or Multisim or Lab VIEW / OrCAD /TINA

HARDWARE REQUIREMENTS

Desktop/Laptop Computer System : 15 Nos
Laser Printer : 1 No

IV SEMESTER

ECC410 INDUSTRIAL ELECTRONICS

Total No of hours / week : 6
Total No of week / semester : 15
Total No of hours / semester : 80

SCHEME OF INSTRUCTIONS AND EXAMINATION

Subject	**Instruction**		**Examination**		
Industrial Electronics	**Hours / Week**	**Hours / Semester**	**Assessment Mark**		
	6	80	**Internal**	**Board Exam**	**Total**
			25	75	100

TOPICS AND ALLOCATION

UNIT	**TOPIC**	**TIME (Hrs)**
I	Power Devices and Phase Control Circuits	14
II	Converters and Choppers	14
III	Inverters, SMPS & UPS	14
IV	PLC and Programming and SCADA	13
V	CNC	13
	Revision and Test	12
Total		80

OBJECTIVES:

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

- To Study working principle of power devices.
- To Study the methods of triggering
- To know about use of pulse transformer & opto isolator.
- To learn about converters and its types.
- To understand commutation concepts in SCR
- To learn about choppers.
- To Study about inverters and types.
- To know about SMPS.
- To understand about UPS and its types.
- To learn about PLC.
- To discuss about ladder diagrams.
- To learn about PID controller.

- To study about basics of numerical control of machines.
- To learn about CNC systems.
- To know about the basics of Robotics

DETAILED SYLLABUS

UNIT I: POWER DEVICES AND TRIGGER CIRCUITS

POWER DEVICES : Insulated gate bipolar transistor (IGBT), MOSFET and GTO - Symbol, Principle of working, VI characteristics and applications - Comparison between power MOSFET, power transistor and power IGBT.
TRIGGER CIRCUITS: Triggering of SCR - Gate triggering –Types –Concepts of DC triggering, AC triggering, Pulse gate triggering – Pulse transformer in trigger circuit – Electrical isolation by opto isolator – Resistance capacitor firing circuit and waveform - Synchronized UJT triggering (ramp triggering) circuit and waveform - Phase angle control circuit using IC TCA 785.

UNIT II: CONVERTERS AND CHOPPERS (Qualitative treatment only)

CONVERTERS: Converters – Definition – Half and Full wave controlled rectifier - Single phase Half controlled bridge converter with R load and RL load - Importance of flywheel diode – Single phase fully controlled bridge converter with resistive load – voltage and current waveforms – Single phase fully controlled bridge converter with RL load – voltage and current waveforms - Commutation- Natural commutation – Forced commutation – Types-3 phase converters.
CHOPPERS: Chopper – Definition –principle of DC chopper operation – Typical chopper circuit (Jones chopper) – Chopper using MOSFET - Applications of DC chopper.

UNIT III: INVERTERS & APPLICATIONS

INVERTERS: Inverter with resistive load – Single phase inverter with RL load – Methods to obtain sine wave output from an inverter- Output voltage control in inverters - McMurray inverter – advantages – - Inverter circuit - Parallel- 3 phase inverter- Solar inverter.
INVERTER APPLICATIONS: SMPS Types - Block diagram of SMPS – advantages and disadvantages. UPS-Types (ON Line, OFF Line)- Comparison - SMPS circuit.

UNIT IV: PROGRAMMABLE LOGIC CONTROLLER

Evolution – advantages over relay logic - Introduction to PLC – Relays- Block diagram of PLC - PLC Programming Languages - Arithmetic Functions – (add, sub, mul, div, sqr) – Comparison of functions - Basics of Input and output module (digital input and output module) - Logic functions- AND logic, OR logic, NAND logic, EX-OR logic -symbols used in ladder logic diagram. Ladder programming – Ladder diagram for simple systems – Star delta starter, Conveyer control and Lift control. PLC interface with GSM.

UNIT V: INDUSTRIAL AUTOMATION

Industrial Controllers: Two Wire Transmitter, Four Wire transmitter, Timer modules-Applications, On-Off controls, Proportional controller, Integral Controller, Derivative Controller, PID controller, Rotary encoder, Current Standards, Voltage standards, Conventional Numerical Control, NC Part Programming, DNC, CNC & Adaptive Control, CNC machine
Industrial Robotics: Robot Anatomy, Robot Specifications, End Effectors, Robotic Sensors, Robot Programming - Applications.

TEXT BOOKS

1. Power Electronics by M.H.Rashid - PHI Publication-3rd Edition-2005

2. Industrial Electronics and control by Biswanath Paul –PHI publications- 2nd Edition - 2010

3. Programmable Logic Controllers - “Frank D.Petruzela “PHI publications

4. Power Electronics by Dr.P.S.Bimbhra, Khanna publishers -2nd Edition- 1998

REFERENCE BOOKS

1. Industrial & Power Electronics By Harish C.Rai, Umesh Publication, 5th Edition 1994

2. ‘Programmable Logic Controllers – Principles and applications – John W. Webb. Ronald A. Reis PHI publications 2017

3. Programmable Logic Controller –Pradeep Kumar& Srivashtava- BPB Publications

ECC420 COMMUNICATION ENGINEERING

Total No of Hours /week : 6
Total No of Weeks/Semester : 15
Total No of Hours / Semester : 90

SCHEME OF INSTRUCTION AND EXAMINATION

SUBJECT	INSTRUCTION		EXAMINATION		
			Assessment Marks		
COMMUNICATION ENGINEERING	Hours/ Week	Hours/ Semester	Internal	Board Exam	Total
	6	90	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(HRS)
1	Networks, Antenna and Propagation	16
2	Amplitude Modulation	16
3	Angle and Phase Modulation	16
4	Pulse and Digital Modulation	15
5	Digital Communication	15
	Revision and test	12
Total		90

RATIONALE:

Today communication engineering has developed to a great extent that there is always the need for study of various communication concepts. This subject fulfills the need for students to have a thorough knowledge of various types of networks, amplitude modulation, phase modulation and digital modulation.

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
- 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
- study basic digital communication system and digital codes.
- learn error detection and correction codes.
- learn various digital modulation techniques

DETAILED SYLLABUS

UNIT I: NETWORKS, ANTENNA AND PROPAGATION

Networks (qualitative treatment only)**:** Symmetrical and asymmetrical networks - Characteristic impedance and Propagation constant.
Equaliser: Types, Applications: constant resistance equalizer.
Attenuator: Types - Symmetrical T and Pi attenuators –Applications and simple problems
Filters: Types and Definitions – Circuit elements and Cut-off frequencies of LPF, HPF and BPF (only simple problems)
Antennas: Basic antenna principle – Polarization - Directive gain – Directivity - Radiation pattern - Folded dipole - Parasitic array - Broad-side and End-fire array - Yagi antenna - Parabolic antenna.
Propagation: Ionospheric layers - Ground wave propagation - sky wave - space wave propagation (short theory only).

UNIT II: AMPLITUDE MODULATION

Modulation: Classification of Radio Frequency-Relationship between wavelength and frequency - Need for modulation - Noise-Internal noise-External noise-Types of modulation.
Amplitude Modulation**:** Expression - AM spectrum and sidebands - Types of AM - Balanced modulator – SSB generation – Phase shift and Filter methods - advantages and disadvantages of SSB - AM-VSB system - Diode detector.
AM Transmitter: Types of transmitters - High level AM transmitter and low level AM transmitter - SSB transmitter.
AM Receiver: TRF receiver - Super heterodyne radio receiver - Selection of IF - Image frequency - AGC types - SSB receiver.

UNIT III: FREQUENCY AND PHASE MODULATION

Frequency Modulation**:** Expression - Waveforms – Frequency spectrum - Effects of noise in FM - comparison of AM and FM - Varactor diode modulator.
FM Transmitter: Direct and Indirect methods - stereophonic FM transmitter.
FM Receiver: FM detectors – Slope detector - Phase discriminator- Ratio detector (qualitative treatment only) -Block diagram of FM Receiver – AFC - Stereophonic FM receiver.
Phase modulation: Principles- Phase modulator circuit- Comparison between FM and PM.

UNIT IV: PULSE AND DIGITAL MODULATION

Pulse modulation: Types - Sampling theorem - Generation and detection of Pulse Amplitude Modulation - Pulse Width Modulation - Pulse Position Modulation - Pulse Code Modulation, Differential Pulse Code Modulation - Delta modulation – quantizing noise - Companding.
Digital modulation techniques: ASK modulation and demodulation – FSK modulation and demodulation – PSK modulation and demodulation – only block diagram and operation.

UNIT – V: DIGITAL COMMUNICATION

Digital Communication: Fundamental block diagram - Basic elements of Digital communication system – Advantages and 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.

Data sets and interconnection requirements – Classification of modems – Modem Interfacing – serial interface standard – RS-232.

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. Networks lines and fields – John D.Ryder, PHI
4. Electronic communication Systems – Kennedy – TMH
5. Electronic Communication – Dennis Roddy and John colen – PHI
6. Transmission lines & Networks – Umesh sinha – Sathya prakashan publications
7. E-Books

ECC430 DIGITAL ELECTRONICS

Total No of Hours /week : 5
Total No of Weeks/Semester : 15
Total No of Hours / Semester : 75

SCHEME OF INSTRUCTION AND EXAMINATION

SUBJECT	INSTRUCTION		EXAMINATION		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
Digital Electronics	5	75	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(HRS)
1	Switching Algebra and Gates	13
2	Combinational Circuits	13
3	Sequential Circuits	13
4	Memory Devices	12
5	A/D and D/A converters	12
	Revision and test	12
Total		75

RATIONALE:

The subject of Digital Electronics holds applications in all branches of engineering. This subject will impart in depth knowledge of Number systems, Logics of Combinational & Sequential circuits and also about various & recent Memory devices and A/D and D/A converters.

OBJECTIVES:

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

- To understand various Number System.
- To understand basic Boolean postulates and laws.
- To understand the De-Morgan's theorem.
- To understand the concept of Karnaugh Map.
- To Learn about logic Gates.
- To Study about Boolean techniques.
- To learn the different digital logic families
- To learn arithmetic circuits-adder/subtractor, BCD adder.
- To understand the encoder/decoder & MUX / DEMUX
- To understand the concept of parity Generator, and checkers
- To understand various types of flip-flops.
- To understand various types of counters.
- To understand various modes of shift registers.
- To understand the concept of RAM & ROM and its types.
- To study A/D and D/A converters.

DETAILED SYLLABUS

UNIT I : SWITCHING ALGEBRA AND GATES:-

Switching algebra:Binary number representation – Straight binary – 1's complement – 2's complement – Addition and subtraction of binary numbers using 1's complement , and 2's complement method – Code conversion- Octal, Hexadecimal, Decimal, BCD – 8421 code- Gray code & Excess-3code – Boolean algebra – Basic laws – DeMorgan's theorems.
Logic gates: Positive and Negative logic – Symbolic representation and truth tables for logic gates – OR, AND, NAND, EX-OR, EX-NOR- Realization of gates using universal gates NAND and NOR – Simplification of logic functions using Karnaugh Map (simple problems).

UNIT II : COMBINATIONAL CIRCUITS

Adder-Half , Full and Four bit parallel adder – Implementing subtraction using four bit full adder – Serial adder – Digital comparator – Arithmetic Logic Unit – Parity checker and parity Generator – Decoder – Demultiplexer – Encoder – Multiplexer – Tri state logic circuits (74244,74245), Bi-directional data transfer.

UNIT III: SEQUENTIAL CIRCUITS

Basic sequential digital system - FLIP-FLOPS – RS-clocked RS flip-flop- JK, T, D, JK- MS Flip-flops – Latches.
Shift Registers: SIPO, SISO, PISO and PIPO.
Counters: Ring counter, Twisted Ring counter – Asynchronous counter : Ripple counter – Up/ Down Counter – Synchronous counter – Serial Carry and Parallel Carry.

UNIT IV :MEMORY DEVICES

Classification of memories, RAM organization - Read/write operations - Static RAM- Bipolar RAM cell - Dynamic RAM - SD RAM.
Read only memory: ROM organization - Expanding memory – PROM – EPROM - -EEPROM. Flash memory- Anti fuse technology.

UNIT V: A/D AND D/A CONVERTERS

Analog to Digital converters: Analog to digital converter – Basics of A/D conversion – Sampling –Sample and hold circuit – Quantization – Types of A/D converter –Block diagram of Flash, Successive approximation, Ramp, Dual Slope ADC – Specifications of ADC – Accuracy, Resolution, conversion time – Functional Block diagram of IC ADC 0808.
Digital to analog converter – Basics of D/A conversion –weighted Resistor D/A Converter – R-2R Ladder D/A Converter –Specifications of DAC-Accuracy, Resolution, Monotonocity, Settling time.

Text Book:

Sl.No	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Digital Logic and Computer Design	M.Morris Mano	Prentice Hall of India

Reference Books:

1. Digital principles & Applications – Albert Paul Malvino & Donald P.Leach – TMH.
2. Digital Electronics – William H.Gothmann – prentice Hall of India.
3. Modern Digital Electronics – R.P. Jain – TMH.
4. Roger L. Tokheim Macmillan – Digital Electronics – McGraw – Hill – 1994.

ECC440 LINEAR INTEGRATED CIRCUITS

Total No of Hours /week : 4
Total No of Weeks/Semester : 15
Total No of Hours / Semester : 60

SCHEME OF INSTRUCTION AND EXAMINATION

Subject	Instruction		Examination		
	Hours/ Weeks	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
Linear Integrated Circuits	4	60	25	75	100

TOPICS AND ALLOCATION

Unit	Topic	Time (Hrs)
Unit 1	Introduction to Operational Amplifiers	10
Unit 2	Op-amp Applications	10
Unit 3	Active Filters and AC Amplifiers	11
Unit 4	Special Function ICs	10
Unit 5	PLL and Applications	9
	Revision and Test	12
Total		60

Objectives:

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

- To discuss above ICs and their advantages
- To study basic op-amp and its characteristics
- To understand linear circuits using op-amp
- To teach linear applications of op-amp
- To study AC amplifiers

- To study active filters
- To introduce special function IC 555 timer
- To study about applications of IC 555
- To learn about fixed IC voltage regulators
- To discuss about general purpose regulator using IC
- To know about PLL & its applications

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO OPERATIONAL AMPLIFIERS

Integrated circuit - Classification of IC - Advantages of IC over discrete components –Types of IC Packages – Operational amplifier IC 741 – Schematic symbol for opamp – pin diagram of IC 741 –Block diagram of an opamp – Characteristics of an Ideal opamp - Simple Equivalent circuit of an opamp – virtual ground – opamp parameters – CMRR –Slew rate- Basic linear circuits- Inverting Amplifier - Non Inverting amplifier – Differential Amplifier – Sign changer – Scale changer

UNIT II: OPAMP APPLICATIONS AND WAVEFORM GENERATORS: (Qualitative treatment only)

Operational amplifier circuits: Summing amplifier - Multiplier – Divider – Voltage follower – Comparator – Zero crossing detector - Integrator – Differentiator – Voltage to current converter – Current to voltage converter – Instrumentation amplifier.
Waveform generators: Square wave - triangular wave - sine wave - Saw tooth wave generators.

UNIT III: FILTERS, AMPLIFIERS:

Active Filters: Concept of Active filters- Comparison with Passive Filters – Low Pass filter- High Pass Filter – First order, Second order- Band pass Filter- Band Reject Filter – Butterworth and Chebyshev Filter-Simple Design Problems on Low Pass, High Pass First order and Second order Filters.
AC Amplifiers: MIC- Preamplifiers - Audio Amplifier – Transformerless audio amplifiers- Amplifier to drive Speaker - IC tuned Amplifier.

UNIT IV: SPECIAL FUNCTION ICs:(qualitative treatment only)

IC 555 Timer– pin diagram of IC 555 – Functional Block diagram of IC555 – Applications – Astable multivibrator – monostable multivibrator – Schmitt trigger .
IC voltage regulators– linear fixed voltage regulator – Positive voltage regulator using IC 78xx - Negative voltage regulator using IC79xx - General purpose regulator using LM 723 - Pin diagram of LM723 - Low voltage and High voltage regulator using LM 723 - Variable Regulators – LM 317 - LM 2596.

UNIT V: PLL & APPLICATIONS (Qualitative treatment only)

Monolithic VCO 566 - Pin diagram –Basic Block diagram of VCO 566.
PLL : Basic principles of PLL – Basic Block schematic of PLL –Lock range – capture range - - Basic components of PLL – Phase detector, LPF –VCO- Monolithic PLL 565-Pin diagram - Functional Block diagram of PLL, IC 565, Applications of PLL – frequency translation – frequency multiplication -CMOS ICs - PLL CD4046.

Text Books:

1. Linear Integrated circuits – D.Roychoudhury&Shail.B. Jain – New age International Publishers – II Edition – 2004.
2. "Integrated circuits" – K.R. Botkar – KhannaPulbisher's – 1996

REFERENCE BOOKS:

1. Introduction to system design using IC "-B.S. Sonde – Wiley Eastern Limited – II Edition– 1992
2. "Operational Amplifiers and Linear Integrated circuits"- Ramakant .A Gayakwad – Prentice Hall – 2000.
3. Digital Integrated Electronics –Taub&Schlling – Mcgraw Hill – 1997
4. Operational amplifiers and Linear Integrated circuits by Robert F.Coughlin and Frederick F.Driscoll –PHI –publications –sixth Edition-2009.
5. Linear Integrated Circuits by Salivahanan&V.S.Kanchana Baskaran- TMH-2008

ECC450 INDUSTRIAL ELECTRONICS AND COMMUNICATION ENGINEERING PRACTICAL

TEACHING AND SCHEME OFEXAMINATION:

Number of Weeks/Semester : 15 weeks

Subject	**Instruction**		**Examination**			**Duration**
	Hrs/ Week	Hrs/ Semester	Assessment Mark			
			Internal	Board Exam	Total	
Industrial Electronics and Communication Engineering Practical	5	75	25	75	100	3 Hrs

ALLOCATION OF MARKS

CIRCUIT DIAGRAM	: 20
CONNECTION	: 20
EXECUTION & HANDLING OF EQUIPMENT	: 20
OUTPUT / RESULT	: 10
VIVA – VOCE	: 05
TOTAL	: 75

LIST OF EXPERIMENTS

Note: At least 5 experiments should be constructed using breadboard or by soldering.

INDUSTRIAL ELECTRONICS PRACITCAL

1. Phase control characteristics of SCR and testing a commutation circuit.

2. Construct a Lamp dimmer using TRIAC (in Bread Board Only)

3. Construct and test a MOSFET based PWM chopper circuit

4. Construct and test an IC based buck converter using PWM

5. Write and implement a simple ladder logic program using digital inputs and outputs for PLC

6. Write and implement a simple ladder logic program for interfacing a lift control with PLC.

7. Write and implement a simple ladder logic program for interfacing a conveyer control with PLC

8. Write and implement a simple ladder logic program using timer and counter with branching and subroutines with PLC.

COMMUNICATION ENGINEERING PRACTICAL

9. Construct and test the circuit of AM Modulation and Demodulation.

10. Construct and test the circuit of FM Modulation and Demodulation.

11. Construct & test Symmetrical t & Pi attenuators.

12. 4.Construct & test Constant K Passive Low Pass & High Pass Filter.

13. Construct & test PAM Generation circuit & Detection circuit.

14. Construct & test PCM Transmitter & Receiver circuit.

15. Construct & Test a three way cross over network.

MAJOR EQUIPMENT REQUIRED

S.NO	Name of the Equipment	Range	Required Nos
1.	Regulated Power supply	0-30v	5
2.	Dual trace CRO	-	2
3.	Signal generator	-	2
4.	PAM kit	-	1
5.	PCM kit	-	1
6.	PLC	-	2

ECC460 INTEGRATED CIRCUITS PRACTICAL

TEACHING AND SCHEME OFEXAMINATION:

Number of Weeks/Semester : 15 weeks

Subject	Instruction		Examination			Duration
	Hrs/ Week	Hrs/ Semester	Assessment Mark			
			Internal	Board Exam	Total	
Integrated Circuits Practical	5	75	25	75	100	3 Hrs

LIST OF EXPERIMENTS

Note: At least 5 experiments should be constructed using breadboard

1. Verification of truth table of OR, AND, NOT, NOR, NAND, EX-OR Gates and realize the logic circuit for a given Boolean expression.

2. Realization of basic gates using NAND & NOR gates.

3. Half adder, Full adder using IC's.

4. Half subtractor, full subtractor using IC's.

5. Construction and verification of truth table for Decoder/Encoder.

6. Multiplexer/De-multiplexer using multiplexer IC's.

7. Construction and verification of truth table for RS, D, T & JK flip-flop.

8. 4- bit ripple counter using FF

9. Construct a Single digit Decade Counter with 7 segment display.

10. Astable and monostable Multi vibrator using IC 555.

11. Construct and test the inverting and non inverting amplifier, voltage follower and summing amplifier.

12. Construct and test the circuit of integrator and differentiator.

13. Construct and test the voltage regulator circuit using 723, LM317 and fixed voltage regulator.

14. Construct and test the circuit of PLL.

15. Construct and test the circuit of R-2R DAC/ADC 0808.

ALLOCATION OF MARKS

CIRCUIT DIAGRAM	: 20
CONNECTION	: 25
EXECUTION & HANDLING OF EQUIPMENT	: 15
OUTPUT / RESULT	: 10
VIVA – VOCE	: 05
TOTAL	: 75

30001 LIFE AND EMPLOYABILITY SKILLS PRACTICAL

Course Name : All Branches of Diploma in Engineering

Subject Code : 30001

Semester : IV

TRAINING AND SCHEME OF EXAMINATION

No. of Weeks per Semester : 15 Weeks

Subject	Instructions		Examination			
Life and Employability Skills	Hours / Week	Hours / Semester	Marks			Duration
	4 Hrs.	60 Hrs.	Internal Assessment	Semester Examination	Total	
			25	75	100	3 Hrs

Topics and Allocation of Hours:

S.No.	SECTION `	No. of Hours
1	**Part A** Communication	30
2.	**Part B** Entrepreneurship, Project Preparation, Productivity, Occupational Safety, Health Hazard, Life Skills	20
3.	**Part C** Environment, Global Warming, Pollution, Communal Harmony	10
	TOTAL	60

RATIONALE

The present scenario unfolds a series of challenges that require a mastery of life skill. To confront with the challenges in the changing job environment and also to keep up with the rapid pace of modern life, life skills are to be honed and nurtured. Apart from the good understanding of the subject, the ability to communicate what one has in mind alone can take

a student to greater heights. In an attempt to develop the communication skill, thereby, making them employable, the syllabus has been devised and titled as "Life and Employability Skills". At the end of the course, the students become viable in the job market and with the aid of the life skill they have acquired they can maintain their poise and mental equilibrium even in a stressful work environment.

SPECIFIC INSTRUCTIONAL OBJECTIVES

TO

1. Emphasize and Enhance Speaking Skills

2. Increase Ability to Express Views & Opinions

3. Develop and Enhance Employability Skills

4. Induce Entrepreneurial skills

5. Accentuate Life Skills for Effective Managerial Ability

LIFE AND EMPLOYABILITY SKILLS PRACTICAL

SYLLABUS

Unit	Topics	Activity	Hours
I	**Communication, Vocabulary Enrichment, Listening, Training, Facing Interviews, Behavioural Skills**	_ "Wordsmithy" (Words within a word ,a vocabulary game) -- Visual Description -- FAQs in interviews self- introduction/another higher official in company – describe/explain product – frame questions based on patterns – make sentences based on patterns	**30**
II	**Entrepreneurship, Project Preparation**	-- prepare an outline of a project to obtain loan from bank in becoming an entrepreneur – prepare a résumé	**10**

III	**Productivity – comparison with developed countries, Effective Management, Occupational Accident &First Aid, Labour Welfare Acts & Rights**	-- search in the website -- prepare a presentation – discuss & interact	**05**
IV	**Interview Techniques, Effective Persuasive Communication, Non verbal Communication, Intercultural Communication, Business Etiquettes**	-- search in the website -- prepare a presentation – discuss & interact	**05**
V	**Environment, Global Warming, Pollution, Communal Harmony**	-- taking down notes / hints – answering questions -- filling the blanks with the exact words heard	**10**

LEARNING STRUCTURE **100 Marks**

-- Focus more on Speaking & Listening Skills

-- Attention less on Reading & Writing Skills

-- Apply the skills in fulfilling the Objectives on Focused Topics

a) Listening **25 Marks**

1. Deductive Reasoning Skills (taking down notes/hints) **10**
2. Cognitive Skills (answering questions) **10**
3. Retention Skills (filling in the blanks with the exact words heard) **05**

b) Speaking Extempore/ Prepared **30 Marks**

1. Expressive Skills (describe/explain things) **10**
2. Interview Skills&Behavioural skills(answering Questions in an interview) **05**
3. Assertive Skills (introducing oneself/others) **05**
4. Fluency/Compatibility Skills (dialogue) **05**
5. Leadership/Team Spirit Skills (group discussion) **05**

c) Writing & Reading **20 Marks**

1. Vocabulary Enrichment **05**
2.a. Creative & Reasoning Skills (frame questions on patterns) **03**
b. Creative & Composing Skills (make sentences on patterns) **02**
3. Attitude & Aim Skills (prepare a résumé) **05**
4. Entrepreneurship Skills (prepare an outline of a project) **05**

d) Continuous Assessment (Internal Marks) **25 Marks**
(search,read, write down, speak, listen, interact & discuss)
1. Cognitive Skills (Google search on focused topics)
2. Presentation Skills& Interactive Skills (after listening, discuss)
Note down and present in the Record Note on any 5 topics (Focussed Topics) **10 Marks**
Other activities recorded in the Record note(All the exercises in the syllabus under Listening, Speaking, Writing & Reading) **10 Marks**
Attendance **05 Marks**

INTERNAL MARKS **25 MARKS**
EXTERNAL MARKS AT THE END EXAMINATION **75 MARKS**

MODEL QUESTION

Time: 3 Hours **Maximum Marks: 75**

A. LISTENING **25 Marks**
1. Listen to the content and take down notes/hints 10
2. Listen to the content and answer the following questions. 10
3. Listen to the content and fill in the blanks with the exact words heard. 05

B. SPEAKING **30 Marks**
1. Describe the given picture/illustration in your own words 05
2. Imagine you are in an interview and answer the questions 05
3. Imagine, a consultant has come to your department. Introduce him to your subordinates. 05
4. Speak with your immediate boss about the progress you have made.(Dialogue) 05
5. Discuss within the group on the topic of focus in the syllabus. 10

C. WRITING & READING **20 Marks**

1. Find at least five different words (atleast 4 letters long) within the word ENTERTAINMENT. 05

2.a. Frame THREE new questions from the given pattern by changing sets of words with your own.03

a.	When	do	you	return?
b.	How	is	his performance?	
c.	Where	has	the manager	gone?

b. Make TWO sentences from the given pattern by changing sets of words with your own. 02

a.	The workers	are	on strike		
b.	The labourers	are paid	well	in this factory.	

3. Imagine you are Selvan S.Mohan of Chennai. Prepare a résuméfor the post of Department Manager. 05

4. Prepare an outline of a project to obtain a loan. (Provide headings and subheadings) 05

I. Guidelines for setting the question paper:

A. LISTENING : ONLY TOPICS related to

POLLUTION /ENVIRONMENT /
GLOBAL WARMING / COMMUNAL HARMONY are to be taken.
These topics are common for all the three types of evaluation.

For 1.& 2. A passage of a minimum of 100 words may be chosen
3. A passage of a minimum of 50 words may be given

B. SPEAKING :

1. A VISUAL / an ILLUSTRATION from the Daily / Magazine can be given.

2. Frequently asked questions in the interviews may be put forth to the

students .

3. Questions such as “Introduce yourself as an engineer with designation” or

“Introduce the official visiting your company/department” may be asked.

4. Dialogue must be with someone in the place of work.
5. Group of six/eight

Discuss the focused topic prescribed in syllabus

C. WRITING & READING:

1. Wordsmithy -Words within a word- a vocabulary game
   a. Words should be atleast 4 letters long
   b. Proper nouns do not count
   c. Letters cannot be duplicated.

2. a. & b. Provide five (Questions under section A and Statements under section B).different structures. Students are to substitute and make at least 3 questions from a) and two from b) with some other word/words.
3. Provide some post related to industries.
4. Outline of the project (skeleton/structure)

Only the various headings and subheadings are to be provided. Content is not needed

II. Guidelines for recording the material on the Focused Topics in the Record note

Write in the record note, **on any five topics**, from the list of topics given below. **10 Marks (**5 topics x 10 marks = 50 marks. Thus, the **Average of 5 topics is 10 Marks)**

1. Interview Techniques
2. Effective Persuasive Communication.
3. Non verbal Communication.
4. Intercultural Communication.
5. Business Etiquettes.
6. Entrepreneurship
7. Effective Management
8. Productivity in Industries – Comparison with developed countries

9. Occupational Accident and First Aid
10. Labour Welfare Acts and Rights

LABORATORY REQUIREMENT:

1. An echo-free room
2. Necessary furniture and comfortable chairs
3. A minimum of two Computers with internet access
4.A minimum of two different English dailies
5. A minimum of Three Mikes with and without cords
6. Colour Television (minimum size – 29")
7. DVD/VCD Player with Home Theatre speakers
8. Smart board
9. Projector

Suggested Reading:

1. Production and Operations Management by S.N. Chary, TMH
2. Essentials of Management by Koontz &Weihrich, TMH
3. Modern Production / Operations Management by E.S. Buffa and R.K. Sarin, John Wiley & Sons
4. Production Systems: Planning, Analysis and Control by J.L.Riggs, 3rd ed., Wiley.
5. Productions and Operations Management by A.Muhlemann, J.Oakland and K.Lockyer, Macmillan
6. Operations Research - An Introduction by H.A.Taha, Prentice Hall of India
7. Operations Research by J.K.Sharma, Macmillan
8. Business Correspondence & Report Writing by R.C. Sharma and K.Mohan, TMH
9. How to prepare for Group Discussion & Interview (With Audio Cassette) by Prasad, TMH
10. Spoken English – A self-learning guide to conversation practice (with Cassette)
11. Introduction to Environmental Engineering by Mackenzie, L. Davis and A. David, Cornwell, McgrawHill, 3rd Ed.
12. Environmental Engineering by Peary, Rowe and Tchobanoglous, McgrawHill
13. Total Quality Management – An Introductory Text by Paul James, Prentice Hall
14. Quality Control and Applications by Housen&Ghose
15. Industrial Engineering Management by O.P. Khanna
16. Influence:The Psychology of persuasion by Robert B. Cialdini, Collins.
17. Non verbal communication by Albert Mehrabian, Routledge,2007.
18. Indian Business Etiquette by Raghu palat, JAICO, 2008.
19. Intercultural Communication :The Indian Context by Ramesh N Rao & Avinash Thombre,SAGE India, 2015.

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V SEMESTER

ECC510 - ADVANCED COMMUNICATION SYSTEMS

Total No of Hours /week : 6
Total No of Weeks/Semester : 15
Total No of Hours / Semester : 90

TEACHING AND SCHEME OF EXAMINATION:

subject	**Instruction**		**Examination**		
Advanced Communication Systems	**Hours/ Week**	**Hours/ Semester**	**Assessment Mark**		
			Internal	**Board Exam**	**Total**
	6	90	25	75	100

TOPICS AND ALLOCATION

Unit	Topic	Time (Hrs)
I	Audio Systems	16
II	Video Systems	15
III	Radar and Navigational Aids	16
IV	Satellite Communication	17
V	Optical Communication	16
	Revision, Test	10
Total		90

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

- Learn Different types of Microphones
- Learn Different types of Loudspeakers
- Understand the different methods of Audio Recording & Reproduction
- Understand the principles of Monochrome & colour TV Related Topics
- To study RADAR & Navigational Aids
- To Study satellite system, orbits, Antennas
- To study about satellite services
- To understand fundamentals of Microwave communication
- 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

DETAILED SYLLABUS

UNIT I : AUDIO SYSTEMS

Microphones: Definition-Construction and performance of the following microphones-Carbon – Condenser – Piezoelectric - Moving Coil and Velocity Ribbon.
Loud speakers: Definition-Constructional details of dynamic cone type - Horn type and electro-static loud speakers – woofer - midrange and tweeter - cross-over network. Surround-sound systems.
Audio recording and reproduction: Compact disc system- MP3 system - DVD system - stereophonic system - Hi-Fi system principles-DTS.

UNIT 2 : VIDEO SYSTEMS

Monochrome Television: Scanning principles -synchronization - aspect ratio- composite video signal- TV broadcasting standards. TV transmitter- TV receiver.
Color TV : Principles of color transmission and reception color CCD camera, LCD, LED display unit – plasma display - Principles of Handy cam, CCTV and cable TV.

UNIT 3 :RADAR AND NAVIGATIONAL AIDS:

Basic Radar System– Applications – Radar Range Equation (Qualitative Treatment Only) – Factors Influencing Maximum Range – Basic Pulsed Radar System – Block Diagram – Display Methods- A - Scope, PPI Display - Instrument Landing System – Ground Controlled Approach System.
Telephony and Fax: Telephone System–Public Switched Telephone Network (PSTN) - Electronic Switching System – Block Diagram – ISDN – Architecture, Features - Video Phone – Block Diagram.
Facsimile Communication System: Facsimile Sender-Cylindrical Scanning – Facsimile Receiver- Synchronization – Phasing - Index Of Cooperation (IOC) – Direct Recording.

UNIT 4: SATELLITE COMMUNICATION:

Satellite system: Kepler's I,II,II laws – orbits – launching orbits – types - Geostationary synchronous satellites - Advantages – Apogee – Perigee - Active and passive satellite - Earth eclipse of satellite.
Antenna: Parabolic reflector antenna – cassegrain antenna. Space segment: Power supply-Attitude control- station keeping – Transponders – TT and C subsystem – Antenna subsystem.
Earth segment**:** Block diagram of Transmit receive earth station - Satellite mobile services - Basics of GPS.
Microwave Communication: Microwave frequency ranges - Microwave devices – Parametric amplifiers –Travelling wave tubes – simple block diagram of microwave transmitter, receiver and microwave link repeater

UNIT 5 : OPTICAL COMMUNICATION:

Optical Communication System – Block Diagram – Advantages Of Optical Fiber Communication Systems – Principles Of Light Transmission in A Fiber Using Ray Theory – Single Mode Fibers - Multimode Fibers – Step Index Fibers - Graded Index Fibers (Basic Concepts Only) – Attenuation In Optical Fibers – Absorption Losses, Scattering Losses-Bending Losses - Core And Cladding Losses Optical Sources – LED – Semiconductor LASER – Principles – Optical Detectors – PIN And APD Diodes - Connectors - Splices – Couplers – Optical Transmitter – Block Diagram – Optical Receiver – Block Diagram - Application Of Optical Fibers – Networking - Industry And Military Applications.

Reference Books

1. Audio and Video system – Principles, maintenance and Troubleshooting by R.Gupta

   Second Edition McGraw Hill Education (P) Ltd.

2. 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.

3G Communication:

1. 3G Wireless with 802.16 and 802.11: WiMAX and WiFi (McGraw-Hill Professional Engineering) Clint Smith, John Meyer
2. WiMAX Handbook: Building 802.16 Networks (McGraw Hill) by Frank Ohrtman
3. WiMAX in 50 Pages by Frank Ohrtman
4. Fundamentals of WiMAX: Understanding Broadband Wireless Networking (Prentice Hall) Jeffrey G. Andrews, Arunabha Ghosh, Rias Muhamed
5. CCTV Surveillance, Second Edition: Video Practices and Technology - **Herman Kruegle**
6. Guide to Networking for Physical Security Systems (Paperback) David Engebretson
7. Telemedicine Society of India http://www.tsi.org.in/
8. RFID Essentials (Theory in Practice) – (O'Reilly Media) By **Bill Glover**, Himanshu Bhatt
9. RFID For Dummies (Wiley Publishing) **Patrick J. Sweeney II**

ECC520 MICROCONTROLLER

Total No of Hours /week : 6
Total No of Weeks/Semester : 15
Total No of Hours / Semester : 90

TEACHING AND SCHEME OFEXAMINATION

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
MICROCONTROLLER	6	90	25	75	100

TOPICS AND ALLOCATION

Unit	Topic	Time (Hrs)
1	Architecture and Instruction set of 8051	19
2	Programming Examples	13
3	I/o and Timer	15
4	Interrupt and serial communication	16
5	Interfacing Techniques	19
	Revision and Test	8
Total		90

RATIONALE:

The exponential growth of Engineering and Technology has benefited the Man kind with extreme sophistication and comfort. To sustain this development, continuous research and development should take place not only in Engineering and Technology but also in Basic Science such as Physics.

The various divisions of Physics like Optics, Acoustics, Dynamics, Semiconductor Physics, Surface Physics, Nuclear Physics, Energy Studies, Materials Science, etc provide the Foundation by enlightening the Fundamental facts, Principles, Laws and Correct sequence of events to develop the Engineering and Technology field for the prosperity of human beings.

OBJECTIVES:

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

- 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 various application of 8051 Microcontroller

DETAILED SYLLABUS

UNIT I: ARCHITECTURE & INSTRUCTION SET OF 8051

Architecture of 8051:Comparison of Microprocessor and Microcontroller – Block diagram of Microcontroller –Functions of each block - Pin details of 8051 – ALU –ROM– RAM – Memory Organization of 8051 - Special function registers –Program Counter – PSW register – Stack - I/O Ports – Timer – Interrupt – Serial Port – Oscillator and Clock - Clock Cycle – State – Machine Cycle –Instruction cycle – Reset – Power on Reset – Overview of 8051 family

Instruction Set of 8051: Instruction set of 8051 – Classification of 8051 Instructions – Data transfer instructions – Arithmetic Instructions – Logical instructions –Branching instructions – Bit Manipulation Instructions.

UNIT II: PROGRAMMING EXAMPLES:

Assembler and Addressing Modes: Assembling and running an 8051 program –Structure of Assembly Language –Assembler directives - Different addressing modes of 8051

Programs: Multibyte Addition – 8 Bit Multiplication and Division – Biggest Number / Smallest Number – Ascending order / Descending order BCD to ASCII Conversion – ASCII to Binary Conversion – Odd Parity Generator – Even Parity Generator -Time delay routines

UNIT III: I/O AND TIMER:

I/O:Bit addresses for I/O and RAM – I/O programming – I/O bit manipulation programming.

Timer:Programming 8051 Timers – Timer 0 and Timer 1 registers – Different modes of Timer – Mode 0 Programming – Mode 1 Programming - Mode 2Programming - Counter programming – Different modes of Counter – Mode 0 Programming – Mode 1 Programming - Mode 2 Programming (simple programs**)**

UNIT IV: INTERRUPT AND SERIAL COMMUNICATION

Serial Communication: Basics of Serial programming – RS 232 Standards – 8051 connection to RS 232 – 8051 Serial Communication Programming – Programming 8051 to transmit data serially - Programming 8051 to Receive data serially.

Interrupt:8051 Interrupts – Programming Timer Interrupts – Programming external hardware interrupts – Programming the serial communication interrupt –Interrupt priority in 8051 (simple programs).

UNIT V: INTERFACING TECHNIQUES

Embedded C programs for Relays – Sensor interfacing – ADC interfacing – DAC interfacing - Keyboard interfacing – Seven segment LED Display Interfacing - Stepper Motor interfacing – DC motor interfacing using PWM- traffic Light- Temperature Control.

TEXT BOOKS:

1. Microcontrollers, Principles and Applications – Ajit pal – PHI Ltd., -2011.

REFERENCE BOOKS:

- 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi,Mazidi and D.MacKinlay, 2006 Pearson Education Low Price Edition.
- Microprocessor and Microcontroller by R.Theagarajan, Sci TechPublication,

ECC530 VERY LARGE SCALE INTEGRATION

Total No of Hours /week : 5
Total No of Weeks/Semester : 15
Total No of Hours / Semester : 75

TEACHING AND SCHEME OF EXAMINATION

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

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
I	Combinational Circuit Design	14
II	VHDL For Combinational Circuit	14
III	Sequential Circuit Design	14
IV	VHDL For Sequential Circuit	14
V	FPGA and CPLD	14
	Revision Test	10
Total		80

OBJECTIVES:

On successful completion of the course the students must be able to:

- Understand device level implementation of digital gates.
- Understand the combinational circuit design and optimizing of the gate
- Design a combinational circuit for any custom made application
- Explain the building blocks for the combinational circuit
- Understand the VHDL code and circuit design process.
- Develop a VHDL code for any combinational circuit
- Answer the VHDL primitives and the importance of VHDL code in a digital circuit
- Design a digital circuit with Multiplexers and Encoders
- Understand the functionality of various flip-flops through its excitation table.
- Design of a sequential circuit for any custom made application
- Explain the style of Moore and Mealy type machines
- Understand to implement VHDL code for various flip-flops
- Design of sequential circuit and implementation with VHDL code
- Understand the CPLD and FPGA hardware.
- Describe what are Semi custom and Full custom ICs

DETAILED SYLLABUS

UNIT I: COMBINATIONAL CIRCUIT DESIGN:

NMOS and CMOS logic implementation of Switch- NOT, AND, OR, NAND, and NOR Gates CMOS Transmission Gate - Digital logic variable - functions – inversion - gate/circuits - Boolean algebra and circuit synthesis using gates (Up to 4 variables).
Combinational Circuit Building Blocks: Circuit synthesis using Multiplexer- Demultiplexer- Encoders and Decoders - Arithmetic adder - Subtractor - Comparator circuit - Hazards and Races.

UNIT II: VHDL FOR COMBINATIONAL CIRCUIT

Introduction to HDL and different level of abstractions - Introduction to VLSI and its design process.
VHDL: Design Entry – Synthesis – Simulation - VHDL Statements and Assignments.
VHDL code for AND, OR, NAND, NOR gates - Implementation of Multiplexer - Demultiplexer –Encoder – decoder - Four bit Arithmetic adder and Subtractor - comparator in VHDL.

UNIT III: SEQUENTIAL CIRCUIT DESIGN

Introduction/Refreshing to Flip-flops and its excitation table, counters and Shift registers.
Design Steps: State diagram - State table - state assignment. Example for Moore and Mealy machines - Design of modulo counter (upto 3 bit) with only D flip-flops through state diagram.

UNIT IV: VHDL FOR SEQUENTIAL CIRCUIT

VHDL constructs for storage elements - VHDL code for D Latch / D, JK and T Flip-flops with or without reset input.
VHDL Examples: Counters- Synchronous counters-2 bit &3 bit up counter - 3 bit up/down counter Decade counter - Johnson Counter.

UNIT V: FPGA and CPLD

Architectural Overview of FPGA and CPLD - Comparison of FPGA with CPLD - Input output Blocks - Configurable Logic Block (CLB) and Slice Resources - JTAG Standard in Details.

TEXT BOOK:

1. “Digital Design” M.Morris Mano Michael D Ciletti Pearson Education 2008
2. “Fundamentals of Digital Logic with VHDL design” Stephen brown and Vranesic 2nd Edition McGrawHill,2008
3. “VHDL Primer” Bhasker J Prentice Hall India -2009

REFERENCES:

1. “Digital Electronics with PLD Integration” Nigel P. Cook, Prentice Hall, 2000
2. “Programmable Logic Handbook: PLD, CPLD, and FPGA” Ashok K.Sharma, Mcgraw-Hill, 1998
3. “Digital Logic Simulation and CPLD Programming with VHDL” Steve Waterman Prentice Hall, 2002.

ELECTIVE I - ECC541 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 Measurements	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 And Special Instruments	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 methods 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

Elementary ideas of cell structure, heart and circulatory system, control nervous system, Musclo-skeletal system, Respiratory system Body temperature and reproduction system. 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 pacemakers –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 – He mo 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 inpatient 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. Safety aspects in electro surgical units – burns, high frequency current hazards, Explosion hazards. Telemedicine – Introduction – working – applications

UNIT V: MODERN IMAGING TECHNIQUES and TELEMEDICINES:

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 cardiography – Angiography –CT scanner - Magnetic resonance imaging techniques. Applied Telemedicine– Fixed Telemedicine - Mobile Telemedicine – Equipments & its interfaces – Connectivity – Types (Real time / Store & Forward) – Barriers of Telemedicine – Possibilities of Telemedicine.

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 Webster – Medicine and Clinical Engineering.
5. R. S. Khandpur – Handbook of Bio – Medical Instrumentation.
6. Dr. Arumugam – Bio Medical Equipments
7. E-Books.

ELECTIVE I - ECC542 DIGITAL COMMUNICATION

Total No. of Hours / Week : 5
Total No. of Weeks/Semester : 15
Total No. of Hours/Semester : 75

SCHEME OF INSTRUCTION AND EXAMINATION

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

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
UNIT - I	Basics of digital communication	13
UNIT - II	Formatting and Base Band Modulation	13
UNIT - III	Baseband Coding Techniques	13
UNIT - IV	Digital Modulation Techniques	12
UNIT - V	Spread Spectrum Techniques	12
	Revision Test	12
Total		75

RATIONALE:

Today, the growth of any industry depends upon electronics and communication. There is the need for digital techniques in each and every field. The reason behind the introduction of this subject is to impart technical excel hence in the field of digital communication by analyzing the various digital transmission methods, error control methods and understanding about the multiple access communication.

OBJECTIVES :

- To know the Basics of Digital Communication
- To study about the various types of signals
- To study about the data transmission
- To understand the Baseband system and sampling
- To learn about PCM waveform types
- To study about M-ary pulse modulation
- To learn about rationale for coding
- To learn about types of coding methods

- To study about various error control codes
- To know the Digital modulation techniques
- To learn about TDM frame structure
- To study about coherent detection of PSK, FSK
- To understand the Spread spectrum communication
- To study the Jamming consideration
- To study about CDMA Digital cellular system

DETAILED SYLLABUS

UNIT – I: BASICS OF DIGITAL COMMUNICATION

Digital communication signal processing – Typical Block diagram and transformations - Advantages over analog communication – Channels for Digital communication- Telephone, Optical fiber, Satellite. Classification of signals- deterministic and random signals - periodic and non-periodic signals – analog and discrete signals - energy and power signals - unit impulse function. Information capacity (Definition only) – Shannon's limit for information capacity (Definition only) - Data transmission - Serial and parallel transmission - Synchronous and asynchronous transmission.

UNIT – II: FORMATTING AND BASE BAND MODULATION

Base band system - The Sampling Theorem –impulse sampling- natural sampling- sample and hold operation - Spectra- Nyquist Theorem – Aliasing – signal interface for a digital system – sampling and quantizing effects- Quantization noise – channel effects – channel noise – PCM - Uniform and Non-uniform Quantization,

Baseband transmission

PCM waveform types- non return-to-zero(NRZ)- return-to-zero (RZ)- phase encoded – multilevel binary – spectral attributes of PCM waveforms – Bits per PCM word and Bits per symbol- PCM word size - M-ary pulse modulation waveforms.

UNIT – III: BASEBAND CODING TECHNIQUES

Rationale for coding – Types of codes – Discrete memory less channel – Error control coding methods – forward error correction – error detection with retransmission – types of errors – random error and burst error – Principles of linear block codes – Hamming code – Binary cyclic codes – Cyclic redundancy check code (CRC) – Convolution code.

UNIT – IV: DIGITAL MODULATION TECHNIQUES

Digital modulation techniques – Listing of various types – Coherent binary modulation techniques – Coherent quadrature modulation techniques – Non Coherent binary modulation techniques - Minimum shift keying (MSK) - Block diagram of MSK transmitter and receiver - TDM-Frame structure, ASCII framing- E1 Framing, T1 Framing for telephone.

Detection of signals – coherent detection of PSK – sampled matched filter –coherent detection of FSK – Non-coherent detection - Binary differential PSK.

UNIT – V: SPREAD SPECTRUM TECHNIQUES

Spread spectrum communication - Beneficial attributes of spread spectrum systems – Pseudo noise sequences – Randomness properties – Balance property, Run property and Correlation property - Direct sequence spread spectrum systems – Processing gain and performance – Frequency hopping systems – Frequency hopping with diversity – fast hopping versus slow hopping – Synchronization – Jamming consideration – Commercial application – CDMA Digital cellular system.

REFERENCE BOOKS:

1. Digital communications Fundamentals & Applications -Bernard Sklar & Pabitra Kumar Ray Pearson -Second edition – 2009.
2. Digital Communications- Simon Haykin, John Wiley India edition – 2006.
3. Digital communication- Dr. J.S.Chitode Technical Publications – Pune Second Edition,2011
4. Digital and analog communication system - B.P.Lathi .Zhi Ding International 4th Edition -OXFORD university press.
5. Digital Communication- P.Ramakrishna Rao –TMH 2011
6. Principles of Communications system- Taub &Schilling TMH Third edition,2008
7. Digital communications-John G.Prokais, 2011.
8. Digital communications- Dr.K.N.Hari Bhat, Dr.D.Ganesh Rao ,Sanguine Technical Publisher,2005

ELECTIVE I – ECC543 ELECTRONIC SYSTEM DESIGN

Total No. Of Hrs. / Week : 5
Total No. of Weeks / Semester :15
Total No. of Hrs. / Semester : 75

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
Robotics and Auto Electronics	5	75	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
UNIT – I	Power supplies	13
UNIT – II	Amplifier, Voltage to current and current to voltage converter	13
UNIT – III	ADC, DAC, Instrumentation amplifier and transducer	13
UNIT - IV	Signal generators	12
UNIT – V	Microcontroller based application	12
	Revision Test	12
Total		75

RATIONALE:
The rationale behind introducing this subject is to make the students understand the structure, working and all other relevant aspects of electronic systems which has become an integral part of Electronic media which is growing at an exponentially high rate all around the world.

OBJECTIVES:

- To understand to design of DC regulated power supply of various voltages with different protection circuits.
- To understand the design of different types of amplifiers for various application.
- To understand the use of various transducers and make use them.
- To design various systems using the analog data collected from transducers
- To understand the use of microcontrollers for various application

DETAILED SYLLABUS

UNIT - I DESIGN OF POWER SUPPLY

DC power supply with filters - Regulators and their types – Protection circuits - Multi output and variable power supply design - Rectifiers – types - half wave, full wave.

UNIT - II DESIGN OF SMALL SIGNAL AMPLIFIERS

CB,CE configuration - Emitter follower - Darlington pair amplifiers with and without – Bootstrapping - Two stage direct coupled amplifiers -Design of audio power amplifier with drivers - Design of simple PA system - Voltage to current converter, current to voltage converter.

UNIT - III DATA ACQUISITION SYSTEM

Analog to digital converter (ADC) - Digital to analog converter (DAC) - Design of Instrumentation amplifier with the bridge type – transducer - Temperature measurement - Design of Electronic voltmeter and ammeter- Design of – multimeter - Display system.

UNIT - IV DESIGN OF FUNCTION GENERATORS

Design of AM signal using multiplier IC - AM signal demodulation using envelope detector - Design of FM signal using VCO (using IC NE566) - FM signal demodulation using phase discriminator and ratio detector

UNIT - V HIGH VOLTAGE/HIGH CURRENT DRIVER

Circuit for Relay and motor control applications - Microcontroller based closed loop system - Security systems, Scrolling display – Microcontroller based stepper motor - Microcontroller based temperature sensor and relay

Reference Books:

1.A Monograph on Electronics Design Principles- N.C.Goyel, R.K.Khetan - Khanna Publishers –Second Edition.
2.Electronic devices and circuits - Allen Mottershead - Prentice hall of india pvt limited, 19th edition, 1997
3. The art of electronics - Paul Horowitz Cambridge University-2nd edition Press -2003
4. Electronic principles and applications - Charles.A.Schuler - Mc graw hill international edition, 3rd edition, 1989
5. 8051 Micro controllers - Mazidi and D.Mackinlay -Pearson education , low price edition, 2006

ECC550 ADVANCED COMMUNICATION SYSTEMS PRACTICAL

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

Subject	Instruction		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal	Examination	Total	
Advanced Communication systems Practical	4	60	25	75	100	3 Hrs.

ALLOCATION OF MARKS

CIRCUIT DIAGRAM/BLOCK DIAGRAM:	20
CONNECTION :	25
EXECUTION & HANDLING OF EQUIPMENT :	15
OUTPUT / RESULT :	10
VIVA – VOCE :	05
TOTAL :	75

LIST OF EXPERIMENTS

1. Construct the circuit to determine the output of a TDM signal. .
2. Construct and test a fiber optic analog link.
3. Construct and test a fiber optic digital link.
4. Construct a suitable circuit & find the bending loss and propagation loss in fiber optics.
5. Construct and test the performance of Manchester encoder and decoder.
6. Construct and measure the Numerical aperture of optical fiber.
7. Construct and test a voice link (with telephone handset both at transmitter and receiver using optical fiber)
8. Install a DTH system & test it.
9. Construct a LED circuit to find the photo diode characteristics.
10. Construct and test the characteristics of Klystron.
11. Study the characteristics of Gunn Diode.

12. Determine the Frequency and wavelength of rectangular waveguide.

13. Determine the Standing wave ratio.

14. Measure the polar pattern and gain of a waveguide horn antenna.

EQUIPMENTS REQUIRED

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

ECC560 MICROCONTROLLER PRACTICAL

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

Subject	Instruction		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal	Examination	Total	
Microcontroller practical	4	60	25	75	100	3 Hrs.

ALLOCATION OF MARKS

ALGORITHM/FLOW CHART	20
PROGRAM	25
EXECUTION	15
RESULT	10
VIVA – VOCE :	05
TOTAL :	75

LIST OF EXPERIMENTS

Part-A

1. Write an Assembly Language Program for Multi-byte Addition and execute the same in the 8051 Kit.

2. Write an Assembly Language Program for Multiplication and Division of two numbers and execute the same in the 8051 Kit.

3. Write an Assembly Language Program for Arranging the given data in Ascending order and execute the same in the 8051 Kit.

4. Write an Assembly Language Program for ASCII to Binary and execute the same in the 8051 Kit.
5. Write an Assembly Language Program for Parity bit generation and execute the same in the 8051 Kit.

6 Write an Assembly Language Program for using timer / Counter and execute the same in the 8051 Kit.

Part – B INTERFACING WITH APPLICATION BOARDS

7. Write an Embedded C Program for interfacing Digital I/O board and test it.

8. Write an Embedded C Program for interfacing Matrix keyboard and test it.

9. Write an Embedded C Program for interfacing seven segment LED displays and test it.

10. Write an Embedded C Program for interfacing Traffic light control and test it.

11. Write an Embedded C Program for interfacing 8 bit ADC and test it.

12. Write an Embedded C Program for interfacing 8 bit DAC and test it.

13. Write an Embedded C Program for interfacing STEPPER MOTOR and test it.

14. Write an Embedded C Program for interfacing DC motor and test it.

15. Write an Embedded C Program for Sending data through serial port between controller kits and test it.

EQUIPMENTS REQUIRED

S.No	**Name of the Equipments**	**Required Nos**
1.	8051 Microcontroller Kit	14 Nos
2.	Digital I/O Interface Board	02 Nos
3.	Matrix keyboard Interface Board	02 Nos
4.	Seven segment LED display Interface Board	02 Nos
5.	Traffic light Interface Board	02 Nos
6.	8 bit ADC Interface Board	02 Nos
7.	8 bit DAC Interface Board	02 Nos
8.	STEPPER MOTOR CONTROL Interface Board	02 Nos
9.	DC motor control Interface Board	02 Nos
10.	RS232 serial port cable	02 Nos

ECC570 VLSI PRACTICAL

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

Subject	Instruction		Examination			
VLSI Practical	Hours / Week	Hours / Semester	Marks			Duration
			Internal	Examination	Total	
	4	60	25	75	100	3 Hrs.

ALLOCATION OF MARKS

INTERFACE CIRCUIT DIAGRAM	10
ALGORITHM/FLOW CHART	20
PROGRAM	20
EXECUTION	10
RESULT	10
VIVA – VOCE :	05
TOTAL :	75

RATIONALE:

VHDL is a versatile and powerful hardware description language which is useful for modeling digital systems at various levels of design abstraction. This language is for describing the structural, physical and behavioral characteristics of digital systems. Execution of a VHDL program results in a simulation of the digital system allows us to validate the design prior to fabrication of Digital Integrated circuit. This practical introduces basic on VHDL concepts and constructs. It introduces the VHDL from simulation cycle to synthesis level in combinational and sequential circuits.

GUIDELINES:

All the experiments given in the list of experiments should be completed and given for the end semester practical examination. In order to develop best skills in handling Instruments/Equipment and taking readings in the practical classes, every three students should be provided with a separate experimental setup for doing experiments in the laboratory. The external examiners are requested to ensure that a single experimental

question should not be given to more than three students while admitting a batch of 30 students during Board Examinations. All the experiments given in the list of experiments should be completed and given for the end semester practical examination.

LIST OF EXPERIMENTS

1. SIMULATION OF VHDL CODE FOR COMBINATIONAL CIRCUIT
Optimize a 4 variable combinational function (SOP or POS), describe it in VHDL code and simulate it. Example: F= (0,5,8,9,12) in sop or pos

2. SIMULATION OF VHDL CODE FOR ARITHMETIC CIRCUITS
Design and Develop the circuit for the following arithmetic function in VHDL Codes and Simulate it. Addition, Subtraction Multiplication (4 x 4 bits)

3. SIMULATION OF VHDL CODE FOR MULTIPLEXER
Design and develop a 2 bit multiplexer and portmap the same for developing upto 8 bit multiplexer.

4. SIMULATION OF VHDL CODE FOR DEMULTIPLEXER
Design and develop an 8 output demultiplexer. Simulate the same code in the software

5. VHDL IMPLEMENTATION OF MULTIPLEXER
Describe the code for a multiplexer and implement it in FPGA kit in which switches are connected for select input and for data inputs a LED is connected to the output.

6. VHDL IMPLEMENTATION OF DEMULTIPLEXER
Switches are connected for select inputs and a data input, Eight LEDs are connected to the output of the circuit.

7. VHDL IMPLEMENTATION OF 7 SEGMENT DECODER
Develop Boolean expression for 4 input variables and 7 output variables. Design and develop a seven segment decoder in VHDL for 7 equations. A seven segment display is connected to the output of the circuit. Four switches are connected to the input. The 4 bit input is decoded to 7 segment equivalent.

8. VHDL IMPLEMENTATION OF 7 SEGMENT DECODER BY LUT
Develop a 7 segment decoder using Look up table. Describe the seven segment decoder in VHDL using developed Look up table. A seven segment display is connected to the output of the circuit. Four switches are connected to the input. The 4 bit input is decoded into 7 segment equivalent.

9. VHDL IMPLEMENTATION OF ENCODER
Design and develop HDL code for decimal (Octal) to BCD encoder. There will be10 input switches (or 8 switches) and 4 LEDs in the FPGA kit. The input given from switches and it is noted that any one of the switch is active. The binary equivalent for the corresponding input switch will be glowing in the LED as output.

10. SIMULATION OF VHDL CODE FOR DELAY
Develop a VHDL code for making a delayed output for 1second or 2 seconds by assuming clock frequency provided in the FPGA Kit.

11. VHDL IMPLEMENTATION FOR BLINKING A LED
Develop a VHDL Code for delay and verify by simulating it. This delay output is connected to LED. Delay is adjusted such away LED blinks for every 1 or 2 seconds.

12. SIMULATE A VHDL TEST BENCH CODE FOR TESTING A GATE

Develop a VHDL test bench code for testing any one of the simple gate. Simulate the test bench code in the HDL software.

13. VHDL IMPLEMENTATION FOR BLINKING A ARRAY OF LEDS

Design and develop a VHDL Code for 4 bit binary up counter. Four LEDs are connected at the output of the counter. The counter should up for every one seconds.

14. VHDL IMPLEMENTATION OF A SPELLER WITH AN ARRAY OF LEDS

Design and develop VHDL Code for a 5 bit Johnson ring counter 4 bit The LEDs are connected at the output of the counter. The speller should work for every one seconds.

15. VHDL IMPLEMENTATION OF 7 SEGMENT DISPLAY

Design and develop a seven segment decoder in VHDL. Design and develop a 4 bit BCD counter, the output of the counter is given to seven segment decoder. A seven segment display is connected to the output of the decoder. The display shows 0,1, 2.. 9 for every one second.

LIST OF EQUIPMENTS:

1. FPGA KIT with atleast 10 switches for input, 8 LEDs for output, a 7 segment display, debounced push switch (2 Nos) for manual clock input and external clock source – 10Nos .

NOTE:

1. Gate level or behavioral level or structural model can be used for all experiments.
2. Manual for the FPGA Kit and interface kit can be given to students for the final exam.

VI SEMESTER

ECC610 - COMPUTER HARDWARE AND NETWORKING

Total No. Of Hrs. / Week : 5
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 75

TEACHING AND SCHEME OF EXAMINATION

Subject	Instruction		Examination		
			Assessment Marks		
	Hours/ Week	Hours/ Semester	Internal	Board Exam	Total
Computer Hardware and Networking	5	75	25	75	100

TOPICS AND ALLOCATION

Unit	Topic	Time (Hrs)
1	Motherboard Components And Memory Storage Devices	16
2	I/O Devices And Interface	16
3	Maintenance And Trouble Shooting Of Desktop And Laptops	16
4	Computer Network Devices And OSI Layers	16
5	802.X And TCP/IP Protocols	16
	Revision And Test	10
Total		**90**

Rationale:

Maintaining and servicing the computers, laptops and peripherals are essential requirements of the computer students. The clear understanding of computer network devices and protocols are also taught in this subject.

OBJECTIVES:

On completion of the following units of syllabus contents, the students can

.

- Understand the principle of operations of all the interfacing boards, IO/Memory slots and interfacing devices.
- Know the use of diagnostic Software.
- Trouble shoot the problems in Laptop.
- Understand the different layers of OSI and their functions. Compare different LAN protocols.
- Identify the protocols used in TCP /IP and compare with OSI model. Use of IP addressing and TCP/ IP protocols briefly.
- Identify the major components that make up the system unit.
- Understand the principle of operations of all the interfacing boards, IO/Memory slots and interfacing devices.
- Know the use of diagnostic Software.
- Trouble shoot the problems in Laptop.
- Understand the different layers of OSI and their functions. Compare different LAN protocols.

DETAILED SYLLABUS

UNIT I: MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES

Introduction: Hardware, Software and Firmware. Mother board, IO and memory expansion slots, SMPS, Drives, front panel and rear panel connectors.
Processors:
Architecture and block diagram of multicore Processor, Features of new processor(Definition only)-chipsets (Concepts only)
Bus Standards:
Overview and features of PCI, AGP, PCMCIA **Primary Memory**: Introduction-Main Memory, Cache memory – DDR2, DDR3 and Direct RDRAM.
Secondary Storage: Hard Disk – Construction – Working Principle Specification of IDE, Ultra ATA, Serial ATA; HDD Partition - Formatting.
Removable Storage:
CD-R,CD-RW,DVD –ROM and DVD –RW**:** construction and reading & writing operations;
Blue-ray – Introduction –Disc Parameters.

UNIT II: I/O DEVICES AND INTERFACE

Keyboard: Signals – operation of membrane and mechanical keyboards–troubleshooting; wireless Keyboard.
Mouse: types, connectors, operation of Optical mouse and Troubleshooting.
Printers: Introduction – Types of printers- Dot Matrix, Inkjet, Laser, MFP (Multi Function Printer) and Thermal printer – Operation, Construction and Features-Troubleshooting **I/O Ports:** Serial, Parallel, USB, Game Port and HDMI.
Displays: Principles of LED, LCD and TFT Displays.
Graphic Cards: VGA and SVGA card.
Modem: Working principle.
Power Supply: Servo Stabilizers, online and offline UPS – working principles; SMPS: Principles of Operation and block diagram of ATX Power supply, Connector Specifications.

UNIT III: MAINTENANCE AND TROUBLE SHOOTING OF DESKTOP AND LAPTOPS

Bios-setup: Standard CMOS setup, Advanced BIOS setup, Power management, advanced chipset features, PC Bios communication – upgrading BIOS, Flash BIOS -setup.
POST: Definition – IPL hardware – POST Test sequence – beep codes
Diagnostic Software and Viruses: Computer Viruses – Precautions –Anti-virus Software – identifying the signature of viruses – Firewalls and latest diagnostic softwares.

Laptop: Types of laptop –block diagram – working principles– configuring laptops and power settings -SMD components, ESD and precautions.
Laptop components: Adapter – types, Battery – types, Laptop Mother Board - block diagram, Laptop Keyboard and Touchpad .
Installation and Troubleshooting: Formatting, Partitioning and Installation of OS – Trouble Shooting Laptop Hardware problems - Preventive maintenance techniques for laptops.

UNIT IV: COMPUTER NETWORK DEVICES AND OSI LAYERS

Data Communication: Components of a data communication.
Data flow: simplex – half duplex – full duplex;
Topologies: Star, Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology.
Networks: Definition -Types of Networks: LAN – MAN – WAN – CAN – HAN – Internet – Intranet –Extranet, Client-Server, Peer To Peer Networks.
Network devices: Features and concepts of Switches – Routers (Wired and Wireless) – Gateways.
Network Models: Protocol definition - standards - OSI Model –layered architecture – functions of all layers.

UNIT V: 802.X AND TCP/IP PROTOCOLS

Overview of TCP / IP:TCP/IP – Transport Layers Protocol –connection oriented and connectionless Services – Sockets - TCP &UDP.
802.X Protocols : Concepts and PDU format of CSMA/CD (802.3) – Token bus (802.4) – Token ring (802.5) – Ethernet – type of Ethernet (Fast Ethernet, gigabit Ethernet) – Comparison between 802.3, 802.4 and 802.5
Network Layers Protocol: IP –Interior Gateway Protocols (IGMP, ICMP, ARP, RARP Concept only).
IP Addressing : Dotted Decimal Notation –Subnetting & Supernetting.
Application Layer Protocols: FTP– Telnet – SMTP– HTTP – DNS -pop

TEXT BOOKS:
1. IBM PC and CLONES, B.Govindrajalu, Tata McGrawhill Publishers, IBM PC and CLONES
2. Computer Installation and Servicing, D.Balasubramanian, Tata McGraw Hill
3. Computer Installation and Servicing
4. The complete PC upgrade and Maintenance, Mark Minasi, BPB Publication, The complete PC upgrade and Maintenance
5. Troubleshooting, Maintaining and Repairing PCs, Stephen J Bigelow, Tata MCGraw Hill Publication ,Troubleshooting Maintaining and
Repairing PCs
6. Upgrading and repairing laptops, Scott Mueller, QUE Publication, Upgrading and repairing laptops
7. Data Communication and networking, Behrouz A.Forouzan, Tata Mc-Graw Hill, New Delhi,
8. Data and Computer Communications, William Stallings, Prentice-Hall of India, Eighth Edition
9. Computer Networks, Andrew S.Tanenbaum, Prentice-Hall of India, New Delhi,

REFERENCE BOOKS:

1. Computer Networks,Achyut Godbole,Tata Mc-Graw Hill -New Delhi
2. Principles of Wireless Networks– A unified Approach, Kaveh Pahlavan and Prashant Krishnamurty, Pearson Education, 2002.

ECC620 EMBEDDED SYSTEMS

Total No. Of Hrs. / Week : 6
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 90

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
Embedded System	6	90	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
UNIT – I	Arm Processor Architecture	17
UNIT – II	Arm Instructions Set And Interrupts	17
UNIT – III	Cache Mechanism	15
UNIT - IV	Memory Protection Unit	15
UNIT - V	Embedded OS	16
	Revision Test	10
Total		90

Rationale:

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

OBJECTIVE:
On successful completion of the course, the students must be able to

- Distinguish between CISC and RISC architecture
- Understand the ARM design philosophy
- Explain the ARM architecture and the pipeline structure
- Describe the little and big endian methods of representation
- Explain the Instruction sets of ARM processor.
- Understand various operational modes in ARM processor
- List the various exceptions and handling methods
- Develop an assembly level code for basic arithmetic primitive operations
- Understand the cache mechanism and cache policies
- List and explain various cache mechanisms
- Explain the essential of cache memory, write buffers and its policies
- Explain the importance of Lockdown and its method
- Explain the importance of MPU and MMU
- Understand the functionality of virtual memory
- Relate and distinguish between OS and RTOS in their functionality
- Understand hard time and soft time RTOS
- Explain multitasking, scheduling, ITC, and synchronization
- Develop simple application in RTOS

DETAILED SYLLABUS

UNITI: ARM PROCESSOR ARCHIECTURE

The RISC and ARM design philosophy. Embedded System Hardware, Embedded System Software.
ARM PROCESSOR FUNDAMENTALS- Data Flow model, Registers, modes of operation, Current Program Status Register, Pipeline, Exceptions, Interrupts and Vector Table.
ARM PROCESSOR Introduction to LPC 2148 ARM controller – Block diagram, memory and on chip peripheral devices – Nomenclature and families.

UNIT II: ARM INSRUCTIONS SET AND INTERRUPTS

ARM and THUMB Instruction Sets – Data Processing Instructions ,Branch Instructions, Load and Store Instructions, Software Interrupt Instructions, Program Status Register Instructions, Conditional Execution.
ARM PROCESSOR EXCEPTIONS AND MODES - Vector Table, Priorities, Link Register offsets, interrupts , IRQ and FIQ Exceptions , interrupt stack design and implementation
SIMPLE PROGRAMS IN ASSEMBLY LANGUAGE FOR Addition, Subtraction, Multiplication and Division.

UNIT III: CACHE MECHANISM

Introduction to cache memory , memory hierarchy and cache memory, cache architecture and cache policies.
CONCEPT OF FLUSHING AND CLEANING CACHE- Flushing and Cleaning ARM cache memory.
CONCEPT OF CACHE LOCKDOWN - Locking Code and Data in Cache.

UNIT IV: MEMORY PROTECTION UNIT

Introduction to protection unit – Protected regions and Demonstration of an MPU system. **MEMORY MANAGEMENT UNIT:** Virtual memory working principle- Defining Regions Using Pages, Multitasking the MMU, Memory Organization in a Virtual Memory System.

UNIT V: EMBEDDED OS

Fundamental components to Embedded OS, Simple little operating System – Initialization, memory model , interrupts and exception handling, Scheduler and Context switch.
EMBEDDED RTOS Real- time systems concepts, foreground/background systems, critical sections, resources, multitasking, context switching, scheduling, re-entrancy , task priorities, mutual exclusion.
SYNCHRONIZATION AND IPC : Introduction to Semaphores and types. Inter process communication – Pipes and Mailbox.

TEXT BOOKS:

1) "ARM System Developer's Guide Designing and Optimizing" by Andrew N.Sloss Elsevier publication, 2004.
2) "Micro C/OS – II" second edition The Real Time Kernel Jean J. Labrosse Publisher: Viva Books Private Ltd (Feb 2002)

REFERENC E BOOK:

1) "Embedded systems" B.Kanta Rao PHI publishers, Eastern Economy Edition, 2011
2) "Embedded Systems Architecture" - Tammy Noergaard, Newness edition, 2005
3) "ARM System-on-Chip Architecture" 2nd Edition, Steve Furbe, Pearson Education, 2000
4) "Embedded/Real Time Systems" Dr. K.V.K.K PRASAD Dream tech press, 2009.

ELECTIVE II – ECC631 MOBILE COMMUNICATION

Total No. Of Hrs. / Week : 5
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 75

TEACHING AND SCHEME OF EXAMINATION

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

TOPICS AND ALLOCATION

Unit	Topic	Time (Hrs)
1	Introduction to Mobile Communication	13
2	Broadcast Systems	13
3	Wireless Transmission (2G)	13
4	Wireless Networking (3G)	12
5	Mobile Network Layer & Transport Layer	12
	Revision And Test	12
Total		**75**

RATIONALE

Communication is one of the integral parts of science that has always been a focus point for exchanging information among parties at locations physically apart. After its discovery, telephones have replaced the telegrams and letters. Similarly, the term 'mobile' has completely revolutionized the communication by opening up innovative applications that are limited to one's imagination. Today, mobile communication has become the backbone of the society. All the mobile system technologies have improved the way of living. It's main plus point is that it has privileged a common mass of society. In this subject, the evolution as well as the fundamental techniques of the mobile communication is discussed.

OBJECTIVES:

- To know the basics of Mobile Radio Communication
- To know about wireless communications systems
- To understand the Cellular concept
- To study broadcasting
- To learn the Digital audio and video broadcasting
- To learn the convergence of mobile communications
- To know wireless communications and the process of transmission
- To study about various architectures in wireless transmission
- To study the CDMA digital standards
- To understand Mobile Services (2G), (2.5G) and (3G)
- To know the GPRS and WAP
- To learn the manufacture and operator technologies
- To learn mobile network layer & transport layer
- To study the Dynamic host configuration protocol
- To know the TCP & its improvements

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO MOBILE COMMUNICATION

Evolution of Mobile Radio Communication, Mobile Radio Telephony in India and around the world, Examples of Wireless Communication Systems: Paging system, Cordless telephones systems, Cellular telephone Systems, Trends in Cellular Radio and personal Communications

THE CELLULAR CONCEPT: Frequency reuse, Channel Assignment strategies, Hand off Strategies, Prioritizing Handoffs, Interference and system capacity, Improving coverage and capacity in cellular systems, Cell splitting ,Sectoring, Repeaters for range extension.

UNIT II: BROADCAST SYSTEMS

Introduction – Cyclical repetition of data – Digital audio broadcasting – Multimedia object transfer protocol – Digital video broadcasting – DVB data broadcasting, DVB for high speed internet access – Convergence of broadcasting and mobile communications.

UNIT III: WIRELESS TRANSMISSION (2G)

Global system for mobile (GSM) - services and features - Radio subsystem - channel types - Example of a GSM call - Frame structure for GSM – DECT system architecture, protocol architecture – TETRA – UMTS and IMT-2000 - radio interface, UTRAN, core network,

handover - CDMA digital cellular standard (IS – 95): Frequency and channel specifications - Forward CDMA channel and Reverse CDMA channel.

UNIT IV: WIRELESS NETWORKING (3G)

Mobile Services (2.5G)
GPRS: GPRS Functional groups – architecture - network nodes – procedures-billing.
WAP: WAP Model - WAP Gateway- WAP Protocols - WAP UA prof and caching, wireless bearers for WAP, WAP developer tool kits - Mobile station application execution environment.
Mobile Services (3G):
Paradigm Shifts in 3G Systems - W-CDMA and CDMA 2000 – Improvements on core network - Quality of service in 3G - Wireless OS for 3G handset - 3G systems and field trials - Other trail systems - Impact on manufacture and operator technologies.

UNIT V: MOBILE NETWORK LAYER & TRANSPORT LAYER

Mobile IP – Goals, assumptions and requirements, Entities and terminology, IP Packet delivery, Agent discovery, Registration, tunneling and encapsulation , Optimization, Reverse tunneling, IPv6, IP micro- mobility support – Dynamic host configuration protocol – mobile ad-hoc network – routing – destination sequence distance vector – Dynamic source routing – alternative metrics
TCP – Congestion control – slow start – fast retransmit/ fast recovery – implications of mobility – Classical TCP improvements – indirect – snooping – Mobile–Transmission timeout freezing – selective retransmission- Transaction oriented – TCP over 2.5/3G wireless networks

REFERENCE BOOKS:
1. Wireless Communications Principles and Practice Theodore S. Rappaport Pearson Education, 2003
2. Mobile Communications Jochen Schiller Pearson Education, 2009, Second edition
3. Wireless and Mobile Network Architectures Yi-BingLin, Imrich Chlamtac Wiley, 2001
4. Mobile Cellular Communication Gottapu Sasibhushana Rao Pearson Education, 2012
5. Wireless Digital Communications Kamilo Feher PHI, 2003
6. Mobile Cellular Communications W.C.Y. Lee 2nd Edition, MC Graw Hill, 1995
7. Wireless Networks P. Nicopolitidis Wiley, 2003
8. Wireless Communications and Networks William Stallings 2nd Edition,Prentice Hall of India-2006

ELECTIVE II – ECC632 TELEVISION ENGINEERING

Total No. of Hrs. / Week : 5
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 80

SCHEME OF INSTRUCTION AND EXAMINATION

Subject	**Instruction**		**Examination**		
Television Engineering	**Hrs/ Week**	**Hrs/ Semester**	**Assessment Mark**		
			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	13
III	Television Transmitter	10
IV	Television Receiver	13
V	Advanced Television Systems	15
	Revision, Test	10
Total		75

OBJECTIVES:

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

- To understand monochrome TV transmitter and receiver
- To understand principles of scanning
- To study about TV standards
- To study fundamentals of colour TV
- To learn about camera tube and its working.
- To understand the working of picture tubes.
- To learn about colour TV transmitter
- To Study about colour TV receiver
- To study about LED, LCD displays
- To study fundamentals of CCTV
- To learn HD TV and 3D TV

DETAILED SYLLABUS

UNIT I: T.V. FUNDAMENTALS

Monochrome TV: Basic block diagram of Monochrome TV transmitter and Receiver – Scanning process –Horizontal, vertical and sequential scanning – flicker – interlaced scanning (qualitative treatment only) –need for synchronization – blanking pulses – Aspect ratio– Resolution –Types – vertical and horizontal resolution – video bandwidth – composite video signal (CVS)– CVS for one horizontal line – Definitions for Vertical sync pulse, Serrated vertical pulse, Equalizing pulse – Positive & Negative modulation - TV Standards – List of Types of TV standards.

Colour T.V. Fundamentals: Additive mixing of colours – Types – colour perception – Chromaticity diagram – Definition for Luminance, Hue, Saturation and Chrominance.

UNIT II: CAMERA AND PICTURE TUBES

CAMERA TUBE: Characteristics – Types of camera tubes – working principle of Vidicon and Plumbicon camera tubes, CCD camera – Video processing of camera pick up signal – Block diagram and Principle of working of colour TV camera tube.

PICTURE TUBE: Construction and working of Monochrome picture tube– screen phosphor – screen burn – Aluminized screen – Types of colour picture tubes -construction and working principle of Delta gun and Trinitron Colour picture tubes – Automatic degaussing.

UNIT III: TELEVISION TRANSMITTER

Principles – Block diagram of Low level IF Modulated TV transmitter –Visual Exciter –Aural Exciter – principle of working of CIN Diplexer –Block diagram of colour TV transmitter – colour compatibility – PAL colour coder –functional blocks and working of each block – Merits and demerits of PAL system.

UNIT IV: TELEVISION RECEIVER

Block diagram of Monochrome Receiver – functions of each block –Need for AGC – Advantages of AGC – Video amplifier requirements –High frequency & Low frequency compensation – Block diagram of PAL colour Receiver – Need for sync separator – Basic sync separator circuits– Vertical
sync separation & Horizontal sync separation – AFC – Need for AFC – Horizontal AFC – Hunting in AFC – Anti Hunt network.

UNIT V: ADVANCED TELEVISION SYSTEMS

Principles of Flat panel display, Plasma display, LED & LCD display –Block diagram of a digital colour TV receiver – Remote control IR transmitter and receiver – closed circuit TV system (CCTV) –Applications of CCTV – Telecine equipment – Digital CCD Telecine system – Block diagram of VCD Player – Block diagram of DVD Player –Introduction to High definition TV (HDTV) & 3DTV.

REFERENCE BOOKS:

1. Monochrome TV Practice, Principles, Technology &servicing by R.R.Gulati-Second Edition-New Age publishers-2004.
2. Monochrome & colour TV by R.R.Gulati - New Age publishers -2003.
3. TV & Video Engg. By A.M.Dhake – Second Edition TMH -2003.
4. Colour TV, Theory and practice – by S.P.Bali-TMH – 1994.
5. Modern VCD-Video CD Player Introduction, servicing and troubleshooting by Manohar Lotia & Pradeep Nair.

ELECTIVE II – ECC633 PROGRAMMABLE LOGIC CONTROLLERS

Total No. of Hrs. / Week : 5
Total No. of Weeks / Semester : 15
Total No. of Hrs. / Semester : 75

SCHEME OF INSTRUCTION AND EXAMINATION

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

TOPICS AND ALLOCATION

Unit	Topic	Time (Hrs)
I	Architecture and operation of PLC	13
II	Programming of PLC	13
III	PLC Timers and counters	13
IV	Advanced instructions	12
V	I/O Module Communication and networking	12
	Revision, Test	12
Total		75

RATIONALE:

Programmable Logic Controller is the mandatory for the control Engineers in any Process Industry. As it is the default controller being used in the industries in automation of process such as packing, discrete control etc., It is obvious for the instrumentation and control Engineer to understand Hardware and programming the PLC.

OBJECTIVES:

- To understand the detailed Hardware of PLC and its parts
- To understand the working of PLC and scan cycle
- To know the Different timers of PLC and programming them
- To know the different counters of PLC and its parameters
- To understand the Ladder logic programming of PLC
- To develop simple ladder programs
- To study the Advanced instructions of PLC
- To understand the communication module of PLC

ECC633 PROGRAMMABLE LOGIC CONTROLLERS

UNIT I: ARCHITECTURE AND OPERATION OF PLC

Evolution of PLCs – Hard-wired control systems. PLC –definition, features, Advantages, Relays .PLC parts and architecture – CPU – I/O section – Programming device -Memory - input field devices – output field devices – input module wiring connections, output module wiring connections- Power Supply -PLC versus computer - Types of PLC – single ended – multitask – control management- unitary - modular- small – medium – large. Developing circuits from Boolean expression – Hardwired logic to programmed logic – programming word level logic instruction – processor memory organization program files – data files – program scan.

UNIT II: PROGRAMMING OF PLC

PLC Programming languages -Standard languages- Ladder diagram (LD) - Function block diagram (FBD) - Sequential function chart(SFC)- Statement List(STL) (each one example program)-Symbols of a PLC - Input and output contact graphical languages(IES)– program format – Typical Numbering mode – Equivalent ladder diagram of AND, OR, NOT, XOR, NAND AND NOR gate equivalent ladder diagram to demonstrates De Morgan's theorem, Ladder design switches- Develop elementary program design of a 4:1 Multiplexer using ladder logic - Programming wired level logic instructions input, output, flag, timer, counter, latch.

UNIT III: PLC TIMERS AND COUNTERS

Definition and Classification of a timer. Characteristics of a PLC timer – functions in a timer – resetting –retentive functions and function block format- non-retentive – classification – Timer ON-delay- Timer-OFF delay- Simple problems using timer PLC counter – Operation of a PLC counter – Counter parameters – Format of counter instruction and counter data file - count up (CTU)- count down(CTD) simple problems using counter.

UNIT IV: ADVANCED INSTRUCTION

Introduction - comparison instructions- Addressing format for micro logic system - Different addressing types – Data movement instructions - Mathematical instructions- Program flow control instructions - PID instructions. Program development and execution using Allen bradly PLC. Simplified start up process of a coal feeding to a boiler plant - elevator for 3 floor building - Traffic light control -conveyor belt Selection of PLC - Safety considerations built in the PLC's.

UNIT V:I/O MODULE COMMUNICATION AND NETWORK

Introduction – classification of I/O Module Input – Output system – Direct I/O, parallel I/O – Sourcing and sinking of serial I/O system. PLC interfacing-Discrete Input module –DC - AC – Discrete output module – Analog input module single ended and output module - RTD input modules- Thermocouple- High speed Encoder-Stepper motor- RS-232 interface module-Differential input module. Types of Communication Interface. Parallel – serial – Parallel – IEEE 488 BUS- Serial _ balanced – unbalanced- communication mode- simplex – Half duplex – full duplex features of good interface. Serial interface RS 232c. DB-9 connection of Rs232C Network Topology, Bus Ring, Star, Tree.

REFERENCE BOOKS:

1. Madhuchhanda Mitra ,Samarjit sen Gupta,"PLC and Industrial Automation an introduction", Penram international Publishing (India) Pvt Ltd.
2. Pradeep Kumar Srivastava, "Exploring Programmable Logic Controller with applications", BPB Publication
3. W. Bolton," Programmable logic controller" IV Edition Reed Elsevier India pvt ltd.
4. Gary Dunning," Introduction to PLC", IIIrd edition Thomson del mar learning

ECC640 COMPUTER HARDWARE & NETWORKING PRACTICAL

OBJECTIVES:

On completion of the following exercises, the students must be able to

- Know the various indicators, switches and connectors used in Computers.
- Familiarize the layout of SMPS, motherboard and various Disk Drives.
- Configure Bios set up options.
- Install various secondary storage devices with memory partition and formatting.
- Know the various types of printer installation and to handle the troubleshooting ability.
- Acquire the practical knowledge about the installation of various devices like scanner, web camera, cell phone and bio-metric devices.
- Assemble PC system and checking the working condition.
- Installation of Dual OS in a system.
- Identify the problems in Computer systems, software installation and rectification also.
- Assembling and disassembling of Laptop to identify the parts and to install OS and configure it.
- Enable to perform different cabling in a network.
- Configure Internet connection and use utilities to debug the network issues.
- Configure router for any topology.

LAB EXERCISES:

Part A – computer servicing practicals

1. **Identification of System Layout.**

Front panel indicators & switches and Front side & rear side connectors.
Familiarize the computer system Layout: Marking positions of SMPS, Motherboard, FDD, HDD, CD, DVD and add on cards.
Configure bios setup program and troubleshoot the typical problems using BIOS utility.

2. **HARD DISK**

Install Hard Disk. Configure CMOS-Setup. Partition and Format Hard Disk. Identify Master /Slave / IDE Devices. Practice with scan disk, disk cleanup, disk De-fragmenter, Virus Detecting and Rectifying Software.

3. a) Install and Configure a DVD Writer and a Blu-ray Disc writer.
   b) Recording a Blank DVD and Blu-ray Disc.

4. **Printer Installation and Servicing:**
   a) Head Cleaning in dot matrix printer
   b) Install and configure Dot matrix printer and Laser printer
   c) Troubleshoot the above printers.
   d) Check and connect the data cable connectivity

5. **Install and configure**

Scanner, Web cam, Cell phone and bio-metric device with system.
Troubleshoot the problems

6. Assemble a system with add on cards and check the working condition of the system and install OS.

7**. Dual OS Installation**

8. Assembling and Disassembling of Laptop to identify the parts and to install OS and configure it.

Part B – computer network practicals

9. Do the following Cabling works in a network
a) Cable Crimping b) Standard Cabling c) Cross Cabling d) IO connector crimping
e) Testing the crimped cable using a cable tester

10. Configure Host IP, Subnet Mask and Default Gateway in a system in LAN (TCP/IP Configuration). Configure Internet connection and use IPCONFIG, PING / Tracert and Netstat utilities to debug the network issues

11. Interface two PCs using Peer To Peer network using connectivity devices – Switch and Router in a LAN and share the Drives and Folders.

12. Transfer files between systems in LAN using FTP Configuration, install Print server in a LAN and share the printer in a network.

13. Configure DNS to establish interconnection between systems and describe how a name is mapped to IP Address

14. Install and configure Network Devices: HUB, Switch and Routers

15. Install and Configure Wired and Wireless NIC and transfer files between systems in LAN and Wireless LAN.

Part C (NOT FOR EXAMINATION)

Visit Any industry/ Institute (Engineering colleges, University campus etc.,) and study the following:

Type and configuration of client PCs and OS
Type and configuration of Server and Domains Used
Type of Networking (Topology and medium used)
Different Network devices used (Switches, Routers, Access points etc.,)
Different types of peripherals used
Applications used by the user.

SCHEME OF VALUATION

Procedure Writing – One Question from PART - A	10 Marks
Procedure Writing – One Question from PART - A	15 Marks
Executing program (PART – A)	15 Marks
Executing program (PART – B)	20 Marks
Result with printout (PART – A)	5 Marks
Result with printout (PART – B)	5 Marks
VIVA – VOCE	5 Marks
TOTAL	75 Marks

Software Requirements:

- Windows XP operating system
- Linux operating system

- Disk Manager (for the purpose of partition and format)
- Norton or E-Trust Antivirus software
- Scandisk
- DVD Writer S/W
- CD Burning S/W (Ahead Nero or latest S/W)
- Blu-ray Burning S/W
- Windows 2000 or 2003 or LINUX Server.
- OS Windows XP with service pack
- Drivers Software

HARDWARE REQUIRED:

S.No	Name of the Equipments	Range	Required Nos
1	Pentium IV / Core with add on cards		5
2	Hard disk drive, CD drive, DVD writer		2
3	Laptop		4
4	USB Pen drive /Bluetooth device		4
5	Printer Inkjet / Laser/Dot matrix printer		2
6	Blank DVD, Head cleaning CD		5
7	Scanner, Web camera, Digital camera		1
8	Windows server 2003 or Linux server		1
9	Blank Blu-ray disk, Net work Cables		
10	Pentium Systems with on board Ethernet Card (NIC)		10
11	Modem, Hub, Router, Switch		1

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ECC650 EMBEDDED SYSTEMS PRACTICAL

LIST OF EXPERIMENTS

1. Study of ARM processor Kit.

2. Write and execute assembly language program for
   a) Addition b) Subtraction c) multiplication d) Division

3. Write and execute a C program to realize input through switch interface and output through LED.

4. Write and execute a C program to blink LED (include delay routine).

5. Write and execute a C program to blink LED (using Timer/Counter).

6. Write and execute a C program to count external interrupt.

7. Write and execute a C program to display a number in seven segment display interface.

8. Write and execute a C program to transmit from kit and receive from PC using serial communication.

9. Write and execute a C program to display message in a 2*16 LCD Module.

10. Write and execute a C program to read ADC and display in LCD.

11. Write and execute a C program to interface seven segment display using I2C interface.

12. Write and execute a C program for PWM generation.

RTOS based experiments

13. Write and execute a C program to blink two LEDS at different delays.

14. Write and execute a C program to display two different messages in LCD display in two lines.

ECC660 SIMULATION PRACTICAL

Objective

- To design and verify the results of various electronic circuits using simulation software and verify the result in the computer

Note:

- All experiments should be designed and verified through SPICE simulation tool (like PSPICE /Multi sim/ Lab VIEW/MATLAB Or CAD / TINA)

LIST OF EXPERIMENTS

1. Study of simulation software features using simple circuits.

2. Rectifier Circuits (Half wave and full wave rectifiers with filters).

3. Power supply design with regulators.

4. Waveform generators using transistors (Astable multivibrator).

5. Waveform generators using IC555 (monostable multivibrator).

6. Clippers and Clampers.

7. Op-amp applications – I (any three circuits).
   (Inverting and non-inverting amplifiers, voltage follower, integrator, Differentiator, summing amplifier, difference amplifier).

8. Op-amp applications – II (any three circuits).
   (Hartley and phase shift oscillators, sine, square and triangular waveform generators, precision rectifiers, Voltage to Current convertor).

9. Instrumentation amplifiers.

10. AM/FM Modulation and Demodulation.

11. ASK/FSK Modulation and Demodulation.

12. PSK Modulation and Demodulation.

13. Analog to Digital Converter using IC ADC0808.

14. PLL IC565 Applications(frequency translation/ frequency multiplication).

15. Single side PCB layout design using CAD tool. Drawing the schematic of simple electronic circuit and design of PCB layout using CAD tool.

16. Multilayer PCB layout design using CAD tool.

ECC670 PROJECT WORK

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 15 weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examination	Total	
PROJECT WORK	4	60	25	75	100	3 Hrs

RATIONALE:

Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students.

The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, so as to participate and manage a large software engineering projects in future.

OBJECTIVES:

- The project is aimed to assemble test a photo type model of any one item/gadget.
- Real time application problems if any may be identified from any industry and
- maybe chosen.
- The knowledge and the skill so far acquired may be made use of.
- The team spirit may be motivated.
- The entrepreneurship ideas may be motivated by conducting a career guidance programme.
- Learn and understand the gap between the technological knowledge acquired through curriculam and the actual industrial need and to compense it by acquiring additional knowledge as required.

GUIDELINES FOR PROJECT FORMULATION

The project work constitutes a major component in most of the professional programmes and it is to be carried out with due care and should be executed with seriousness by the candidates.

Batch Size : Maximum 6 students per batch

TYPE OF PROJECT

As majority of the students are expected to work out a real life project in some industry/research and development laboratories/educational institutions/software companies, it is suggested that the project is to be chosen which should have some direct relevance in day-to-day activities of the candidates in his/her institution. Students are encouraged to work in the areas listed at the end. However, it is not mandatory for a student to work on a real life project. The student can formulate a project problem with the help of Guide.

INTERNAL ASSESSMENT:

The internal assessment should be calculated based on the review of the progress of the work done by the student periodically as follows.

Detail of assessment	Period of assessment	Max.Marks
First Review	6TH	10
Second Review	14TH	10
Attendance	Entire semester	5
	TOTAL	25

EVALUATION FOR BOARD EXAMINATION:

Details of Mark allocation	**Max Marks**
Marks for Report Preparation, Demo, Viva-voce	65
Marks for answers of 4 questions which is to be set by the external examiner from the given question bank consisting of questions in the following two topics Disaster Management and Environmental Management. Out of four questions two questions to appear from each of the above topics i.e. 2 questions x 2 topics = 4 questions 4 questions x 2 ½ marks = 10 Marks	10
Total	**75**

DETAILED SYLLABUS

ENTREPRENEURSHIP, ENVIRONMENTAL & DISASTER MANAGEMENT

1. AWARENESS IN ENTREPRENEURSHIP DEVELOPMENT

Introduction – Entrepreneur – types -Characteristics & attributes of Entrepreneur – Expectations of entrepreneurship – Contributions of an entrepreneur – Identifying problems and opportunities. - Why do Entrepreneurs Fail?

Types of Industries - Importance of SSI – Assistance offered – Governmental and Non- Governmental organizations – Identifying prospects of various Small scale industries in your area with resources and other infrastructural facilities available.

Starting a SSI – various stages – product – ownership – locality – points related to building, water and electricity – financial assistance – raw materials – machineries –
human resource – efficient manufacturing techniques – marketing - Technical, Financial, Marketing, Personnel and Management Feasibility study and report - concessions and incentives offered by agencies.

Industrial Zones – industrial Estates - Pollution Control – industries with pollution problem - Marketing assistance

Acquiring common services – repairing – testing facilities – training institutions – suppliers of applied technology.

2. ENVIRONMENTAL MANAGEMENT

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.

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.

Waste water management **–** Characteristics of Industrial effluents **–** Treatment and disposal methods **–** Pollution of water sources and effects on human health.

Air pollution management **–** Sources and effects **–** Dispersion of air pollutants **–** Air pollution control methods **–** Air quality management.

Noise pollution management **–** Effects of noise on people **–** Noise control methods.

3. DISASTER MANAGEMENT

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..

Disaster Mitigation measures – Causes for major disasters – Risk Identification – Hazard 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.

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 neighbors / 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 deal 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) Nagapattinam (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?

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Autonomous Examination – Question Paper Pattern

Common for all theory subjects

Time: 3 Hrs. **Max Marks: 75**

PART – A : Carries 3 questions answer any 2 questions each carries 4 marks

PART – B : Carries 2 questions answer any 1 questions each carries 7 marks

Unit	Part	No. of Question	Marks
I	A	2 X 4	**8** Marks
	B	1 X 7	**7** Marks
II	A	2 X 4	**8** Marks
	B	1 X 7	**7** Marks
III	A	2 X 4	**8** Marks
	B	1 X 7	**7** Marks
IV	A	2 X 4	**8** Marks
	B	1 X 7	**7** Marks
V	A	2 X 4	**8** Marks
	B	1 X 7	**7** Marks
TOTAL			**75** Marks

EQUIVALENT PAPERS
ELECTRONICS AND COMMUNICATION ENGINEERING

B SCHEME SUBJECTS		C SCHEME SUBJECTS	
III SEMESTER			
ECB310	Electronic Devices and Circuits	ECC310	Electronic Devices and Circuits
ECB320	Electric Circuits and Instrumentation	ECC320	Electric Circuits and Instrumentation
ECB330	Digital Electronics	ECC430	Digital Electronics
ECB340	Electronic Devices and Circuits Lab	ECC340	Electronic Devices and Circuits Practical
ECB350	Electric Circuits & Instrumentation Lab	ECC350	Electric Circuits & Instrumentation Practical
ECB360	Digital Electronics Lab	ECC460	Integrated Circuits Practical
ECB370	Computer Application Lab	ECC370	Computer Application Practical for Electronics
IV SEMESTER			
ECB410	Linear Integrated Circuits	ECC440	Linear Integrated Circuits
ECB420	Industrial Electronics	ECC410	Industrial Electronics
ECB430	Communication Engineering	ECC420	Communication Engineering
ECB440	C-Programming	ECC330	Programming in C
ECB450	IE and CE Lab	ECC450	IE and CE Practical
ECB460	C-Programming Lab	ECC360	Programming in C Practical
ECB470	English Communication Lab	30001	Life and Employability Skills Practical
V SEMESTER			
ECB510	Microcontroller and its Application	ECC520	Microcontroller
ECB520	Advanced Communication Systems	ECC510	Advanced Communication Systems
ECB531	Elective – I Theory 1. VLSI	ECC530	Very Large Scale Integration
ECB532	Elective – I Theory 2. Digital Signal Processor	NO EQUIVALENT	
ECB533	Elective – I Theory 3. Robotics and Auto Electronics	NO EQUIVALENT	
B0001	Entrepreneurial Development	NO EQUIVALENT	
ECB550	Microcontroller and its Application Lab	ECC560	Microcontroller Practical
ECB560	Advanced Communication Systems Lab	ECC550	Advanced Communication Systems Practical
ECB571	Elective – I Practical 1. VLSI Lab	ECC570	VLSI Practical
ECB572	Elective – I Practical 2. Digital Signal Processor Lab	NO EQUIVALENT	
ECB573	Elective – I Practical 3. Robotics and Auto Electronics Lab	NO EQUIVALENT	
VI SEMESTER			
ECB610	Computer Hardware and Networking	ECC610	Computer Hardware and Networking
ECB620	Embedded Systems	ECC620	Embedded Systems
ECB631	Elective – II Theory 1. Television Engineering	ECC632	Elective – II Theory 2. Television Engineering
ECB632	Elective – II Theory 2. Bio Medical Instrumentation	ECC541	Elective – I Theory 1. Bio Medical Instrumentation
ECB633	Elective – II Theory 3. Digital Communication	ECC542	Elective – I Theory 2. Digital Communication
ECB640	Computer Hardware and Networking Lab	ECC640	Computer Hardware and Networking Practical
ECB650	Embedded Systems Lab	ECC650	Embedded Systems Practical
ECB660	Simulation Lab	ECC660	Simulation Practical
ECB670	Project Work	ECC670	Project Work

SALIENT FEATURES OF C SCHEME

ADDITION – DELETION

III SEMESTER:

B SCHEME	C SCHEME
ELECTRONIC DEVICES AND CIRCUITS	• Specification of diodes, transistors – Introduced
ELECTRIC CIRCUITS AND INSTRUMENTATION	• Quantitative Approach of Theorems are introduced.
DIGITAL ELECTRONICS	• This subject has been shifted to Forth Semester.
ELECTRONIC DEVICES AND CIRCUITS LAB	• No changes.
ELECTRIC CIRCUITS & INSTRUMENTATION LAB	• Calibration of Voltmeter, Ammeter experiments and Series and Parallel resonant circuits are included.
DIGITAL ELECTRONICS LAB	• This subject has been shifted to fourth semester.
COMPUTER APPLICATION LAB	• This subject is renamed as Computer Application Practical in Electronics. • Simulation exercises for basic electronic circuits are included.
NEW SUBJECT INTRODUCED	
PROGRAMMING IN C	• This subject has been shifted from IV sem. • File handling operations, preprocessor deleted.
PROGRAMMING IN C PRACTICAL	• This subject has been shifted from IV sem. • C Programs based on electronic circuits - Introduced

IV SEMSETER

B SCHEME	C SCHEME
LINEAR INTEGRATED CIRCUITS	• Second order Filters and AC Amplifiers have been added. • A/D and D/A converters have been deleted.
INDUSTRIAL ELECTRONICS	• Industrial Automation is included.
COMMUNICATION ENGINEERING	• Digital Communication is included. • Audio Systems, RADAR have been shifted to ACS (V Semester)
C-PROGRAMMING	• This subject is shifted to third semester and renamed as Programming in C.
IE AND CE LAB	• No major changes.
C-PROGRAMMING LAB	• This subject has been shifted to Third Semester and renamed as Programming in C Practical.
ENGLISH COMMUNICATION LAB	• This subject is renamed as Life and Employability Skills Practical.
NEW SUBJECT INTRODUCED	
DIGITAL ELECTRONICS	• This subject has been shifted from third semester. • A/D and D/A converters have been added.
INTEGRATED CIRCUITS PRACTICAL	• The experiments of Linear Integrated Circuits practical and Digital Electronics practical are combined.

V SEMSETER

B SCHEME	C SCHEME
MICROCONTROLLER AND ITS APPLICATION	• Peripheral devices and PIC Controller have been deleted. • I/O and timer, Interrupt and Serial Communication have been included.
ADVANCED COMMUNICATION SYSTEMS	• Microwave, Digital and Mobile Communication have been removed. • Audio and Video Systems and RADAR have been included.
ELECTIVE – I THEORY 1. VLSI	• This subject is made as Core paper. • Latest technologies in VLSI have been included.
ELECTIVE – I THEORY 2. DIGITAL SIGNAL PROCESSOR	• Deleted
ELECTIVE – I THEORY 3. ROBOTICS AND AUTO ELECTRONICS	• Deleted
ENTREPRENEURIAL DEVELOPMENT	• Deleted
MICROCONTROLLER AND ITS APPLICATION LAB	• It is renamed as Microcontroller Practical • More importance given to Embedded C Programs.
ADVANCED COMMUNICATION SYSTEMS LAB	• DTH installation, Testing of voice link have been included.
ELECTIVE – I PRACTICAL 1. VLSI LAB	• This subject is made as Core paper. • No major changes.
ELECTIVE – I PRACTICAL 2. DIGITAL SIGNAL PROCESSOR LAB	• Deleted
ELECTIVE – I PRACTICAL 3. ROBOTICS AND AUTO ELECTRONICS LAB	• Deleted
NEW SUBJECTS INTRODUCED	
BIO MEDICAL INSTRUMENTATION	• This subject is shifted from VI Semester.
DIGITAL COMMUNICATION	• This subject is shifted from VI Semester.
ELECTRONIC SYSTEM DESIGN	• A New Subject is introduced

VI SEMESTER:

B SCHEME	C SCHEME
COMPUTER HARDWARE AND NETWORKING	• Syllabus was slightly modified to suit the latest technologies.
EMBEDDED SYSTEMS	• No changes
ELECTIVE – II THEORY 1. TELEVISION ENGINEERING	• Retained
ELECTIVE – II THEORY 2. BIO MEDICAL INSTRUMENTATION	• Shifted to Fifth Semester.
ELECTIVE – II THEORY 3. DIGITAL COMMUNICATION	• Shifted to Fifth Semester.
COMPUTER HARDWARE AND NETWORKING LAB	• No major changes
EMBEDDED SYSTEMS LAB	• Retained
SIMULATION LAB	• No changes
PROJECT WORK	• Retained
NEW SUBJECTS INTRODUCED	
MOBILE COMMUNICAITON	• A new subject is introduced as Elective
PROGRAMMABLE LOGIC CONTROLLER	• A new subject is introduced as Elective