DIPLOMA

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

SYLLABUS

(WITH EFFECT FROM JUNE 2023)

G - SCHEME

DR.DHARMAMBAL GOVT.POLYTECHNIC COLLEGE FOR WOMEN,
THARAMANI,CHENNAI –600113.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CORE COURSES

COURSE CODE	COURSE NAME	THEORY	PR/ TU	DRAWING	CONTACT HOURS
ECG302	ELECTRONIC DEVICES AND CIRCUITS	5	-	-	5
ECG304	DIGITAL ELECTRONICS	5	-	-	5
ECG401	ANALOG CIRCUITS	5	-	-	5
ECG402	COMMUNICATION ENGINEERING I	5	-	-	5
ECG501	COMMUNICATION ENGINEERING II	5	-	-	5
ECG601	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS	5	-	-	5
ECG371	ELECTRONIC DEVICES AND CIRCUITS LAB	-	4	-	4
ECG373	DIGITAL ELECTRONICS LAB	-	4	-	4
ECG471	ANALOG CIRCUITS LAB	-	4	-	4
ECG472	COMMUNICATION ENGINEERING I LAB	-	4	-	4
ECG671	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS LAB	-	4	-	4
ECG571	COMMUNICATION ENGINEERING II LAB	-	4	-	4
	TOTAL	30	24	-	54

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

APPLIED COURSES

COURSE CODE	COURSE NAME	THEORY	PR/ TU	DRAWING	CONTACT HOURS
ECG301	ENGINEERING MATHEMATICS-III	5	-	-	5
ECG303	ELECTRICAL CIRCUITS AND INSTRUMENTS	5	-	-	5
ECG502	MEASUREMENT SYSTEMS & ELECTRIC VEHICLE TECHNOLOGY	5	-	-	5
ECG503	8051 MICROCONTROLLER AND EMBEDDED SYSTEMS	5	-	-	5
ECG602	INTERNET OF THINGS	5	-	-	5
ECG372	ELECTRICAL CIRCUITS AND INSTRUMENTS LAB	-	4		4
ECG572	MEASUREMENT SYSTEMS & SIMULATION LAB	-	4	-	4
ECG573	EMBEDDED SYSTEMS LAB	-	4	-	4
ECG672	INTERNET OF THINGS LAB	-	4	-	4
ECG673	PROJECT WORK AND INTERNSHIP	-	5	-	5
	TOTAL	25	21		46

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DIVERSIFIED COURSES

COURSE CODE	COURSE NAME	THEORY	PR/ TU	DRAWING	CONTACT HOURS
ECG403	C PROGRAMMING	5	-	-	5
ECG473	C PROGRAMMING LAB	-	4	-	4
**ECG474	ENTREPRENEURSHIP & STARTUP	-	5	-	5
*ECG581	MOBILE & WIRELESS COMMUNICATION	5	-	-	5
*ECG582	BIOMEDICAL INSTRUMENTATION	5	-	-	5
*ECG583	E VEHICLE	5	-	-	5
*ECG681	VERY LARGE SCALE INTEGRATION	5	-		5
*ECG682	COMPUTER HARDWARE AND NETWORKS	5	-	-	5
*ECG683	CONSUMER ELECTRONICS	5	-	-	5
*ECG684	VERY LARGE SCALE INTEGRATION LAB	-	4	-	4
*ECG685	COMPUTER HARDWARE AND NETWORKS LAB	-	4	-	4
*ECG686	CONSUMER ELECTRONICS LAB	-	4	-	4
	TOTAL	35	21		56

**Common for all departments

* Elective courses

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

III SEMESTER

COURSE CODE	COURSE NAME	THEORY	PR/ TU	DRAWING	CONTACT HOURS
ECG301	ENGINEERING MATHEMATICS - III	5	-	-	5
ECG302	ELECTRONIC DEVICES AND CIRCUITS	5	-	-	5
ECG303	ELECTRICAL CIRCUITS AND INSTRUMENTS	5		-	5
ECG304	DIGITAL ELECTRONICS	5	-	-	5
ECG371	ELECTRONIC DEVICES AND CIRCUITS LAB	-	4	-	4
ECG372	ELECTRICAL CIRCUITS AND INSTRUMENTS LAB	-	4	-	4
ECG373	DIGITAL ELECTRONICS LAB		4		4
	PHYSICAL EDUCATION		2		2
	LIBRARY/SEMINAR		1		1
		20	15	-	35

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

IV SEMESTER

COURSE CODE	COURSE NAME	THEORY	PR/ TU	DRAWING	CONTACT HOURS
ECG401	ANALOG CIRCUITS	5	-	-	5
ECG402	COMMUNICATION ENGINEERING I	5	-	-	5
ECG403	C PROGRAMMING	5	-	-	5
ECG471	ANALOG CIRCUITS LAB	-	4	-	4
ECG472	COMMUNICATION ENGINEERING I LAB	-	4	-	4
ECG473	C PROGRAMMING LAB	-	4	-	4
**ECG474	ENTREPRENEURSHIP & STARTUP	-	5	-	5
	PHYSICAL EDUCATION		2		2
	LIBRARY/SEMINAR		1		1
	TOTAL	15	20	-	35

** Common for all departments

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

V SEMESTER

COURSE CODE	COURSE NAME	THEORY	PR/ TU	DRAWING	CONTACT HOURS
ECG501	COMMUNICATION ENGINEERING II	5	-	-	5
ECG502	MEASUREMENT SYSTEMS & ELECTRIC VEHICLE TECHNOLOGY	5	-	-	5
ECG503	8051 MICROCONTROLLER AND EMBEDDED SYSTEMS	5	-	-	5
*ECG581	MOBILE & WIRELESS COMMUNICATION	5	-	-	5
*^ECG582	BIOMEDICAL INSTRUMENTATION				
*ECG583	E VEHICLE				
ECG571	COMMUNICATION ENGINEERING II LAB	-	4	-	4
ECG572	MEASUREMENT SYSTEMS AND SIMULATION LAB	-	4	-	4
ECG573	EMBEDDED SYSTEMS LAB	-	4	-	4
	PHYSICAL EDUCATION		2		2
	LIBRARY/SEMINAR		1		1
	TOTAL	20	15	-	35

* Elective courses ^Common with ICE syllabus

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VI SEMESTER

COURSE CODE	COURSE NAME	THEORY	PR/ TU	DRAWING	CONTACT HOURS
ECG601	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS	5	-	-	5
ECG602	INTERNET OF THINGS	5	-	-	5
*ECG681	VERY LARGE SCALE INTEGRATION	5	-	-	5
*ECG682	COMPUTER HARDWARE AND NETWORKS				
*ECG683	CONSUMER ELECTRONICS				
ECG671	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS LAB	-	4	-	4
ECG672	INTERNET OF THINGS LAB	-	4	-	4
*ECG684	VERY LARGE SCALE INTEGRATION LAB	-	4	-	4
*ECG685	COMPUTER HARDWARE AND NETWORKS LAB				
*ECG686	CONSUMER ELECTRONICS LAB				
ECG673	PROJECT WORK AND INTERNSHIP	-	5	-	5
	PHYSICAL EDUCATION		2		2
	LIBRARY/SEMINAR		1		1
	TOTAL	15	20	-	35

* Elective courses

DEPARTMENT OFELECTRONICS AND COMMUNICATION ENGINEERING

DISCIPLINE WISE TASK FORCE MEETING

EXTERNAL EXPERTS

1) Dr.G.Geetha,M.E., Ph.D,
Professor,ECE,CEG,
Anna University, Chennai-25.

2) Dr.P.Sivasankar M.E.,Ph.D,
Associate Professor,
Electrical Electronics and Communication Engg Dept
NITTTR, Tharamani, Chennai-113

3) Thiru S.Dhanasekaran M.E.,
AGM HQ North,
Flower Bazaar Telephone Exchange,
BSNL Chennai Telephones, Chennai

4) Tmt.M.J.Anitha, M.E.,
HoD,ECE Dept, Central Polytechnic College,
Tharamani, Chennai-113

5) Thiru R.Mahendran M.E.,
Scientific Assistant,
National Institute of Ocean Technology,
Chennai

6) Thiru J.Saminathan M.E.,
Teaching Fellow, CEG Campus,
Guindy, Chennai-25.

7) Dr.Arvind Balaji M.E.,Ph.D,
Application Engineer,Vasee Electronics,
Saligramam, Chennai

8) Selvi S.Shanthi,B.E
Alumni
Product Test Engineer, Crayon Data Private Ltd,
Tharamani, Chennai-113

DEPARTMENT OFELECTRONICS AND COMMUNICATION ENGINEERING

DISCIPLINE WISE TASK FORCE MEETING

INTERNAL EXPERTS

1) Mrs.A.Shyamala Jeyanthi B.Tech, M.S
SPCU Coordinator,DOTE
Lecturer(SG),ECE Department,
DDGPCW,Chennai-113

2) Mrs.K.Sudhamathi,M.E.,PhD,
HoD,ECE Department,
DDGPCW,Chennai-113

3) Thiru S.Nirmal Prabu, B.E.,
Cons.Pay Lecturer,ECE Dept
DDGPCW,Chennai-113

4) Thiru M.Manikandan,M.E.,
Cons.Pay Lecturer,ECE Dept
DDGPCW,Chennai-113

5) Tmt.B.Sindhu, M.E.,
Cons.Pay Lecturer,ECE Dept
DDGPCW,Chennai-113

6) Tmt.G.Umamaheswari, M.E.,
Part Time Lecturer/ECE Dept,
DDGPCW,Chennai-113

7)Tmt.J.Leena, M.E.,
Part Time Lecturer/ECE Dept,
DDGPCW,Chennai-113

DEPARTMENT OFELECTRONICS AND COMMUNICATION ENGINEERING

DISCIPLINE WISE TASK FORCE MEETING

EXTERNAL EXPERTS

Tmt.J.RAMA M.E.,
Principal,
Government Polytechnic College,
R.K.Nagar,Chennai-600081

Thiru.Alagappan,M.E.,
Vasee Electronics,Saligramam,
Chennai-600093.

Dr. G. Kulanthaivel, M.E.,PGDCA.,Ph.D.,MIEEE(USA)
Professor & Head ,
Electrical & Electronics and Communication Engg,
NITTTR,Chennai

SCHEME OF EXAMINATION

III SEMESTER

SL. NO	COURSE CODE	COURSENAME	Hours per week	EXAMINATION				
				Exam duration	Int. Marks (a)	Exam Marks (b)	Max. Marks (a+b)	Min. for pass
1	ECG301	ENGINEERING MATHEMATICS - III	5	3	25	75	100	40
2	ECG302	ELECTRONIC DEVICES AND CIRCUITS	5	3	25	75	100	40
3	ECG303	ELECTRICAL CIRCUITS AND INSTRUMENTS	5	3	25	75	100	40
4	ECG304	DIGITAL ELECTRONICS	5	3	25	75	100	40
5	ECG371	ELECTRONIC DEVICES AND CIRCUITS LAB	4	3	25	75	100	50
6	ECG372	ELECTRICAL CIRCUITS AND INSTRUMENTS LAB	4	3	25	75	100	50
7	ECG373	DIGITAL ELECTRONICS LAB	4	3	25	75	100	50

IV SEMESTER

SL NO	COURSE CODE	COURSE NAME	Hours per Week	EXAMINATION				
				Exam Duration	Int. Marks (a)	Exam Marks (b)	Max. Marks (a+b)	Min. for pass
1	ECG401	ANALOG CIRCUITS	5	3	25	75	100	40
2	ECG402	COMMUNICATION ENGINEERING I	5	3	25	75	100	40
3	ECG403	C PROGRAMMING	5	3	25	75	100	40
4	ECG471	ANALOG CIRCUITS LAB	4	3	25	75	100	50
5	ECG472	COMMUNICATION ENGINEERING I LAB	4	3	25	75	100	50
6	ECG473	C PROGRAMMING LAB	4	3	25	75	100	50
7	**ECG474	ENTREPRENEURSHIP & STARTUP	5	3	25	75	100	50

**Common for all departments

SCHEME OF EXAMINATION

V SEMESTER

SL NO	COURSE CODE	COURSE NAME	Hrs. Per Week	EXAMINATION				
				Exam Duration	Int. Marks (a)	Exam Marks (b)	Max. Marks (a+b)	Min. for pass
1	ECG501	COMMUNICATION ENGINEERING II	5	3	25	75	100	40
2	ECG502	MEASUREMENT SYSTEMS & ELECTRIC VEHICLE TECHNOLOGY	5	3	25	75	100	40
3	ECG503	8051 MICROCONTROLLER AND EMBEDDED SYSTEMS	5	3	25	75	100	40
4	*ECG581	MOBILE & WIRELESS COMMUNICATION	5	3	25	75	100	40
	*^ECG582	BIOMEDICAL INSTRUMENTATION						
	*ECG583	E VEHICLE						
5	ECG571	COMMUNICATION ENGINEERING II LAB	4	3	25	75	100	50
6	ECG572	MEASUREMENT SYSTEMS AND SIMULATION LAB	4	3	25	75	100	50
7	ECG573	EMBEDDED SYSTEMS LAB	4	3	25	75	100	50

* Elective courses ^Common with ICE syllabus

SCHEME OF EXAMINATION

VI SEMESTER

SL NO	COURSE CODE	COURSENAME	HRS. PER WEEK	EXAMINATION				
				Exam Duration	Int. Marks (a)	Exam Marks(b)	Max. Marks (a+b)	Min.for pass
1	ECG601	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS	5	3	25	75	100	40
2	ECG602	INTERNET OF THINGS	5	3	25	75	100	40
3	*ECG681	VERY LARGE SCALE INTEGRATION	5	3	25	75	100	40
	*ECG682	COMPUTER HARDWARE AND NETWORKS	5	3	25	75	100	40
	*ECG683	CONSUMER ELECTRONICS	5	3	25	75	100	40
4	ECG671	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS LAB	4	3	25	75	100	50
5	ECG672	INTERNET OF THINGS LAB	4	3	25	75	100	50
6	*ECG684	VERY LARGE SCALE INTEGRATION LAB	4	3	25	75	100	50
	*ECG685	COMPUTER HARDWARE AND NETWORKS LAB	4	3	25	75	100	50
	*ECG686	CONSUMER ELECTRONICS LAB	4	3	25	75	100	50
7	ECG673	PROJECT WORK AND INTERNSHIP	5	3	25	75	100	50

* Elective courses

ECG301 ENGINEERING MATHEMATICS – III

Total no of hours /week	5
Total no of weeks/ semester	16
Total no of hours/semester	80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Engineering Mathematics – III	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	Differentiations And Integrations	14
2	Fourier Series	14
3	Laplace Transforms	14
4	Z – Transforms	14
5	Probability Theory	14
	Revision and Test	10
Total		80

ENGINEERING MATHEMATICS – III

CODE NO :ECG301 **TOTAL HOURS : 80**

UNITI DIFFERENTIATIONS AND INTEGRATIONS Time:14hrs

Introduction – Leibnitz theorem - n^{th} order differentiation of standard functions – Taylor's and Maclaurin's series – Integration of rational algebraic functions of the form $\frac{px+q}{ax^2+bx+c}$ – Integration by substitution – Definite integrals – Integration by parts – Reduction formulae.

UNITII FOURIER SERIES Time:14hrs

Periodic function – Fourier series - Definition – Euler's formulae for Fourier coefficients a_0 , a_n and b_n - Even and Odd function – Fourier series expansion of full range function – Half range expansion.

UNITIII LAPLACE TRANSFORMS Time:14hrs

Definition – Laplace transform of standard function and periodic function – Inverse Laplace transforms – Method of partial fractions – Laplace transform of convolution theorem - Second order differential equations.

UNITIV Z – TRANSFORMS Time:14hrs

Introduction – z – transform – Definition - Elementary properties of z – transform – Problems based on Bilateral z – transform.

UNITV PROBABILITY THEORY Time:14hrs

Definition – Classification of probability – Conditional probability – Addition , Multiplication rules – Baye's theorem – Discrete and Continuous random variable – Mean , Variance – Standard deviation – Binomial distribution, Poisson distribution – Normal distribution – Exponential distribution.

REVISION AND TEST Time: 10hrs

Text books:

1. Prof.,T.Veerarajan :Engineering mathematics III
2. Prof.,Dr. A. Singaravelan :Engineering mathematics III
3. Prof.,Kandhaswami, Thilagavathi :Engineering mathematics III

Reference books:

1. Prof.,M.K. Venkataraman : Engineering mathematics III
2. Prof.,Manikavasagampillai : Engineering mathematics
3. Prof.,P.S.Sivaramakrishna das:Transforms and partial differential equations.

ECG302 ELECTRONIC DEVICES AND CIRCUITS

Total no of hours /week	5
Total no of weeks/ semester	16
Total no of hours/semester	80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Electronic Devices and Circuits	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	Electronic Components	14
2	Semiconductor Diodes	14
3	BJT and Biasing	14
4	FET, UJT and their Applications	14
5	Thyristors and Opto Electronic Devices	14
	Revision and Test	10
Total		80

OBJECTIVES:

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

- Familiarize various passive active components and switches
- Study the working principle of PN junction diode, zener diode and transistor
- Understand the working principle of different types of rectifiers
- Understand the different transistor configurations
- Understand the concept of transistor biasing and its types
- Study the performance of special devices like FET,MOSFET,UJT
- Study the performance of SCR, DIAC, and TRIAC
- Know the construction and working principle of optoelectronic devices
- Study the performance of LDR, LED

ELECTRONIC DEVICES AND CIRCUITS

CODE NO :ECG302 **TOTAL HOURS : 80**

UNIT I: ELECTRONIC COMPONENTS **Time:14hrs**

Introduction – classification - active & passive components - resistors – types(names) & applications of resistors - Capacitors - types(names) & applications - Capacitors in series-capacitors in parallel(no numerical) Inductors - types(names) & applications –Inductors in series-Inductors in parallel(no numerical)

Switches - Switch function – types - on/off - push button - push to on - push to off - two way switch - SPST – SPDT (definition)- Electromagnetic switches: - Relay - Principle of operation - MEMS- applications.

UNIT II : SEMICONDUCTOR DIODES **Time:14 hrs**

Review of semiconductor(not for examination)-PN junction diode - diffusion and drift current – VI characteristics of PN junction diode – cut in voltage & breakdown voltage

Rectifier – Introduction-classification of rectifiers-half wave rectifier-full wave Rectifier-center tapped – bridge (no mathematical equations)-comparison-Applications-filters- LC and PI filters

Special purpose diodes: Types (names only)-Working and characteristics of Zener diode – Zener diode as Voltage regulator - Working and characteristics of Varactor diode,concept of Gunn diode**.**

UNIT III: BJT AND BIASING **Time:14hrs**

BJT: Transistor action - PNP & NPN transistor - transistor circuit configuration: common base - common emitter - common collector configurations – BJT as amplifier-BJT as a switch

BIASING: Need for biasing-types-fixed biasing, collector to base bias and self bias(operation only, no derivation of circuit elements and parameters)-compensation techniques(define) -thermal run away.

UNIT IV: FET, UJT AND THEIR APPLICATIONS **Time:14hrs**

FET: Introduction - construction, operation and characteristics of JFET in depletion mode- Construction, operation and characteristics of MOSFET in depletion and enhancement mode – comparison of FET and BJT – comparison of FET and MOSFET

FET APPLCIATIONS: common source amplifier.

UJT: construction, operation, characteristics and applications.

UNIT V : THYRISTORS & OPTOELECTRONIC DEVICES **Time:14 hrs**

SCR: constructional details - principle of operation - transistor analogy - turning on & turning off mechanism –applications.DIAC and TRIAC: construction - operation - characteristics – applications.Opto electronic devices: principle of working, characteristics of photo diodes - photo transistors - solar panel - Opto coupler- LDR – LED - LCD - seven segment display.

REVISION AND TEST **Time: 10hrs**

Text Books:

1. Electronic Devices and Circuits - David A.Bell
2. Basics of Electronics – V.K.Mehta
3. Applied Electronics by R.S.Sedha
4. Electronics devices and circuits- L.Floyd.

Reference Books:

1. Basic Electronics - Bernard Grob
2. . Electronic Devices and Circuits - Millman and Halkias
3. Opto Electronic Devices – P. Battacharya
4. Thyristors and their applications – Ramamoorthy

ECG303 - ELECTRICAL CIRCUITS AND INSTRUMENTS

Total no of hours /week :5
Total no of weeks/ semester :16
Total no of hours/semester :80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Electrical Circuits and Instruments	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	DC Circuits and DC network theorems	14
2	AC fundamentals and AC Circuits	14
3	Resonance in AC circuits	14
4	Analog Indicating Instruments	14
5	Electronic instruments & CRO	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- Understand ohm's law and Kirchoff's laws.
- Understand the DC circuit theorems
- Solve simple problems in DC Circuits.
- Understand the different RLC series and parallel circuits
- Understand the series and parallel resonance circuits.
- Solve simple problems in AC circuits
- Understand the principle of PMMC
- Study of transformers
- Understand the usage of multimeter
- Understand the basic measuring instruments.
- Draw the block diagram of CRO

ELECTRICAL CIRCUITS AND INSTRUMENTS

CODE :ECG303 **TOTAL HOURS : 80HRS**

UNIT I : DC CIRCUITS & DC NETWORK THEOREM **Time : 14 hrs**

Concept of electrical quantity - Voltage - Current -Power- Resistance - Resistance in series, Resistance in parallel - Ohm's law - Kirchoff's voltage law - Kirchoff's current law - Nodal and Mesh Analysis -Simple problems.

Thevenin's theorem - Norton's theorem - Maximum power transfer theorem - Super position theorem - Source transformation - Star(T)to Delta(Π), Delta(Π) to Star(T) transformation(formula only) - Simple problems.

UNIT II : AC CIRCUITS AND RESONANCE **Time : 14 hrs**

Definition of period, frequency, amplitude, phase, peak value, average value, effective(RMS) value, reactance, Susceptance, impedance(Z), admittance(Y) - Voltage current relationship in RL circuit, RC circuit, RLC circuits - Series/Parallel.

RLC circuits - Series/Parallel resonance, Condition for resonance, resonant frequency, resonance curve, bandwidth, Q-factor - application of resonance circuits.

UNIT III : INDICATING INSTRUMENTS **Time : 14 hrs**

Types of AC/DC meters - Construction and working principle of PMMC instrument - Extension of DC meters - Shunt and series Multipliers - Construction and working principle of MI meter-attraction type-repulsion type.

UNIT IV: TRANSFORMERS AND MULTIMETERS **Time : 14 hrs**

Transformers: Magnetic Coupled circuit, Mutual inductance, Linear transformers: Construction- working principle-emf equation- turns ratio –efficiency- losses-applications.

Digital Multimeter-Construction ,working principle and applications.

UNIT V : MEASURING INSTRUMENTS **Time : 14 hrs**

Block diagram, working and applications of general purpose CRO, DSO, Function generator, Earth value tester, Insulation tester, Digital energy meter, Smart meters.

REVISION AND TEST **Time : 10 hrs**

Text books:

1. Electric circuit theory - Dr. M. Arumugam, N.PremKumar
2. Electrical & Electronics, Measurements and Instrumentation by A.K.Sawhney
3. Modern electronic instrumentation and measurement techniques by Albert D.Helfrick and William David Cooper

Reference books :

1. Instrumentation - Devices and systems by C.S.Rangan, G.R. Sarma and VSV. Mani
2. Electrical and electronics - Measurements and instrumentation by Umesh Sinha
3. Electronic instrumentation G.K. MIthal
4. Electrical circuits - Schaum's series - Joseph Edminister - TMH.

ECG304-DIGITAL ELECTRONICS

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Digital electronics	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	Switching algebra AND Logic Gates	14
2	Combinational Circuits	14
3	Sequential Circuits	14
4	Converters And Memories	14
5	Introduction to VLSI	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- Understand various Number System.
- Understand Boolean laws and De-Morgan's theorems
- Understand the concept of Karnaugh Map.
- Learn about logic Gates.
- Learn about CMOS and TTL.
- Learn arithmetic circuits-adder/subtractor, digital comparator.
- Understand the encoder, decoder, MUX & DEMUX
- Understand the concept of parity Generator, parity checkers, ALU
- Understand various types of flip-flops,counters
- Understand working of shift registers.
- Understand various types of ADC, DAC.
- Understand the concept of RAM & ROM and its types.
- Understand the concept of FPGA &CPLD.
- Develop a VHDL code for combinational circuits

DIGITAL ELECTRONICS

CODE NO: ECG304 **TOTAL HOURS: 80**

UNIT I: SWITCHING ALGEBRA AND LOGIC GATES **Time: 14 hrs**

Switching algebra: Binary number representation –1's complement – 2's complement – Addition and subtraction of binary numbers using 1's complement, 2's complement method – Code conversion – Octal, Hexadecimal, Decimal, Binary – BCD – TTL, CMOS.

Gates: Logic gates – Positive and negative logic– Boolean algebra – Basic laws – De Morgan's theorems – Symbolic representation and truth tables for logic gates OR, AND, NOT, NAND, NOR, 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 **Time: 14 hrs**

Basic combinational digital logic system – Design of Half adder, Half subtractor ,Full adder and Full subtractor using K-map – Four bit parallel adder – Implementing Four bit parallel adder / subtractor using full adder – Serial adder – Digital comparator – Arithmetic Logic Unit – Parity checker and parity generator – Decoder – Demultiplexer – Encoder – Multiplexer - Tri state logic **,** Bi-directional data transfer.

UNIT III: SEQUENTIAL CIRCUITS **Time: 14 hrs**

Basic sequential digital system – Flip-flop: RS Flip-flop, JK Flip-flop, T Flip-flop, D Flip-flop – Master Slave JK Flip-flop – Latches – Shift registers- SIPO, SISO, PISO and PIPO – Counters- Asynchronous / Ripple counter -UP counter, DOWN counter, UP/DOWN counter– Synchronous counter -UP counter, DOWN counter, UP/DOWN counter – Ring counter, Twisted Ring counter.

UNIT IV: CONVERTERS AND MEMORIES **Time: 14hrs**

Converters: D/A converters- Binary weighted resistors, R-2R ladder network – block diagram and functions of DAC 0800 – A/D converters: Counter type, Single slope type, Dual slope type, and Successive approximation type – block diagram and functions of ADC 0808/0809.

Memories: Classification – RAM: SRAM, DRAM – ROM: PROM, EPROM and EEPROM,FLASH

UNIT V: INTRODUCTION TO VLSI **Time: 14 hrs**

Introduction to PLA & PAL – General block diagram of CPLD, FPGA.

VLSI design process: Different level of abstractions -Data flow modelling -Behavioral modelling - Structural modelling – Steps involved in VLSI design process- Design Entry & Simulation

General format for VHDL program – VHDL codes for combinational circuits - basic gates, Half Adder & Half subtractor

REVISION AND TEST **Time: 10hrs**

Text Books:

1. Digital principles and applications. – Albert Paul Malvino& Leach.
2. Digital Design - Morris Mano
3. Verilog HDL A guide to Digital Design & Synthesis – Samir Palnitkar

Reference books:

1. Integrated Electronics - Millman&Halkies
2. Modern Digital Electronics - R.P.Jain
3. Digital Electronics - Tocci

ECG-371 - ELECTRONIC DEVICES AND CIRCUITS LAB

EQUIPMENTS REQUIRED

S. No	Name of the Equipments	Range	Required Nos
1	Dual Power Supply	(0 – 15)V	10
2	Signal Generator	(0 – 1)MHz	10
3	Dual Trace CRO/DSO	30 MHz	10
4	Transformer	12V - 0 -12V	5
5	Digital Multimeter		10
6	Computer with simulation tool		02

ELECTRONIC DEVICES AND CIRCUITS LAB

CODE NO : ECG371 **TOTAL HOURS :64**

1. Conducting the cold check using Multimeter on the following devices and checking for their conditions such as Identification of
   (1) Open or shorted junctions.
   2) anode and cathode of diode.
   (3) base, collector and emitter of transistor.
   (4) emitter, base 1 and base 2 of UJT and
   (5) gate, drain and source of a FET
   (6) Anode, Cathode and Gate of SCR
   .(7) resistance using color coding
2. V-I characteristics of pn junction diode
3. V-I characteristics of zener diode
4. Half wave rectifier with and without capacitor filter
5. Input and output characteristics of Common Emitter configuration of BJT
6. Construct the UJT Circuits and plotting V-I Characteristic.
7. Construct the LED and LDR circuits and plotting V-I Characteristics.
8. Construct the SCR circuits and plotting of V-I characteristics.
9. Construct the DIAC circuit and plotting of V-I characteristics.
10. Construct the TRIAC circuit and plotting of V-I characteristics.
11. Using simulation tool(Electronic Work Bench, Pspice etc.) ,verify V-I characteristics of pn junction diode .
12. Using simulation tool(Electronic Work Bench, Pspice etc.) ,verify V-I Characteristic of UJT.

ECG372-ELECTRICAL CIRCUITS AND INSTRUMENTS LAB

EQUIPMENTS REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Dual Power Supply	0 – 15V	10
2	Signal Generator	0-1 MHz	10
3	Dual Trace CRO/DSO	30MHz	10
4	Digital Multimeter		5
5	DRB		3
6	DIB		2
7	DCB		2
8	Computer		1
9	Simulation Software(Like Electronic Work Bench)		

ELECTRICAL CIRCUITS AND INSTRUMENTS LAB

CODE: ECG372 **TOTAL HOURS : 64 Hrs**

1. Verification of KVL and KCL
2. Verification of Thevenin's theorem
3. Verification of Norton's theorem
4. Verification of maximum power transfer theorem
5. Verification of Super position theorem
6. Determination of resonance frequency in series resonance circuit and parallel resonance circuit
7. Calibration of an ammeter and a voltmeter
8. converting a galvanometer into a voltmeter and its calibration
9. Extending the range of an ammeter and voltmeter
10. Construction and calibration of shunt type ohmmeter
11. Using simulation tool(Electronic Work Bench,Pspice ,Multisim.) ,verify KCL theorem
12. Using simulation tool(Electronic Work Bench,Pspice Multisim.) ,verify Thevenin theorem

ECG373-DIGITAL ELECTRONICS LAB

EQUIPMENTS REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	IC Trainer Kit		10
2	Computer with simulation tool		2

DIGITAL ELECTRONICS LAB

CODE NO:ECG373 **TOTAL :64 Hrs**

1. Realization of logic gates: AND, OR, NAND, NOR, OR and NOT.
2. Realization of AND, OR using NAND and NOR.
3. Realization of Half Adder and Half Subtractor.
4. Realization of Full adder.
5. Construct and test a 1- bit digital comparator.
6. Test Multiplexer (74151) and Decoder (74138).
7. Construct and test Demultiplexer
8. Construct and test encoder.
9. Test the working of D, JK, T Flip-flops (7474 or 7477, 7473or 7476).
10. Test the working of Ripple counter.
11. Write a VHDL program for logic gates (AND, OR, NOT) and simulate.
12. Write a VHDL program for half adder and full adder and simulate.

ECG401-ANALOG CIRCUITS

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Analog Circuits	Hours/ week	Hours/ Semester	Assessment marks		
			Internal	External	Total
	5	80	25	75	100

Topics and allocation

UNIT	TOPIC	TIME(HRS)
1.	Small signal Amplifier	14
2.	Feedback and Power Amplifiers	14
3.	Oscillators and Tuned Amplifiers	14
4.	Op amp and its applications	14
5.	Waveform Generators	14
	Revision and test	10
	Total	80

OBJECTIVES:

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

- Understand the concept of small signal amplifiers
- Understand Multistage amplifiers
- Concept of feedback amplifiers and power amplifiers
- Understand the concept of Tuned Amplifiers
- Study the performance of different types of oscillators
- Study basic Op Amp ,its characteristics and applications
- To know about PLL and its applications.
- Understand the concept of different waveshaping circuits
- Study about waveform generators.
- Study about IC555 and its applications

ANALOG CIRCUITS

CODE NO:ECG401 **TOTAL HOURS: 80**

UNIT I: SMALL SIGNAL AMPLIFIERS **Time: 14 hrs**

CB-CE-CC Amplifier-input impedance, output impedance, voltage gain, current gain (comparison)-Bootstrap, Darlington amplifier, multistage amplifier: RC coupled amplifier-frequency response of RC coupled amplifier.

UNIT II: FEED BACK AND POWER AMPLIFIERS **Time: 14 hrs**

Feedback techniques: positive and negative feedback - types of negative feedback-voltage series feedback - current series feedback- voltage shunt feedback - current shunt feedback – comparison of different types of negative feedback – typical circuits of different types of negative feedback amplifiers(circuits only).

Power amplifiers: classification of power amplifiers - class A, class B, class C amplifier –efficiency (definition only) of power amplifier - class B push pull amplifier - complementary symmetry push pull amplifier.

UNIT III: OSCILLATORS AND TUNED AMPLIFIERS **Time: 14 hrs**

Oscillators: Introduction - condition for oscillation - classification of oscillators - LC resonant oscillator: Hartley - Colpitts Oscillator - RC oscillators: RC phase shift oscillator & Wien bridge oscillator.

Tuned amplifiers: Working of single tuned amplifier (capacitor coupled) - characteristics of parallel tank circuit – Advantages of tuned amplifiers - Frequency response of tuned amplifier.

UNIT IV: OP AMP AND ITS APPLICATIONS **Time: 14 hrs**

Operational amplifier: Block diagram, Characteristics of an Ideal op amp - op amp in inverting mode, non-inverting mode, voltage follower mode - Applications of Op amp: adder, subtractor, integrator, differentiator, comparator, Digital to Analog converter - symbol, pin diagram of op amp IC 741 - Instrumentation amplifier - block diagram and applications of PLL.

UNIT V: WAVE FORM GENERATORS **Time: 14 hrs**

Clipper, Clamper circuits using diodes - Voltage multipliers - Miller integrator ramp generator, Bootstrap ramp generator – astable multivibrator using transistor and opamp.

IC 555 - pin diagram – astable multivibrator, monostable multivibrator using IC 555 timer.

REVISION AND TEST **Time: 10 hrs**

Text Books:

1 Electronic Device and Circuits – G.K.Mithal

2. Electronic Principles – Metha

3. Electronic Devices and Circuits–David A.Bell

Reference Books:

1. Electronic Devices and Circuits – Millman and Halkias

2. Electronic Circuit Analysis and Design-Donald A.Neeman

3. Operational amplifiers and Linear Integrated Circuits – Robert F.Coughlin&FredeerickF.Driscoll

4. Linear Integrated Circuits – Roy Chouthry

ECG402 - COMMUNICATION ENGINEERING I

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Communication Engineering I	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	Signals & Systems	14
2	Filters, Antennas and wave propagation	14
3	AM, FM and PM	14
4	Television Engineering & Display Unit	14
5	Computer Networks	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- understand classification of signals .
- Understand the concept of signals using Fourier Transform
- understand the basic principles of Filters, transmission line
- understand the principle of working of antenna
- understand the theory of Propagation
- understand the concept of modulation
- study amplitude modulation process
- study the Frequency modulation process
- learn about different types of FM Transmitter and Receiver:
- understand the concept of Pulse modulation
- understand principle of scanning
- understand principles of transmission and reception of television
- understand the concept of data communications and networks
- learn about different types of topologies and networks
- understand the theory of transmission media and network models

COMMUNICATION ENGINEERING I

CODE :ECG402 **TOTAL HOURS : 80hrs**

UNIT I : SIGNALS & SYSTEMS **Time : 14 hrs**

Elementary signals- Classification of signals(definition only)- Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals Fourier and Laplace transform (properties only).

Classification of systems(definition Only) CT systems and DT systems- – Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable-properties of LTI systems and Z-Transform

UNIT II : FILTERS, ANTENNAS AND WAVE PROPOGATION **Time : 14 hrs**

Filters : Definition- Types-Constant K LPF - Transmission lines : Fundamentals of Transmission Lines - Equivalent circuit - Characteristic Impedance - SWR(Definition only).

Antenna Definition –Antenna Parameters : Directivity, Directive gain, Power gain, Field intensity, Antenna resistance, Band width, Beam width polarization, Classification of antennas – Monopole antenna – Dipole antenna-Introduction to Smart antenna.

Electromagnetic Frequency spectrum-Propagation of waves: Ground wave, Sky wave and Space wave propagation.

Unit III : AM, FM AND PM **Time : 14 hrs**

Modulation - Need for modulation - types of modulation AM & FM : mathematical expression , Frequency spectrum bandwidth requirements & power relation.

AM Transmitter : Types(Names only) - Block diagram & working principle of high level transmitter.

AM Receiver: Types(Names only) - Block diagram & working principle of Super heterodyne receiver.

Frequency modulation : FM generation - Direct method - FM demodulation, Effect of noise in FM - pre emphasis - de emphasis- Slope detector. Introduction to phase modulation

Pulse modulation: Types(Names only) - Definition-PAM, PWM,PPM and PCM - Block diagram of PCM transmitter and receiver.

UNIT IV : TELEVISION ENGINEERING & Display unit **Time : 14 hrs**

Scanning principle- synchronization -aspect ratio-Principle of Monochrome transmission and reception-Block diagram and working of PAL Colour Receiver

Working of LED display –Concept of OLED, QLED & HDTV

UNIT V : COMPUTER NETWORKS **Time : 14 hrs**

Data Communication: Components of a data communication -Data flow:Simplex-Half duplex.Transmission Media(Names only)

Networks-Definition -Network criteria-Types of connections: point to point -multi point -Topologies :Star,Bus,Mesh,Hybrid-Advantages and disadvantages of each topology-

Types of networks:LAN-MAN-WAN-Internet-Intranet-Ethernet,Client-server,peer to peer networks,WLAN,WIFI,WIMAX&(features only).

Network Models: Protocol Definition- Standards- OSI Model-Layered architecture-Function of all layers-Overview of TCP/IP.

REVISION AND TEST **Time : 10 hrs**

Text books:

1. Network Lines and Fields-J.D.Ryder.
2. Electronic Communication Systems-Kennedy
3. Computer networks,Andrew S.Tanenbaum,Prentice-Hall of India,New Delhi,
4. Signals and systems-Dr. J.S.Chithode.

Reference books :

1. Transmission lines and Networks- Umesh sinha.
2. Communication Engineering- Umesh Sinha
3. Electronics Communication -Dennis Roddy & John Coolen.

ECG403-C PROGRAMMING

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
C programming	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	Program development & introduction to c	14
2	Decision making ,arrays and strings	14
3	Functions ,structures and unions	14
4	Pointers	14
5	File management and preprocessors	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- understand program definition
- List down and explain various program development steps
- understand algorithm and flowchart
- understand the concepts of constants, variables ,datatypes and operators
- Develop programs using input and output operators
- Write programs using different looping and branching statements
- Write programs based on arrays and string handling function
- Write programs using user defined functions , structures and union
- Write programs using pointers
- Write programs using command line arguments
- Write programs using file handling functions
- Write programs using compiler controlled directives.

C PROGRAMMING

CODE NO: ECG403 **TOTAL HOURS:80**

UNIT I:PROGRAM DEVELOPMENT & INTRODUCTION TO C **Time: 14Hrs**

Program definition-Program development cycle - Programming Languages – Low Level language – High Level Language – Features of a good programming language- Algorithm - Definition –Flow Chart –Flow chart symbols - Examples on Algorithm and flow chart: Area & circumference of circle, Largest of 2 numbers & odd or even, factorial of a given number. Introduction to C: History of C- Features of C Language -Structure of a C program– Execution of C Program : Compiling, Link and Run a program - C character set – tokens - data types and storage class – data type Qualifiers - Declaration of variables – Assigning values to variables – Escape sequences - defining symbolic constants- C operators: Arithmetic, Logical, assignment, relational, increment and decrement, conditional, bit wise, special -operator precedence-C expressions – Arithmetic expressions – evaluation of expressions – type conversions in expressions – type cast operator -operator precedence and associativity - I/O statements : Formatted input, formatted output, Unformatted I/O statements –C program to calculate simple and compound interest.

UNIT II: DECISION MAKING, ARRAYS AND STRINGS **Time:14Hrs**

Decision making & Branching: Introduction – simple if statement -if-else, else-if ladder, nested if-else -switch statement -goto statement - Looping Statements: while, do-while statements, for loop, break & continue statement –C program to find the largest of three numbers- C program to perform addition, subtraction, multiplication and division according to user's choice.

Arrays: Declaration and initialization of one dimensional, two dimensional and character arrays- accessing array elements. –C program to implement Matrix Addition Subtraction & Transpose.

Strings: Declaration and initialization of string variables, reading string, writing strings - string handling functions from standard library (strlen(), strcpy(), strcat() and strcmp()-C program to determine whether the given string is palindrome or not.

UNIT III :FUNCTIONS , STRUCTURES AND UNIONS **Time:14Hrs**

Built-in functions: Math functions -console I/O functions -Standard I/O functions - User defined Functions: Need of user defined functions, scope and life time of variables, defining functions, function call (call by value, call by reference), return values, storage

classes. category of function(No argument No return value, No argument with return value, argument with return value) -recursion-C program to find the factorial of a given number with recursion.

Structures and Unions: Structure -definition, Initialization, Comparison of structure variables, Arrays of Structures, Arrays within structures, Structures within structures, Structures and functions – Unions – structure of Union-Difference between Union and structure – C program to prepare the total marks for N students by reading the Rengo, Name, Marks by using array of structures.

UNIT IV: POINTERS **Time:14Hrs**

Pointers: Introduction – Difference between Pointers and Variables-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.

Dynamic memory Management: Introduction functions -Memory allocation process – Allocating a block of memory : MALLOC – Allocation of multiple blocks of memory : CALLOC – Releasing the used space: FREE – Altering the size of the block: REALLOC –C Program to find the length of the given string using pointers- c program to reverse the given string using pointers.

UNIT – V FILE MANAGEMENT & PREPROCESSORS **Time:14Hrs**

File Management: Introduction – Defining and Opening a file -Closing a file Input/output operations on files – Error handling during I/O Operations Random access to files – Command line arguments: Introduction – argv and argc arguments

The Preprocessor: Introduction - Macro substitution, File inclusion, Compiler control directives .

REVISION AND TEST **Time: 10 Hrs**

Text Books

1. Programming in ANSI C -E.Balagurusany Tata Mc-Graw Hill, New Delhi

Refernce Books

1. Programming and Problem solving using C ISRD Group , Lucknow Tata Mc-Graw Hill, New Delhi 2010
2. Let us C - YeswanthKanetkar BPB Pulications
3. Programming in “c”- D.Ravichandran New Age International (P) Ltd.

EQUIPMENTS REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Dual Power Supply	0 – 15V	8
2	Signal Generator	0-1 MHz	8
3	Dual Trace CRO/DSO	30MHz	10
4	Digital Multimeter		6
5	RC Phase shift oscillator kit		2
6	Feedback Amplifier kit		2
7	Hartley Oscillator kit		2
8	RC coupled Amplifier kit		2
9	Emitter follower kit		2
10	Single tuned amplifier kit		2
11	Monostable multivibrator kit using 555 Timer		2
12	Class A power amplifier kit		2

ANALOG CIRCUITS LAB

CODE NO:ECG471 **Total Hours: 64**

1. Test and Plot the frequency response of RC Coupled amplifier.
2. Test the performance of Class A Power amplifier
3. Test the performance of RC phase shift oscillator
4. Test and Plot the frequency response of Emitter follower Circuit.
5. Test the performance of single tuned amplifier.
6. Construct and test the inverting and non inverting amplifier using OP-AMP (IC 741)
7. Construct and test the performance of Clippers using diodes
8. Construct and test the performance of clampers using diodes
9. Construct and determine the regulation characteristics of full wave voltage doubler.
10. Test the performance of waveform generator using opamp.
11. Test the performance of astable multivibrator using IC555.
12. Test the performance of monostable multivibrator using IC555.

ECG472 - COMMUNICATION ENGINEERING I LAB

EQUIPMENTS REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Dual Power Supply	0 – 15V	2
2	Audio oscillator	0-20KHz	2
3	Load speaker		2
4	Function Generator	0-1MHz	10
5	Dual Trace CRO/DSO	30MHz	10
6	Digital Multimeter		2
7	Amplitude Modulator & Detector kit		2
8	Frequency Modulator kit & Demodulator kit		2
9	Time division Muxing&DeMuxing kit		2
10	Three way cross over network system		2
11	PAM kit		2
12	PPM kit		2
13	PCM kit		2
14	PWM kit		2

COMMUNICATION ENGINEERING I LAB

CODE : ECG472 **TOTAL HOURS: 64**

1. Construct and test the performance of a Low Pass Filter. Draw the characteristic curve and determine the cutoff frequency.
2. Construct and test the performance of a High Pass Filter Draw the characteristic curve and determine the cutoff frequency.
3. Construct and test the performance of a Band Pass Filter Draw the characteristic curve and determine the cutoff frequency.
4. Test the performance of Pulse Code Modulation & Demodulation
5. Construct and test the performance of an AM circuit and draw the output waveforms and also to calculate the modulation index.
6. Construct and test the performance of a FM circuit and draw its output waveforms and also to calculate the modulation index.
7. Construct and test the performance of a AM detector.
8. Frequency response characteristics of a Pre-emphasis and De-emphasis circuits
9. Test the performance of Time Division Multiplexing &Demultiplexing.
10. Test the performance of Pulse Amplitude Modulation & Demodulation.
11. Test the performance of Pulse Width Modulation & Demodulation.
12. Construct and test the performance of a cross over network for a three way system. Draw the response curve over the audio range

ECG473 - C PROGRAMMING LAB

HARDWARE AND SOFTWARE REQUIRED

S.No	Name of the Equipments	Range	Required Nos
1	Desktop computers		36
2	Laser printer		4
3	C Compiler with editor		

C PROGRAMMING LAB

CODE NO : ECG473 **TOTAL HOURS :64**

1. Write a C Program to calculate Simple and Compound interest
2. Write a program to find the roots of a quadratic equation
3. Write a program to generate Fibonacci series.
4. Accept two numbers and based on user's choice perform addition, subtraction multiplication and division.
5. Write a program to check whether the given string is palindrome or not.
6. Write a program to arrange the given N names in alphabetical order
7. Write a program to implement matrix addition and transpose
8. Write a program to prepare the total marks for N students by reading the Regno,Name,Mark1 to Mark6 by using array of structures. .
9. Write a function to calculate the sum and average of given N numbers. Write a main function to call the above function
10. Write a program to find the factorial of a given number
    (i) Without recursion (ii) With recursion.
11. Using pointers, find the length of the given string.
12. Write a program to copy contents of one file to another file. Also find the number of characters, lines and words in the above file.

ECG474 - ENTREPRENEURSHIP AND STARTUP

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
ENTREPRENEURSHIP AND STARTUP	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	Entrepreneurship – Introduction and Process	14
2	Business Idea and Banking	14
3	Start ups, E-cell and Success Stories	14
4	Pricing and Cost Analysis	14
5	Business Plan Preparation	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- Acquire Entrepreneurial spirit and resourcefulness
- Understand the concept and process of entrepreneurship
- Acquire entrepreneurial quality, competency and motivation
- Learn the process and skills of creation and management of entrepreneurial venture
- Familiarization with various uses of human resource for earning dignified means of living
- Know its contribution and role in the growth and development of individual and the nation
- Understand the formation of E-cell
- Aware the concept of incubation and starts ups
- Survey and analyze the market to understand customer needs
- Understand the importance of generation of ideas and product selection
- Learn the preparation of project feasibility report
- Understand the importance of sales and turnover
- Familiarize of various financial and non-financial schemes

ENTREPRENEURSHIP AND STARTUP

CODE : ECG474 **TOTAL HOURS : 80**

UNIT I : ENTREPRENEURSHIP – INTRODUCTION AND PROCESS **Time : 14 hrs**

Concept, Functions and Importance - Myths about Entrepreneurship - Pros and Cons of Entrepreneurship - Process of Entrepreneurship - Benefits of Entrepreneur - Competencies and characteristics - Ethical Entrepreneurship - Entrepreneurial Values and Attitudes – Motivation – Creativity - Innovation - Entrepreneurs - as problem solvers - Mindset of an employee and an entrepreneur - Business Failure - causes and remedies - Role of Networking in entrepreneurship.

UNIT II : BUSINESS IDEA AND BANKING **Time : 14 hrs**

Types of Business: Manufacturing, Trading and Services - Stakeholders: Sellers, vendors, consumers and Competitors - E- commerce Business Models - Types of Resources: Human, capital, Entrepreneurial tools and resources - Selection, utilization of human resources and professionals, etc. - Goals of Business; Goal Setting - Patent, copyright and Intellectual property rights - Negotiations - Importance and methods - Customer Relations and Vendor Management - Size and capital based classification of business enterprises - Various sources of Information - Role of financial institutions - Role of Government policy - Entrepreneurial support system - Incentive schemes for State Government - Incentive schemes for Central Government.

Unit III : START UPS, E-CELL AND SUCCESS STORIES **Time : 14 hrs**

Concept of Incubation centres - Visit and report of DIC , financial institutions and other relevance institutions - Success stories of Indian and global business legends - Field Visit to MSME's - Study visit to Incubation centers and startup - Learn to earn - Startup and its stages - Role of Technology – E-commerce and Social Media - Role of E-Cell - E-Cell to Entrepreneurship

UNIT IV : PRICING AND COST ANALYSIS **Time : 14 hrs**

Unit of Sale, Unit Price and Unit Cost - for single product or service - Types of Costs - Start up, Variable and Fixed - Income Statement - Cash flow Projections - Break Even Analysis - for single product or service – Taxes - Financial Business Case Study - Understand the meaning and concept of the term Cash Inflow and Cash outflow – Price - Calculate Per Unit Cost of a single product - Operational Costs - Understand the importance and preparation of Income Statement - Prepare a Cash Flow Projection – Projections - Pricing and Factors affecting pricing - Launch Strategies after pricing and proof of concept

UNIT V : BUSINESS PLAN PREPARATION **Time : 14 hrs**

Generation of Ideas - Business Ideas Vs. Business Opportunities - Opportunity Assessment – Factors, Micro and Macro Market Environment - Selecting the Right Opportunity - Product selection - New product development and analysis - Feasibility Study Report – Technical analysis, financial analysis and commercial

analysis - Market Research - Concept, Importance and Process - Market Sensing and Testing - Marketing and Sales strategy - Digital marketing - Branding - Business name, logo, tagline - Promotion strategy - Business Plan Preparation - Social Entrepreneurship as Problem - Solving - Concept and Importance - Risk Taking- Concept - Types of business risks - Execution of Business Plan

REVISION AND TEST **Time : 10 hrs**

Reference books :

1. Dr. G.K. Varshney: Fundamentals of Entrepreneurship, Sahitya Bhawan Publications, Agra - 282002.
2. Dr. G.K. Varshney: Business Regulatory Framework , Sahitya Bhawan Publications, Agra - 282002.
3. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd: Entrepreneurship , McGraw Hill (India) Private Limited, Noida - 201301.
4. M. Scarborough, R. Cornwell: Essentials of Entrepreneurship and small business management, Pearson Education India, Noida - 201301.
5. Charantimath Poornima M.: Entrepreneurship Development and Small Business Enterprises, Pearson Education, Noida - 201301.
6. Trott: Innovation Management and New Product Development, Pearson Education, Noida - 201301.
7. M N Arora: A Textbook of Cost and Management Accounting, Vikas Publishing House Pvt. Ltd., NewDelhi-110044.
8. Prasanna Chandra: Financial Management, Tata McGraw Hill Education Private Limited, New Delhi.
9. I.V. Trivedi, Renu Jatana: Indian Banking System, RBSA Publishers, Rajasthan
10. Simon Daniel: How To Start A Business In India, Buuks, Chennai –600018.
11. Ramani Sarada: The Business Plan Write -Up Simplified - A practitioners guide to writing the Business Plan, Notion Press Media Pvt. Ltd., Chennai 600095.

ECG501 - COMMUNICATION ENGINEERING II

Total no of hours /week	5
Total no of weeks/ semester	16
Total no of hours/semester	80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Communication engineering II	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	Digital communication	14
2	Microwave communication and Radar Fundamentals	14
3	Optical Communication	14
4	Satellite communication	14
5	Cellular communication	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- To study basic digital communication system and discuss the characteristics of data transmission circuits
- To learn error detection and correction codes and various digital modulation techniques
- To study the fundamentals of Microwave communication
- To understand the principles of radar and navigational aids
- To understand optical communication system and discuss about fiber modes ,configurations ,losses optical sources and detectors
- To understand satellite orbits& satellite sub systems
- To study the fundamental cellular concepts such as frequency reuse,handoff
- To learn multiple access techniques
- To learn about GSM cellular system

COMMUNICATION ENGINEERING II

CODE NO: ECG501 **TOTAL HOURS: 80hrs**

UNIT I: DIGITAL COMMUNICATION **Time: 14 hrs**

Fundamental block diagram and basic elements of digital communication system - advantages, disadvantages of digital communication - characteristics of data transmission circuits - bandwidth requirement - speed - baud rate - noise -cross talk - distortion – equalizers.

Digital modulation techniques: Block diagram and operation of ASK modulation /demodulation - FSK modulation/demodulation - PSK modulation/demodulation.

Error Detection And Correction Codes – Parity Check Codes – Redundant Codes – Retransmission - Forward Error Correcting Code – Hamming Code - Turbo codes.

UNIT II : MICROWAVE COMMUNCIATION & RADAR FUNDAMENTALS **Time:14hrs**

Phase and group velocity - Basic concept of : Wave guide Tees - Hybrid Junction - Cavity Resonator - Directional Coupler - Working principle of Klystron, Magnetron, Traveling wave tube - Block diagram of microwave Transmitter &Receiver.

Radar System- Block Diagram-Radar Range Equation (Qualitative Treatment) – Factors influencing Max. Range-Applications – Navigational aids – Direction finders.

Introduction to Millimeter waves -Characteristics and its uses.

UNIT III : OPTICAL COMMUNICATION **Time: 14hrs**

Optical communication system: Advantages of optical fiber-Block diagram of optical communication system - Principle of light transmission in a fiber using Ray Theory - single mode fibers - multimode fibers - step index fibers - graded index fibers

Attenuation in optical fibers - Absorption losses, scattering losses, bending losses, core and cladding losses. Dispersion mechanism – Intramodal, intermodal dispersion

Optical sources: LED and Laser principles - optical detectors: PIN and APD.

UNIT IV: SATELLITE COMMUNICATION **Time: 14hrs**

Satellite System – Frequency allocation for satellite services – Kepler's Law – Orbits types :LEO-MEO-GSO– Orbital perturbations .

Space Segment: Power Supply - Attitude Control - Station Keeping -TT & C Subsystems - Transponders - Antenna Sub systems

Earth Segment: Block diagram of Transmit - Receive earth station - DBS(DTH) Global Positioning System - Space Segment- Control segment - User Segment- Services - Applications

UNIT V: CELLULAR COMMUNCIATION **Time: 14 hrs**

Cellular Communication - Frequency allocation - Cellular concept -frequency reuse - Interference: co channel interference - adjacent channel interference - improving coverage and capacity in cellular systems - cell splitting - sectoring - handoff – GSM Architecture – Introduction to FDMA,TDMA & CDMA- Introduction to GPRS, EDGE & HSPA.

REVISION AND TEST **Time: 10 hrs**

Text Books:

1. Electronic Communication Systems - George Kennedy -Tata McgrawHill
2. Optical Communication-KEISER
3. Wireless Networks - Pahalavan

Reference Books:

1. Satellite Communication – Dennis Roddy – Mc GrawHill
2. Wireless communication principles and practice THEODORE S.RAPPERPORT

ECG502- MEASUREMENT SYSTEMS & ELECTRIC VEHICLE TECHNOLOGY

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Measurement Systems & Electric Vehicle Technology	Hours/ week	Hours/ semester	Assessment marks		
			Internal	External	Total
	5	80	25	75	100

Topics and allocation

UNIT	TOPIC	TIME(HRS)
1.	Signal Generators & Analyzers	14
2.	Bridges & Digital Instruments	14
3.	Measurement of Non electrical Quantities	14
4.	Electric Vehicles	14
5.	AC Machines & DC Machines	14
	Revision and test	10
	Total	80

OBJECTIVES:

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

- Study of signal generator
- Explain the function generator and pulse generator
- Explain the principle of frequency synthesizers & analyzers
- List out the types of bridges
- Explain the concept of digital meter
- Study the basic measuring instruments
- List out the classification of transducers
- Explain the principle of operation of transducers
- Study the different types of electric vehicles
- Study the different types of batteries used in EV
- Study the principle and types of DC generators and DC motors
- Explain the principle and types of AC machines

MEASUREMENT SYSTEMS & ELECTRIC VEHICLE TECHNOLOGY

CODE NO :ECG502 **TOTAL HOURS : 80**

UNIT I: SIGNAL GENERATORS & ANALYZERS **Time: 14 Hrs**

Signal Generators: Block Diagram & Principle of operation of –AF signal generator, RF signal generator- Function generator- pulse generator- Pattern generator- sweep Frequency Generator

Analyzers: Distortion Analyzer,Spectrum Analyzer - Block diagram & Working principle of frequency synthesizer- Direct & Indirect method.

UNIT II: BRIDGES & DIGITAL INSTRUMENTS **Time:14Hrs**

Bridges: Basic operation of Bridges – Wheat stone Bridge, Schering Bridge, Maxwell's Bridge- Hay's Bridge- Wien's Bridge.

Digital instruments: Comparison of Digital & Analog Instruments – Characteristics of digital meters –Digital Voltmeter- Digital Tachometer-Digital Panel meter-Digital Storage oscilloscope(DSO)- Digital Multimeter.

UNIT III: MEASURMENT OF NON ELECTRICAL QUANTITIES **Time:14hrs**

Classification of transducers- strain gauge: bonded,unbonded and semiconductor - Measurement of load :Block diagram & working of Electronic weighing machine - Measurement of temperature: RTD, thermistor, thermo couple- Seeback effect- Radiation Pyrometer - Measurement of light intensity using photo sensitive transducer (LDR)– Measurement of Displacement using LVDT.

UNIT IV ELECTRIC VEHICLES: **Time:14hrs**

Introduction to Electric Vehicle (EV) - Types(Names only):Battery Electric Vehicle (BEV) ,Hybrid electric Vehicle(HEV) , Plug-in Hybrid Electric Vehicle (PHEV),Fuel Cell Electric Vehicle (FCEV)-Differentiate between BEV and Conventional Vehicle - Block diagram of BEV - Types of EV motors - DC motor drives– Permanent Magnetic Brush Less DC Motor Drives (BLDC)-Merits and Demerits of DC motor drive- Introduction to Battery- Types-Lead Acid Batteries, Nickel Based Batteries and Lithium Based Batteries - Battery tester-Charging -DC charging, Wireless charging.

UNIT V: AC MACHINES & DC MACHINES **Time:14hrs**

Construction, working principle and application of DC Generator, DC Motor-classification of ac motors(names only)- Construction & working principle of Single phase Induction motor-Need of earthing in Machine-Types of Earthing - Types of fuse-Special Purpose Motors Types - Construction, working principle and application of stepper motor.

REVISION AND TEST **Time:10hrs**

Text Books:

1. Electrical & Electronics and Measurements& Instrumentation by A.K.Sawhney
2. Modern Electronic Instrumentation & Measurements Techniques by Albert D. Helfrick and William David Cooper
3. A text book of Electrical Technology- B.L.Theraja and A.K.Theraja Volume1 Basic Electrical Engineering & Volume 2 AC & DC Machines

Reference Books:

1. Instrumentation - Devices & Systems by C.S. Rangan, G.R. Sarma & VSV.Mani
2 Electrical & Electronics – Measurements and Instrumentation by Umesh Sinha
3 Electronic Instrumentation G.K. Mithal
4. Electrical Machines- S.K.Bhattacharya (TTTI Chandigarh)-TMH
5. Electronic Instrumentation- Kalsi.

ECG503: 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS

Total no of hours /week 5
Total no of weeks/ semester 16
Total no of hours/semester 80

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
8051 Microcontroller and Embedded systems	5	80	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
1	8051 Microcontroller	14
2	Introduction to Embedded system and ARM Processor	14
3	Arm instructions set and interrupts	14
4	Embedded C basics, GPIO (Slow), Timer, interrupt, PWM and RTC	14
5	ADC, DAC, I^2C feature, UART	14
	Revision and test	10
Total		80

OBJECTIVES

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

- understand the history and concept of MP & MC
- understand the features of MC 8051
- Understand architecture of 8051 & function of various registers
- Differentiate between CISC and RISC architecture
- Understand the ARM design philosophy
- Understand the ARM architecture and the pipeline structure
- Understand the Instruction sets of ARM processor.
- Understand various operational modes in ARM processor
- Understand Embedded C basics, GPIO (Slow), Timer, PWM,ADC,DAC and RTC

8051 MICRO CONTROLLER AND EMBEDDED SYSTEMS

CODE : ECG503 **TOTAL HOURS: 80**

UNIT I: 8051 MICROCONTROLLER **Time:14hrs**

Evolution of microprocessor(Not for examination purpose)-Comparison of microprocessor and microcontroller(Not for examination purpose)-- Features of Micro controller - 51 family - 8051 Block diagram - pin details of 8051 - Memory organization: Internal memory and external memory - Special Function Registers - bit pattern of PSW & PCON - Timers: timer 0 & timer 1 registers - timer operation modes - TMOD & TCON register.

UNIT II: Introduction to Embedded system and ARM Processor **Time: 14Hrs**

Definition of Embedded System – Features of Embedded System – Types of Embedded System – List of Embedded System Devices-RISC and CISC Processors(comparision)

ARM PROCESSOR FUNDAMENTALS Data Flow model, modes of operation, Current Program Status Register, Pipeline, Exceptions, Interrupts and the Vector Table

ARM PROCESSOR Introduction to LPC 2148 ARM controller – Block Diagram, memory and on chip peripheral devices – Nomenclature and Families

UNIT III: ARM INSTRUCTIONS SET AND INTERRUPTS **Time: 14 Hrs**

ARM and THUMP 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, Prioriies, Link Register offsets, Interrupts, IRQ and FIQ Exceptions, Interrupt stack design and implementation

UNIT IV: Embedded C basics, GPIO (Slow), Timer, interrupt, PWM and RTC

Time: 14 Hrs

Embedded C Basics - GPIO (Slow) Register Map - Pin Connect Block - 8 bit LEDs - 8 bit Switches - Buzzer - Relay -Stepper Motor Interfaces -Timer/Counter - Block Diagram - Register Map Vector Interrupt Controller (VIC) - Register description -External Interrupts - Timer/Counter based Interrupt- PWM Features- block diagram - Register Map - RTC Feature - Block Diagram - Register Map

UNIT V: ADC, DAC, I^2C feature, UART **Time: 14 Hrs**

ADC Feature - Block Diagram - Register Map - DAC Feature – Block Diagram - Register Map - Introduction to I2C – Start, Stop, ACK, Restart, NACK signals – Data transfer from Master to Slave and Slave to Master - I2C feature in LPC 2148 – Block diagram –Register map – I2C Master mode operation – Interfacing I2C based I/O expander PCF8574 – Interfacing LED – 7 segment display – UART feature – UART0 Block diagram – Register map –Transmission and reception of messages for PC

REVISION AND TEST **Time: 10 hrs**

Text Books:

1. The 8051 Micro controllers and Embedded systems- Mohammed Ali Mazidi
2. Embedded/Real-Time Systems: Concepts, Design and Programming – Dr. K.V.K.K. Prasad
3. ARM system – on chip Architecture (2nd Edition) By Steve Furbe

Reference Books:

1. Embedded systems Architecture – Tammy Noergaard
2. ARM System Developer's Guide – AsndrewN.Sloss
3. ARM Architecture Reference Manual – David seal
4. ARM System – on – Chip Architecture (2nd Edition) by steveFurbe
5. MicroC/OS – II The Real Time Kernel Jean J. Labrosse
6. Real Time concepts for Embedded Systems – by Qing Li and Caroline Yao
7. LPC 2148 User Manual

ECG571 - COMMUNICATION ENGINEERING II LAB

EQUIPMENT REQUIRED

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
1	Computer		10
2.	Klystron based microwave test bench		2
3.	Optical transceiver kit		3
4.	DSO/CRO		4
5.	MATLAB Software		10 users

COMMUNICATION ENGINEERING II LAB

CODE NO:ECG571 **TOTAL HOURS: 64**

1. Perform linear convolution between two signals using MATLAB
2. Find out the FFT spectrum of continuous time signal.
3. Characteristics of klystron.
4. Find the Numerical Aperture of Optical Fiber.
5. Test the performance of Transmission and Reception using Optical Link.
6. Measurement of connector and bending loss.
7. Construct and test the performance of ASK Modulation system using MATLAB
8. Construct and test the performance of ASK demodulation system using MATLAB.
9. Construct and test the performance of FSK Modulation system using MATLAB
10. Construct and test the performance of FSK Demodulation system using MATLAB
11. Construct and test the performance of BPSK Modulation system using MATLAB
12. Construct and test the performance of BPSK demodulation system using MATLAB

ECG572- MEASUREMENT SYSTEMS AND SIMULATION LAB

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
1.	Strain gauge kit		2
2.	RTD, Thermistor & Thermocouple kit		2
3.	Maxwell's bridge kit		2
4.	LVDT kit		2
5.	Schering's Bridge kit		2
6.	DRB		5
7.	Power supply	(0-30)V	5
8.	Multimeter		5
9.	Labview simulation software		10 Users

MEASUREMENT SYSTEMS AND SIMULATION LAB

CODE NO:ECG572 **TOTAL HOURS: 64**

1. Measurement of Resistance using Wheat stone's bridge .
2. Measurement of capacitance using Schering Bridge.
3. Measurement of Inductance using Maxwell's bridge.
4. Measurement of displacement using LVDT.
5. Measurement of light intensity using LDR.
6. Measurement of temperature using RTD.
7. Measurement of temperature using Thermocouple &Thermistor.
8. Construct a LABVIEW code to arithmetic calculator.
9. Construct a LABVIEW code to half adder and full adder.
10. Construct a LABVIEW code for functional generator.
11. Study of waveform graph & chart.
12. Distinguish the water temperature as hot or cold by the following condition data using LABVIEW.

Temp < 20	-	Cold
20 < Temp < 80	-	Warm
Temp > 80	-	Hot

ECG573 - EMBEDDED SYSTEMS LAB

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
1.	ARM7 TDMI Kit with interface boards		10
2.	Interface support and devices like RTC, ADC, LCD, Seven segment display, LEDS ,Switches and stepper motor		
3.	Manual for the kit		

EMBEDDED SYSTEMS LAB

CODE NO: ECG573 **TOTAL HOURS: 64**

1. Introduction with Embedded C / C++ Programming for ARM Processor.
2. Write Programs for a) 8 bit digital output – LED interface b) 8 bit digital Inputs (Switch Interface).
3. Write Programs for a) 4 x 4 Matrix keyboard b) Buzzer c) Relay Interface.
4. Write a program for character-based LCD interface.
5. Write a program for Analog to Digital Conversion (on chip ADC).
6. Write interface programs for Serial Transmission and Reception.
7. Write and execute c program to blink the LEDs using on chip TIMER/COUNTER for the delay using polling method).
8. Write and execute c program to blink the LEDs using on chip TIMER/COUNTER for the delay (using interrupt method).
9. Write an interface program Real time clock.

EXERCISES BASED ON RTOS PROGRAMMING:

10. Write a simple program with two separate LED Blinking tasks.
11. Implement Priority Scheduling and OS Time Delay Functions by writing 3 different UART Transmitting Tasks.
12. Interface a stepper motor and control the speed of rotation by Implementing RTOS delay functions

ECG601-INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS

Total no of hours /week :5

Total no of weeks/ semester :16

Total no of hours/semester :80

SCHEME OF INSTRUCTION AND EXAMINATION

SUBJECT	INSTRUCTION		EXAMINATION		
Industrial Electronics and Medical Electronics	Hours/ week	Hours/ semester	Assessment marks		
			Internal	External	Total
	5	80	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(HRS)
1.	Power devices	14
2.	Converters and choppers	14
3.	Inverters and power supplies	14
4.	Ultrasonics & PLC and SCADA	14
5.	Medical Electronics	14
	Revision and test	10
	Total	80

OBJECTIVES:

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

- To Study working principle of power devices.
- To Study the methods of triggering
- To learn about converters and its types.
- To learn about choppers.
- To Study about inverters and types.
- To understand the concept of HVDC.
- To know about SMPS.
- To understand about UPS and its types.
- To learn about PLC.
- To discuss about ladder diagrams.
- To learn about Bio potential
- To learn about Diagnostic and therapeutic equipment

INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS

CODE NO:ECG601 **TOTAL HOURS: 80**

UNIT I: POWER DEVICES **Time:14hrs**

Working Principle, characteristics and operation of IGBT, Power Transistors, Power MOSFETS, SCR and GTO

SCR: Turn on and Turn off methods - series and parallel operation of SCRS - Applications of SCRS - Over voltage protection - Regulated DC and AC Power supply - emergency light - Automatic battery charger circuit

Protection of power devices: Snubber circuits - Heat sinks

UNIT II: CONVERTERS AND CHOPPERS **Time:14hrs**

(Qualitative treatment only)

Converters: Single phase semi bridge half controlled converters with R, RL and freewheel diode- single phase fully controlled bridge converters with R, RL and freewheeling diode - effect of source inductance and overlap angle - Three phase semi and full converters with resistive load only - Single phase and three phase dual converters

- single phase Cyclo converters - AC voltage controller with R and RL loads

Choppers:Principle of chopper operation - DC choppers: single and two thyristor step down choppers - step up chopper - AC chopper - Chopper drives: Type A, type B, type C, Type D and Type E drives. Chopper using MOSFET.

UNIT III: INVERTERS AND POWER SUPPLIES **Time:14hrs**

Inverters: single phase series and parallel inverters using thyristors - Single phase half bridge & full bridge inverter - three phase bridge inverter with resistive load only - Mcmurray inverter circuit - output voltage control in inverter - method of obtaining sine wave output from an inverter - PWM techniques: single pulse, multiple pulse and sinusoidal modulation :Parallel inverter using IGBT-Solar Grid Inverter .

HVDC transmission - block schematic – advantages

Power supplies: Linear Power Supply (LPS), Switch mode Power Supply(SMPS) - Buck converter - Boost regulator - Buck Boost regulator –advantages of SMPS over LPS - Uninterrupted Power Supply (UPS) - Online and Offline UPS

UNIT IV: ULTRASONICS & PLC and SCADA **Time:14 hrs**

Ultrasonic: Properties of Ultrasound waves - Generation of ultrasound waves: Peizo electric ultrasonic oscillator - Magnetostriction oscillator Circuit -Applications:

Ultrasonic for Communication (SONAR) - Non Destructive Testing and Flaw Detection - ultrasonic Drilling - Soldering - Cleaning and medical applications

PLC and SCADA

Advantages of PLC - block diagram of PLC - CPU - memory - I/Os -Power supply- programming of PLC - different methods:- ladder, STL and FBD - Ladder programming of logic gates, timer, counter - simple examples - traffic light controller – conveyors

Sensors and Transducers Application: Proximity sensor, Reed Sensor, Photoelectric Sensor (Definition and Application)

SCADA: uses of SCADA. - MTU - RTU - communication - SCADA software - memory tags - Device Tags

UNIT V: MEDICAL ELECTRONICS **Time: 14 hrs**

Sources of Bioelectric Potential -resting and action potential- Electrode types : micro-skin-surface and needle electrodes.

Diagnostic Equipment

ElectroCardioGram (ECG)-Standard 12 lead system-Block Diagram of ECG Recorder-ElectroMyoGram(EMG)-Block Diagram of EMG Recorder - Pulse oximeter.

Therapeutic Equipment

Cardiac Pacemaker : external pacemaker -Internal pacemaker- Programmable pace maker Defibrillators: AC Defibrillators- DC Defibrillators.

REVISION AND TEST **Time: 10 hrs**

Text Books :

1. Industrial Electronics and Control - SK Battacharya& S Chattarjee
2. Industrial electronics -G.K.Mithal.
3. Programmable Logic Controller – Pradeep Kumar &Srivashtava – BPB

Reference Books:

1. Industrial Electronics - Thomas E. Kissell
2. Introduction to Programmable Logic Controllers - Gary Dunning.
3. Industrial Instrumentation- D.Patranabis.
4. Programmable Contollers – Richard A. Cox Vikas Publishing Houses – 2001.
5. Biomedical Instrumentation and Measurement: Lessle Cromwell, Fred.J Weibell, Erich.A Pfeiffer

ECG602 - INTERNET OF THINGS

Total no of hours /week	5
Total no of weeks/ semester	16
Total no of hours/semester	80

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
Internet of Things	Hours/ Week	Hours/ Semester	Assessment Marks		
	5	80	Internal	External	Total
			25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
1.	Fundamentals of IoT	14
2.	Arduino Uno Architecture	14
3.	Interfacing with I/O Devices, PC/Laptop	14
4.	Interfacing with WiFi and Cloud computing	14
5.	Interfacing with Wireless XBEES2B, Zigbee and Remote PC	14
	Revision and Test	10
Total		80

OBJECTIVES:

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

1. Assess the vision of IoT.
2. Classify Real World IoT applications in various Domains.
3. Understand design methodology for IoT platforms.
4. Understand about Arduino architecture
5. Understand cloud architecture & benefits
6. Understand Interfacing Arduino with I/O Devices, PC/LAPTOP
7. Understand Interfacing Arduino with WiFi and cloud computing

INTERNET OF THINGS

COURSE CODE:ECG602 **TOTAL HOURS: 80**

UNIT I:Fundamentals of IoT **Time: 14 hrs**

Understanding IoT fundamentals - IOT Architecture and protocols - Various Platforms for IoT - Real-time Examples of IoT- Overview of IoT components and IoT Communication Technologies - Challenges in IoT

UNIT II: Arduino Uno Architecture: **Time: 14 hrs**

Interrupts - Timers - Serial ports- Gpio structures - I2c - ADC - Sensors - like AD590 - ultrasonic - Blue tooth sensor - PTBC - Pro - Wireless sensor – like XBee S2b -wireless sensor configuration – read - write - Wifi sensors like XBEES6B – fixing access points- IOT Cloud platforms - Cloud Architecture Cloud computing - benefits.

UNIT III: **Interfacing with I/O Devices, PC/LAPTOP :** **Time: 14 hrs**

Basics of Embedded C programming for Arduino-Interfacing LEDs - relay-LCD 16x2 interface - 7segment display interface - RTC INTERFACE
Interfacing PC/LAPTOP with Arduino through serial ports-Interfacing Bluetooth with Arduino serialport - Android studio –Develop using apps through Android Studio-controlling LEDS,RTC,LCD DISPLAY from android cellphone

UNIT IV: **Interfacing with WiFi and cloud computing:** **Time: 14 hrs**

Interfacing WiFi XBEES6B with Arduino serial port - Fixing internet access point using XCTU software - Connecting WiFi through internet modem –Digi International Cloud Computing - Developing Widget in Cloud - Controlling remote trainer kit - LEDS -LCD - RELAYS - ADC etc.

UNIT V: **Interfacing with Wireless XBEES2B, Zigbee and Remote PC:** **Time: 14 hrs**

Interfacing Wireless XBEES2B with Arduino-Serial port-Send and receiving data from zigbee network - Interacting remote PC through wireless network.

REVISION AND TEST **Time: 10 hrs**

Text Books

1. Internet of Things – A Hands on Approach, By Arshdeep Bahga and Vijay Madisetti
   Universities Press, ISBN: 9788173719547 (Unit I to V)
2. Designing the Internet of Things – Adrian McEwen & Hakim Cassimality WileyIndia, ISBN: 9788126556861 (Unit VI)

References

1. The Internet of Things – Key Applications and Protocols, Wiley Publication, Olivier
   Hersent, David Boswarthick, Omar Elloumi. ISBN: 9788126557653
2. The Internet of Things , Pearson, By Michael Miller ISBN: 9789332552456
3. http://www.cisco.com/c/dam/en_us/solutions/trends/iot/introduction_to_IoT_november.pdf
4. https://www.bbvaopenmind.com/en/iot-implementation-and-challenges/
5. https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-staff-report- november-2013-workshop-entitled-internet-things-privacy/150127iotrpt.pdf

ECG671-INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS LAB

List of equipments and the quantity required for a batch of 30 students

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
1.	Dual Power Supply	(0-30)V	10
2.	PLC		5
3.	Computer		02
4.	DRB		10
5.	CRO/DSO		10
6.	BP Apparatus (Resource may be shared from ICE Dept)		2
7.	ECG Recorder(Resource may be shared from ICE Dept)		2
8.	EMG Recorder(Resource may be shared from ICE Dept)		2
9.	Stethoscope(Resource may be shared from ICE Dept)		2
10.	Software simulation tool (like PSPICE /Electronic work bench/ Lab VIEW/etc) any one		

INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS LAB

CODE NO : ECG671 **TOTAL HOURS: 64**

1. Construct and test dc timer circuit.
2. Construct and test ac timer circuit.
3. Construct and test commutation circuits of SCR
4. Construct and test a chopper circuit
5. Construct and test the performance of a full wave rectifier using SCR
6. Construct and test a single phase inverter
7. PSPICE simulation of SCR circuits.
8. Implementation of DOL starter using PLC
9. Implementation of On delay timer using PLC
10. Simple ladder program to verify truth table of logic gates using SCADA.
11. Measurement of oxygen level, pulse rate using pulse oximeter.
12. Measurement of Blood Pressure using BP monitor.

ECG672-INTERNET OF THINGS LAB

List of equipments and the quantity required for a batch of 30 students

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
1.	Computer		05
2.	Arduino Board		10
3.	Android smart phone		04
4	Android studio		01
5	Bluetooth Module		02
6	IOT trainer kit		02

INTERNET OF THINGS LAB

CODE NO:ECG672 **TOTAL HOURS: 64**

1. Study of IOT – protocol – architecture - web of things-applications
2. Installation of Arduino IDE.
3. Interfacing Light Emitting Diode (LED)- Blinking LED
4. Interfacing Light Dependent Resistor (LDR) and LED, displaying automatic night lamp
5. Interfacing Temperature Sensor (LM35) and/or humidity sensor (e.g. DHT11)
6. Interfacing Air Quality Sensor-pollution (e.g. MQ135) – display data on LCD, switch on LED when data sensed is higher than specified value.
7. Interfacing Bluetooth module (e.g. HC05)- receiving data from mobile phone on Arduino and display on LCD
8. Develop basic android App using Android Studio to display “WELCOME TO ECE DEPARTMENT” on the cell phone screen
9. Send alert messages to Android cell phone screen from IOT trainer kit
10. Develop multiple Button Widgets on Android cell phone Screen and Switch ON/OFF IOT Trainer kit LEDs

PROJECT WORK AND INTERNSHIP

CODE NO : ECG673 **TOTAL HOURS: 80**

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	Max. Marks
First Review	6th week	10
Second Review	14th week	10
Attendance	Entire semester	5
	Total	25

EVALUATION FOR BOARD EXAMINATION

Details of Mark allocation	Max Marks
Demonstration / Presentation	20
Report	20
Viva-Voce	20
Internship report	15
Total	**75**

c) Internship Report

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year “Project Work & Internship” for 20 marks. The internship shall be

undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Autonomous examination.

ECG581- MOBILE & WIRELESS COMMUNICATION

Total no of hours /week :5

Total no of weeks/ semester :16

Total no of hours/semester :80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Mobile & Wireless communication	Hours/ week	Hours/ semester	Assessment marks		
			internal	External	Total
	5	80	25	75	100

Topics and allocation

UNIT	TOPIC	TIME(HRS)
1.	Cellular concepts	14
2.	Mobile radio propagation	14
3.	Cellular mobile systems	14
4.	OFDM & MIMO communications	14
5.	Wireless networks & security	14
	Revision and test	10
	Total	80

OBJECTIVES:

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

- Study the evolution of mobiles
- Explain the cellular concepts
- Study the interference and improving capacity of the cellular systems
- Explain large scale path loss
- Solve the models in mobile radio propagation
- Study of small scale path loss
- Study of multiple access techniques
- Explain the GSM architecture
- Explain the LTE architecture
- Draw the block diagram of forward and reverse CDMA channel
- Study of OFDM &MIMO
- Study the mobile satellites
- Study the wireless networks
- Explain the security threat
- Explain the security technologies for secure communication

MOBILE & WIRELESS COMMUNICATION

CODE NO: ECG 581 **TOTAL HOURS: 80**

UNIT I : CELLULAR CONCEPTS **Time :14 Hrs**

Evolution of Mobile radio communication - Paging system-cordless telephone system-Cellular telephone system -Cellular concepts-system design fundamentals-Introduction to frequency reuse-Channel assignment strategies-Hand of mechanism-Interference-Adjacent channel Interference , Co channel Interference-Improving coverage & capacity in cellular systems-cell splitting, sectoring, Microcell zone concept- Introduction to PICO cells and femto cells.

UNITII: MOBILE RADIO PROPAGATION **Time : 14 Hrs**

Large scale path loss: Free space Propagation model-Three basic propagation mechanisms(definitions only) -Reflections-Diffraction-Scattering-Ground reflection model.

Small scale fading& Multi path- factors influencing small scale fading- Doppler shift-Parameters of Mobile multi path channels- Time dispersion parameters-Coherence Bandwidth - Doppler spread& Coherence time- Types of small scale fading(only definitions)-Flat fading-Frequency selective fading-fast fading-slow fading

UNIT III: CELLULAR MOBILE SYSTEMS **Time: 14 hrs**

Brief Introduction of evolution of Cellular systems-Multiple access strategies-FDMA- TDMA- CDMA- SDMA - GSM System Architecture - BSS-NSS-OMSS-GSM Interface - LTE Architecture--Introduction to 5G technology.

UNIT IV: OFDM AND MIMO COMMUNICATIONS **Time: 14 hrs**

OFDM Introduction-Block diagram of OFDM transmitter and Receiver-Smart antenna system - MIMO systems – spatial multiplexing- System model – System capacity – Fading Channels – Transmitter diversity, Receiver diversity.

UNIT V: WIRELESS NETWORKS AND SECURITY **Time: 14 hrs**

Overview of wireless networks & Standards-Categories- WPAN, WWAN, WLAN - Blue tooth-Architecture -Mobile and wireless security-Creating secure environment-Authentication-Data Integrity-Confidentiality-Authentication security threats - Spoofing-Sniffing- Adhoc Networks-tampering security technologies-cryptography, Digital signature firewall- Steganography.

REVISION AND TEST **Time: 10 hrs**

Text Books:

1. Wireless Communication Principles and Practice – Theodore S.Rappaport
2. Mobile and Wireless Design Essentials – Martyn Mallick

Reference Books:

1. Mobile Communications- Jochen Schiller
2. Mobile satellite Communications –Richharia
3. Digital Communication – Simon Haykin
4. Andrea Goldsmith, “Wireless Communications”, Cambridge University Press, 2005.
5. Yong Soo Cho, Jaekwon Kim, Won Young Yang and Chung G. Kang, “MIMO-OFDM WirelessCommunicationsWithMatlab”, IEEE Press, John Wiley & sons, 2010.

ECG582- BIOMEDICAL INSTRUMENTATION

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Biomedical instrumentation	Hours/ week	Hours/ semester	Assessment marks		
			internal	External	Total
	5	80	25	75	100

Topics and allocation

UNIT	TOPIC	TIME(HRS)
I	Physiological Measurements	14
II	Measuring Instruments & Biomedical Recorders	14
III	Patient Care and Supporting Sources	14
IV	Bio Telemetry and Patient Safety	14
V	Modern Imaging Techniques	14
	Revision and test	10
	Total	80

OBJECTIVES:

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

- The generation of Bio-potential and its measurement using various electrodes
- The measurement of blood pressure
- The measurement of lung volume
- The measurement of respiration rate
- The measurement of body temperature and skin temperature
- Theoperating principle of ECG recorder
- Theoperating principle of EEG recorde.
- The principles of operations of EMG, ERG and EOG recorder
- The principle of operation of pacemaker and power sources of implantable pacemakers
- The basic principle of dialysis
- The working principles of telemetry
- The basic principle of telemedicine
- Learn about patient safety
- The various methods of accident prevention.
- Theapplication of lasers in medicine.
- Know about X-ray apparatus.
- The basic principle of CT and MRI techniques

BIOMEDICAL INSTRUMENTATION

CODE NO:ECG582 **TOTAL HOURS: 80**

UNIT I : PHYSIOLOGICAL MEASUREMENTS **Time :14 Hrs**

Bio–potential and their generation, resting and action potential Electrodes: micro, skin surface and needle electrodes. Measurement of Blood pressure – direct method and indirect method –Measurement of blood flow: Electromagnetic flow meter, ultrasonic blood flow meter, measurement of Blood pH. Measurement of Respiration rate, lung volume, Heart rate, Temperature (body temperature, skin temperature), Cardiac ouput measurement techniques.

UNIT II : MEASURING INSRUMENTS & BIOMEDICAL RECORDERS **Time :14 Hrs**

Electro cardio graph (ECG): lead system, ECG electrodes, ECG amplifies, ECG recording units, analysis of ECG curves, Electroencephalogram (EEG):Central nervous system,10–20 lead system, EEG recorder, recording techniques, EEG wave types, clinical use of EEG, Brain tumor. Electromyography (EMG), EMG waves – EMG recording techniques Electroretinography (ERG)- Electrooculography (EOG)- Phonocardiogram.

UNIT III : PATIENT CARE AND SUPPORTING SOURCES **Time :14 Hrs**

Cardiac pacemaker: Classification, External pacemakers, Implantable pacemaker, Programmable pacemakers, Power sources of implantable pacemakers:(Hg batteries, nuclear batteries, lithium cells).Cardiac defibrillators, AC defibrillators,DC defibrillators, Automatic external defibrillator.

Heart lung machine, oxygenators. Blood pumps,Peristaltic pump, Infusionpump; Dialysis: hemodialysis, peritoneal dialysis. Endoscopy – principle of working & applications; Heart valves, problems of artificial heart valves; anesthesia machine.

UNIT IV : BIO TELEMETRY AND PATIENT SAFETY **Time :14 Hrs**

BioTelemetry:Physiological adaptable to biotelemetry–Components of a bio telemetry system, Application of telemetry in patient care – elements of biotelemetry; AM,FM transmitter and receiver – requirements for biotelemetry system – radio telemetry with sub carrier single channel and multi channel telemetry. Telemedicine; Introduction and working applications.

Patient safety**:**Physiological effects of electric current – Micro and macro shock – leakage current – shock hazards from electrical equipment. Methods of Accident Prevention – Grounding – Isolated powerdistribution system. Safety aspects in electro surgical units – burns, high frequency current hazards, Explosion hazards.

UNIT V : MODERN IMAGING TECHNIQUES **Time :14 Hrs**

Laser beam properties: Block diagram, application of lasers in medicine – Ultrasonic imaging techniques & their application in medical field, Modes of display, recording devices. X-ray apparatus – block diagram – operation – X-raygeneration – Tomogram - Computerized Axial tomography; Axial Echo Cardiography, infrared imaging and their applications in medical field, Magnetic Resonance Imaging Techniques.

REVISION AND TEST **Time: 10 hrs**

Text Books:

1. Hand book of Biomedical Instrumentation – R.S.Khanpur
2. Bio Medical Instrumentation – Dr. M. Arumugam

Reference Books:

1. Bio-medical Instrumentation and Measurement Edition II–LesileCromwell, Fred. J. Weibell, Erich, A. Pfeiffer
2. Introduction to Medical Electronics– B. R. Klin
3. Medical Electronics – Kumaradoss
4. Medicine and Clinical engineering – Jacobson and Webster
5. Handbook of biomedical instrumentation –R.S. Khanpur

ECG583- E VEHICLE

Total no of hours /week 5
Total no of weeks/ semester 16
Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
E VEHICLE	Hours/ week	Hours/ semester	Assessment marks		
			internal	External	Total
	5	80	25	75	100

Topics and allocation

UNIT	TOPIC	TIME(HRS)
1.	Environmental impact and history	14
2.	Electric vehicles	14
3.	Energy Storages	14
4.	Electric Mobility Policy Frame Work	14
5.	Tamilnadu E-Vehicle Policy 2019	14
	Revision and test	10
	Total	80

OBJECTIVES:

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

- To learn the environmental impact and history of Electric Vehicles.
- To understand the concept of Electric Vehicle and its types.
- To study the configurations of Electric Vehicles
- To acquire knowledge about Energy Storages, Charging System, Effects and Impacts
- To appreciate the Electric Mobility Policy Frame work India and EV Policy Tamil Nadu 2019

E VEHICLE

CODE NO:ECG 583 **TOTAL HOURS: 80**

UNIT I: ENVIRONMENTAL IMPACT AND HISTORY **Time:14 Hrs**

Environmental impact of conventional vehicle **-** Air pollution – Petroleum resources – History of Electric vehicles & Hybrid Electric Vehicles - Conventional drive train system – Rear Wheel, Front Wheel and All wheel - Parts of Drive train system

Electric vehicle Types: Introduction to Battery Electric Vehicle (BEV) – Definition BEV – Necessity BEV – Different between BEV and Conventional Vehicle - Advantages of BEV - Block diagram of BEV – Hybrid electric Vehicle (HEV)- Plug-in Hybrid Electric Vehicle (PHEV) – Fuel Cell Electric Vehicle (FCEV) – Description.

UNIT II:ELECTRIC VEHICLES **Time:14 Hrs**

Configurations of Electric Vehicle – Performance of Electric Vehicles – Tractive Effort in Normal Driving – energy consumption. Hybrid Electric Vehicles: Concept of Hybrid electric drive trains – Architecture of Hybrid Electric Drive trains – Series, Parallel and Series & Parallel

Electric Propulsion Systems: Types of EV motors - DC motor drives– Permanent Magnetic Brush Less DC Motor Drives (BLDC) – Principles, Construction and Working – Hub motor Drive system – Merits and Demerits of DC motor drive, BLDC motor drive

UNIT III:ENERGY STORAGES **Time:14 Hrs**

Electrochemical Batteries – Battery Technologies – Construction and working of Lead Acid Batteries, Nickel Based Batteries and Lithium Based Batteries Role of Battery Management System (BMS)– Battery pack development Technology– Cell Series and Parallel connection to develop battery pack.

Charging: Battery Charging techniques - Constant current and Constant voltage, Trickle charging – Battery Swapping Techniques – DC charging – Wireless charging **–** Maintenance of Battery pack – Latest development in battery chemistry.

Effects and Impacts: Effects of EV – Impacts on Power grid – Impacts on Environment – Impacts on Economy.

UNIT IVELECTRIC MOBILITY POLICY FRAME WORK **Time:14 Hrs**

Government of India Electric Mobility Policy Frame work – Global Scenario of EV adoption – Electric mobility in India – National Electric Mobility Mission Plan 2020 – Action led by Original Equipment Manufacturers – Need of EV Policy – Advantage of EV Eco system – Scope and Applicability of EV Policy – ARAI Standards for Electric Vehicle – AIS 038, AIS 039 &AIS 123 - Key Performance Indicator - Global impact – Trends and Future Developments

UNIT V TAMIL NADU E-VEHICLE POLICY 2019 **Time:14 Hrs**

Tamil Nadu E-vehicle Policy 2019: Vehicle Population in Tamil Nadu – Objectives of EV Policy – Policy Measures – Demand side incentives – Supply side incentives to promote EV manufacturing – Revision of Transport Regulation of EV – City building codes – Capacity Building and Skilling – Charging structure – implementing agencies – R&D and Business Incubation – Recycling Ecosystem – Battery and EVs

REVISION AND TEST **Time: 10 hrs**

Reference Books

1. Modern Electric, Hybrid Electric and Fuel Cell Vehicles, Mehrdad Ehsani, Yimin Gao, Sebastien E.Gay, Ali Emadi, CR Press, London, New York.
2. Comparison of Electric and Conventional Vehicles in Indian Market: Total Cost of Ownership, Consumer Preference and Best Segment for Electric Vehicle (IJSR), Akshat Bansal, Akriti Agarwal
3. A Comprehensive Study of Key Electric Vehicle (EV) Components, Technologies, Challenges, Impacts, and Future Direction of Development (MDPI), Fuad Un-Noor, SanjeevikumarPadmanaban, Lucian Mihet-Popa, Mohammad NurunnabiMollah and Eklas Hossain.
4. Electric Vehicles: A future Projection CII October 2020 report.
5. Design and analysis of aluminum/air battery system for electric vehicles, Shaohua Yang, Harold Knickle, Elsevier. 71
6. Propelling Electric Vehicles in India, Technical study of Electric Vehicles and Charging Infrastructure
7. Zero Emission Vehicles (ZEVs): Towards A Policy Framework – NTI Aayog.
8. Faster Adoption Of Electric Vehicles In India: Perspective Of Consumers And Industry, The Energy and Resources Institute, New Delhi.
9. India EV Story: Emerging Opportunities by Innovation Norway.
10. Automotive Industry Standards – AIS 038, AIS 039 & AIS 123 – Manual

ECG681-VERY LARGE SCALE INTEGRATION

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
Very Large Scale Integration	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
1	Introduction to VLSI	14
2	Introduction to VHDL	14
3	Combinational circuit design	14
4	Sequential circuit design	14
5	Programmable Logic Devices	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- Understand the implementation of logic gates using NMOS & CMOS.
- Understand the implementation of digital gates in VHDL.
- Understand the implementation of logical expressions in VHDL.
- Develop a VHDL code for any combinational circuit
- Design a digital circuit with Mux
- Study about state diagram and state table.
- Understand the functionality of various flipflops through its excitation table.
- Design of a counter using flipflops.
- Explain the style of Moore and Mealy type machine.
- Design of sequential circuit and implementation with VHDL code
- Explain the importance of PLA, PAL and PLD and develop circuits using PAL and PLA
- Understand the CPLD and FPGA hardware.
- Understand the design flow of ASIC.

VERY LARGE SCALE INTEGRATION

CODE NO: ECG681 **TOTAL HRS:80**

UNIT I : INTRODUCTION TO VLSI **Time : 14hrs**

NMOS,CMOS logic: NOT, AND, OR, NAND, and NOR Gates using NMOS – NOT, AND,OR, NAND, and NOR Gates using CMOS – Implementation of logic function (SOP, POS) in CMOS.
VLSI design process: Different level of abstractions in VLSI design – steps involved in VLSI design process: Design Entry, Simulation, Synthesis, Placement and Routing – Layout rules, Stick diagram.

UNIT II : INTRODUCTION TO VHDL: **Time : 14 hrs**

Introduction: HDL – Different types of modeling – General format for VHDL program . VHDL statements: Syntax for process statement, if statement, if else statement, if elsif else statement, case statement –Syntax for signal declaration and signal assignment statement –Syntax for variable declaration and variable assignment statement, component declaration. VHDL code example: VHDL code for Logic gates AND, OR, NOT, NAND, NOR gate and XOR gates.

UNIT III : COMBINATIONAL CIRCUIT DESIGN: **Time : 14 hrs**

Combinational circuit: Half adder, Full adder , Half subtractor and Full subtractor – 4 to 1 Mux, 1 to 4 Demux, 4 to 2 Encoder, 2 to 4 decoder and comparator – Four bit Arithmetic adder – Four bit Arithmetic subtractor . 3.2 VHDL program for Combinational circuit: VHDL program for Half adder, Full adder – VHDL program for Hall subtractor and Full subtractor – 4 to 1 Mux, 1 to 4 Demux, 4 to 2 Encoder, 2 to 4 decoder and comparator in VHDL – VHDL program for Four bit Arithmetic adder (structural) – VHDL program for Four bit Arithmetic subtractor (structural) .

UNIT IV : SEQUENTIAL CIRCUIT DESIGN: : **Time : 14 hrs**

Sequential circuit: Flip-flops: D, JK and T Flip-flops – counters:3 bit up Counter,3 bit down counter and 3 bit up/down counter ,Decade counter, ring counter and Johnson Counter. VHDL program for Sequential circuit: VHDL program for D, JK and T Flip-flop switch reset input, without reset input – VHDL program for 3 bit up Counter,3 bit down counter and 3 bit up/down counter, Decade counter, ring counter and JohnsonCounter.

UNIT V : PROGRAMMABLE LOGIC DEVICES **Time : 14hrs**

PROGRAMMABLE LOGIC DEVICES: PROM, PLA and PAL : Introduction to PROM, PLA and PAL – Implementation of combinational circuits with PROM ,PAL and PLA (upto4variables) – Comparison between PROM ,PAL and PLA. CPLD,FPGA and ASIC : Architecture of Complex Programmable Logic device (CPLD) – Architecture of Field

Programmable Gate Arrays(FPGA) – Introduction to Application Specific Integrated Circuit(ASIC) – Types Of ASIC – ASIC design flow.

Revision and test **10 Hrs**

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. “M.MorrisMano,MichaelDCiletti ““DigitalDesign”PearsonEducation2008.
2. “BhaskerJ ““VHDLPrimer”PrenticeHallIndia-2009.
3. “NEIL H.E.WESTE, KAMRAN ESRHAGHIAN” “Principles of CMOS VLSI design”, Addison – Wesley professional, second edition 1994.
4. “NigelP.Cook” “Digital Electronics with PLD Integration”, Pearson 2000.
5. “Ashok K.Sharma” “ProgrammableLogicHandbook:PLDs,CPLDs,andFPGAs”,Mcgraw-Hill,1998.
6. “Michael John Sebastian Smith”” Application Specific Integrated Circuits”, Addison – Wesley professional ,first edition 1997.

ECG682 - COMPUTER HARDWARE AND NETWORKS

Total no of hours /week	5
Total no of weeks/ semester	16
Total no of hours/semester	80

SCHEME OF INSTRUCTION AND EXAMINATION:

Subject	Instruction		Examination		
Computer hardware and networks	Hours/ Week	Hours/ Semester	Assessment Marks		
	5	80	Internal	External	Total
			25	75	100

TOPICS AND ALLOCATION

UNIT	TOPIC	TIME(Hrs)
1	Motherboard components and memory storage devices	14
2	I/O devices and interface	14
3	Maintenance and trouble shooting of desktop and laptops	14
4	Computer network devices and OSI layers	14
5	802.X and TCP/IP protocols	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- Identify the major components that make up the system unit.
- Understand stick memory.
- Understand the principle of operations of Keyboard, mouse and Displays.
- Study about the specification of I/O Ports of all I/O devices like serial, parallel, USB – Game
- port, Blue tooth and IP Connectors
- Understand the technology of high quality multiple color graphic output devices like Dot
- matrix, Inkjet, Laser, Line, MFP and computer system.
- Understand the operations to Power Supply devices.

- Know the use of diagnostic Software.
- Identify the major components of Laptop.
- Troubles shoot the problems in Laptop.
- Understand the concept of data communication.
- Discuss the advantages and disadvantages of different network topologies.
- Compare different network classifications based on different category.
- Know the use of different network devices.
- 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.

COMPUTER HARDWARE AND NETWORKS

COURSE CODE:ECG 682 **TOTAL HOURS: 80**

UNIT I : MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES

Time: 14Hrs

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 Processors - Chipsets (Concepts only).

Bus Standards: Overview and features of PCI, AGP, PCMCIA.

Primary Memory: Introduction-Main Memory, Cache memory – DDR2, DDR3, DDR4 and Direct RDRAM.

Secondary Storage: Construction and Working Principle of Hard Disk - Specification of SATA, Ultra ATA, Serial ATA - HDD Partition - Formatting.

SSD- Introduction- USB operation - Zip Drive - Blu-ray – Disc Parameters -Stick memory.

UNIT II :I/O DEVICES AND INTERFACE

Time: 14Hrs

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- Construction and working principle of Dot Matrix, Inkjet, Laser, MFP (Multi-Function Printer) printer – Troubleshooting of printer.I/O Ports: Serial, Parallel, Game Port and HDMI and Micro HDMI.Displays: Principles of LED (OLED, AMOLED, POLED), LCD Displays.Graphic Cards: VGA and SVGA card.Modem: Working principle-Power Supply: Servo Stabilizers - online and offline UPS of working principles - SMPS: Operation and block diagram of ATX Power supply - Connector - Specifications.

UNIT III MAINTENANCE AND TROUBLE SHOOTING OF DESKTOP AND LAPTOPS

Time: 14Hrs

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. Laptop: laptop – block diagram – working principle – configuring laptops and power settings - SMD components, ESD & precautions. Laptop components: Adapter – types, Battery – types, Laptop Mother Board - 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 **Time: 14Hrs**

Data Communication: Components of a data communication,Types:
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 **Time: 14Hrs**

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 - Unmanageable Switch - manageable Switch – Telnet – SMTP– HTTP – DNS – pop.

REVISION AND TEST **Time : 10 hrs**

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. The complete PC upgrade and Maintenance, Mark Minasi, BPB Publication, The complete PC upgrade and Maintenance

4. Troubleshooting, Maintaining and Repairing PCs, Stephen J Bigelow ,TataMCGraw Hill

5. Upgrading and repairing laptops, Scott Mueller, QUE Publication, Upgrading and repairing laptops
6. Data Communication and networking, Behrouz A.Forouzan, Tata Mc-Graw Hill, New Delhi,.

Reference Books:

1. Computer Networks,AchyutGodbole,Tata Mc-Graw Hill -New Delhi
2. Principles of Wireless Networks– A unified Approach, KavehPahlavan and Prashant

ECG683 - CONSUMER ELECTRONICS

Total no of hours /week 5

Total no of weeks/ semester 16

Total no of hours/semester 80

Scheme of instruction and examination

SUBJECT	INSTRUCTION		EXAMINATION		
Consumer Electronics	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	External	Total
	5	80	25	75	100

Topics and Allocation

UNIT	TOPIC	TIME (HRS)
1	INTRODUCTION TO AUDIO SYSTEM	14
2	REPRODUCING SYSTEM & AUDIO RECORDING	14
3	COLOUR TV & TV ENCODERS	14
4	DIGITAL TRANSMISSION & RECEPTION	14
5	CONSUMER APPLIANCES	14
	Revision and test	10
Total		80

OBJECTIVES:

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

- Understand the various types of microphones and loud speakers.
- Identify the various digital and analog signal.
- Describe the basis of television and composite video signal.
- Describe the various kinds of colour TV standards and system.
- Compare the various types of digital TV system.
- Understand the various types of consumer goods.
- Maintain various consumer electronic appliances.

CONSUMER ELECTRONICS

CODE :ECG683 **TOTAL HOURS : 80HRS**

UNIT I : INTRODUCTION TO AUDIO SYSTEM **Time : 14 hrs**

Audio System

Microphones and Loudspeakers: Carbon, moving coil, cordless microphone,Direct radiating and horn loudspeaker, Multi-speaker system.

Sound Recording

Magnetic Recording, Digital Recording, Optical Recording (CD system, DVD, Blu-ray Disc).

UNIT II : REPRODUCING SYSTEM & AUDIO RECORDING **Time : 14 hrs**

Reproducing system

Sound reproducing Systems: Monophonic, Stereophonic, Surround System. Hi-Fi system, block diagram and use of Home Theatre Systems

Audio recording

Sound Recording: Principles of Sound recording: Magnetic Recording/ Reproduction. Audio CD Recording/ Reproduction, Study of working principle of audio and VCD, Digital sound recording on CD system, MP3.

UNIT III : COLOUR TV & TV ENCODERS **Time : 14 hrs**

Colour TV

Primary colours, concepts of additive and subtracting mixing of colours, concepts of luminance, Hue and Saturation, Representation of a colour in colour triangle, non-spectral colour, visibility curve.

TV ENCODERS:Compatibility of colour TV system with monochrome system. Basic colour TV system-NTSC, SECAM, and PAL their advantages and disadvantages. Construction and working principles of Trinitron and PIL types of colour picture tubes.

UNIT IV: DIGITAL TRANSMISSION & RECEPTION **Time : 14 hrs**

DIGITAL TRANSMISSION :Digital satellite television, Direct-To-Home (DTH) satellite television, Introduction to: Video on demand, CCTV, High Definition (HD)-TV.

RECEPTION: Introduction to Liquid Crystal and LED Screen Televisions Basic block diagram of LCD and LED Television and their comparison.

UNIT V : CONSUMER APPLIANCES **Time : 14 hrs**

Basics principle and working of Microwave Oven and Photostat Machine and Digital Camera, Cam CorderWashing Machine: wiring diagram, electronic controller for washing machine, technical specifications, types of washing machine, fuzzy logic

REVISION AND TEST **Time : 10 hrs**

Text books:

1. Electric circuit theory - Dr. M. Arumugam, N.PremKumar
2. Electrical & Electronics, Measurements and Instrumentation by A.K.Sawhney
3. Modern electronic instrumentation and measurement techniques by Albert D.Helfrick and William David Cooper

Reference books :

1. Instrumentation - Devices and systems by C.S.Rangan, G.R. Sarma and VSV. Mani
2. Electrical and electronics - Measurements and instrumentation by Umesh Sinha
3. Electronic instrumentation G.K. MIthal
4. Electrical circuits - Schaum's series - Joseph Edminister - TMH.

ECG684 - VERY LARGE SCALE INTEGRATION LAB

LIST OF EQUIPMENTS

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
1	FPGA should have atleast 10 switches for input, 8 LEDs for output, a 7 segment display, debounced push switch(8 Nos) for manual clock input and external clock source.		**10**
2.	computers		**10**

VERY LARGE SCALE INTEGRATION LAB

CODE NO: ECG684 **TOTAL HOURS: 64**

1. Write simple VHDL Code for Half adder, Halfsubtractor, and implement on FPGA Kit.
2. Write simple VHDL Code for Full adder, Full subtractor and implement on FPGA Kit.
3. Write simple VHDL Code for 4 bit parallel adder and implement on FPGA Kit.
4. Write a VHDL code for 8x1 Multiplexer and implement on FPGA Kit.
5. Write a VHDL code for 1x8 De multiplexer and implement on FPGA Kit.
6. Write VHDL code for 3x8 Decoder and implement on FPGA Kit.
7. Write VHDL code for 8x3 encoder and implement on FPGA Kit.
8. Write a VHDL code for JK flipflop,Dflipflop,Tflipflop and implement on FPGA Kit.
9. Write a VHDL code for Ring counter and twisted ring counter and implement on FPGA Kit.
10. Write a VHDL code for Right shift register and Left shift register and implement on FPGA Kit.
11. Simulation of VHDL code for single bit comparator.
12. Simulation of VHDL code for simple ALU.

ECG685 - COMPUTER HARDWARE AND NETWORKS LAB

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
	Hardware Requirements :		
1.	Computer with Pentium / Core processors with add on cards		36
2.	Hard disk drive		06
3.	CD Drive		06
4.	DVD Writer		06
5.	Blank DVD		50
6.	Blank Blu-ray disk		50 Nos
7.	Head cleaning CD		
8	Dot matrix Printer		06
9	Laser Printer		06
10	Digital Camera		02
11	Web Camera		02
12	Scanner		02
13	Blue tooth device and cell phone		02
14	Bio-metric device		02
15	Laptop		18
16	Crimping Tool		06
17	Network Cables		
18	Modem		01
19	Laser Printer		01
	Software Requirements		

1	Windows XP operating system		
2	Linux operating system		
3	Disk Manager (for the purpose of partition and format)		
5	DVD Writer S/W		
6	Scandisk		
7	CD Burning S/W (Ahead Nero or latest S/W		
9	Pentium/ Core Systems with on board Ethernet Card (NIC)		18
10	OS Windows XP with service pack		
12	Drivers Software		

COMPUTER HARDWARE AND NETWORKS LAB

CODE NO:ECG685 **TOTAL HOURS: 64**

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.

2. Install Hard Disk

3. Install and Configure a DVD Writer .And Recording a Blank DVD.

4. Install any one type of printer.

5. Install the scanner

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

7. Dual OS Installation in your system

8. Adding and managing user profiles, setting permissions

9. Creating, sending, viewing and printing an email received.

10. Use of address book facilities, sent folder, save draft folder and trash folder

11. Browse a website, search a particular topic through search engine.

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

13. Do the following cabling works in a network
    a. Cable crimping
    b. Standard cabling
    c. Cross cabling

ECG686-CONSUMER ELECTRONICS LAB

LIST OF EQUIPMENTS

S.NO	NAME OF THE EQUIPMENTS	RANGE	REQUIRED NOS
1	public address system		02
2.	Dish Antenna with accessories kit		01
3	CCTV system		01
4	Smart phone,washing machine,Digital camera,microwave oven,Camcorder		01
5	Temperature control system		Each 01
6	LCD/LED Projector		01

CONSUMER ELECTRONICS LAB

CODE NO:ECG686 **TOTAL HOURS: 64**

1. To study public address system and its components.
2. To plot the directional response of a Microphone.
3. To plot the directional response of a Loud Speaker.
4. Trouble shooting of CD/DVD Player.
5. To perform fault identification in LED TV.
6. Installation of Dish Antenna for best reception.
7. Installation of CCTV system.
8. Demonstration of Microwave Oven.
9. Demonstration of Automatic Washing Machine and locate various sensors used in that washing machines.
10. To study the various parameters in the Smartphone and Tablet.
11. Explore digital cameras settings.
12. To build and test temperature control system.
13. To build and test circuit for A/C motor control.
14. Verify functions of Camcorder.
15. Installation of LCD/LED Projector and verify the functionalities.

INSTRUCTIONS TO QUESTION PAPER SETTERS

I. Question No 1 to 5 should be chosen from each unit in Part A & Part B

II. Question No 6 & 7 of Part A and Question No 6 ,7 & 8 of Part B can be from any one unit not exceeding one question from each unit.

QUESTION PAPER PATTERN

COURSE CODE : **TIME : 3Hrs**

COURSE NAME : **MAX MARKS : 75**

PART - A (5 * 5= 25)

Answer any FIVE questions

1.
2.
3.
4.
5.
6.
7.

PART - B (5 * 10= 50)

Answer any FIVE questions.

1.
2.
3.
4.
5.
6.
7.
8.

DR.DHARMAMBAL GOVT POLYTECHNIC COLLEGE FOR WOMEN, THARAMANI, CHENNAI-13. DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING COMPARISION STATEMENT OF E SCHEME AND G SCHEME SYLLABUS					
S.N	**Subject**	**Addition**	**Deletion**	**Modification**	**UNIT**
1	ENGINEERING MATHEMATICS III	PROBABILITY THEORY Definition – classification of probabilityconditional probabilityaddition, multiplication rules-Baye's theorem. Discrete and continuous random variable - Mean - Variance - Standard deviation – Moment generating function. Binomial Distribution, Poisson Distribution, Normal Distribution.	Differentiations		I
				FOURIER SERIES Periodicfunction – Fourier series – Definition – Euler's formulae for Fourier coefficients a_0, a_n and b_n Even and odd function – Fourier series expansion of full range function – Half range expansion	II

		FOURIER TRANSFORM Introduction – Fourier Integral theorem(without Proof)- Fourier Transform pair – Fourier Transform – Inversion formula for Fourier Transform – Properties of Fourier Transform – Convolution theorem.	Integrations		III
				LAPLACE TRANSFORMS Definition –Laplace transform of standard function and periodic function – Inverse Laplace transforms – method of partial fractions – second order Differential Equations.	IV
		Z – TRANSFORMS Introduction – Z-transform – Definition – Elementary properties of Ztransform – Problems based on Bilateral Z transform .	Differential Equations		V
2	ELECTRONIC DEVICES AND CIRCUITS	MEMS		Capacitors,Inductors	I
		Gunn diode	Ripple factor,Tunnel diode		II
		Biasing	Frequency response	BJT & its applications modified	III
			FET as inverter,UJT as relaxation oscillator		IV

3	ELECTRICAL CIRCUITS AND INSTRUMENTS		Energy	Nodal and Mesh Analysis	I
			Rectangular and Polar Form Concept of selectivity and Tuned circuit	UNIT III clubed with UNIT 2	II
				Indicating Instruments(moved from unit IV to unit III)	III
		Transformers		Digital Multimeters	IV
		Function Generator,Earth value tester,Insulation tester,Digital energy meter,Smart meters.	Basic DC voltmeter with DC amplifier CRT MSO	Unit V renamed as MEASURING INSTRUMENTS Digital Storage Oscilloscope	V
4	DIGITAL ELECTRONICS		Mux,DeMux,Encoder & Decoder	VLSI design process	V
5	ANALOG CIRCUITS	SMALL SIGNAL AMPLIFIER	Biasing	Multi stage amp Unit II is modified in Unit I as Small signal Amp	I
				Feedback amplifier (Unit II and Power amplier (Unit 2) is clubbed	II
				Oscillators and Tuned Amplifiers	III
		IC741	Cu to Voltage converter ,Voltage to current converter		IV
		Astable multivibrator using Op Amp		Voltage Multipliers	V
6	COMMUNICATION ENGG I		Operation on signals	Unit 5 moved as Unit I Classification of signals.	I

		Monopole antenna , Dipole antenna	High pass filter derivation.Parabolic reflector,Patch antenna, cassegrain feed mechanism(included in CEII). Reflection mechanism details.	Unit I moved as UnitII and renamed as FILTERS, ANTENNAS AND WAVE PROPOGATION. Classification of antennas.	II
				Unit II moved as Unit III	III
		PAL,OLED, QLED	Composite video signal,CCD camera	Unit III moved as Unit IV	IV
			LiFi	Unit IVmoved as Unit V	V
7	C PROGRAMMING	NO CHANGE			
8	COMMUNICATION ENGINEERING II			Digital codes	I
		Millimeter waves			II
			WDM		III
				Global Positioning System	IV
		GPRS, EDGE & HSPA			V
9	MEASUREMENT SYSTEM AND ELECTRICAL VECHILE	NO	NO	NO	I

	TECHNOLOGY	Schering bridge-Digital tachometer-Digital panel meter-Digital storage oscilloscope (DSO)	Kelvin double bridge-Digital frequency meters-Measurement of-frequency,period,Time-interval,Ratio-universal counter-Digital voltmeter-ramp type-Integrating type		II
		Bonded,unbounded and semiconductor types strain gauge.	Block diagram of DC signal conditioning system-AC signal conditioning system-Thermometer.		III
				Completly changed	IV
				Completly changed	V
10	8051 MICRO CONTROLLER & EMBEDDED SYSTEMS			Completly changed	TWO SUBJECTS MERGED
11	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS	pulse oximeter	Propagation of action potentials - bio electric potentials		V
12	IOT			NEW SUBJECT INTRODUCED	
13	PROJECT WORK	ADDED INTERNSHIP PROGRAM			
14	MOBILE & WIRELESS COMMUNICATION (SUBJECT TITLE	MICROCELL ZONE CONCEPT			I
		NO	NO	No	II

	CHANGED)	Introduction to 5G Technology	Spread spectrum signals DSSS FHSS		III
		NO	NO	NO	IV
		NO	NO	NO	V
15	BIOMEDICAL AND INSTRUMENTATION		Galvanic skin resistance(GSR)		II
		Methods of Accident prevention Grounding-isolated power distribution system.	telemetry for ECG measurements during exercise, Telemetry for emergency patient monitoring, Health level 7 standards, Digital Imaging and Communication in Medicine(DICOM).		IV
			SPECT-PET Advantage & applications.		V
16	E VECHILE TECHNOLOGY	NEW SUBJECT			
17	Very Large Scale Integration			Unit I Completely Changed	I
				Unit III is changed as Unit II	II
				Unit IV is changed as Unit III	III
				Unit V is changed as Unit IV	IV

				Unit I is changed as Unit V	V
18	COMPUTER HARDWARE AND NETWORKS	DDR4,SSD introduction,Zip Drive;Blu-ray,Disc parameters	USB,Processor BUS-High speed BUS-1TB RAM-Troubleshooting hard disk drives.Pendrive basic principle		I
		HDMI,VGA	Line printer,Thermal printer-Operation-construction-Features and troubleshooting, Bluetooth interface,IR connector,Fire ware,Signal specification problems with interfaces.TFT displays.		II
		Identifying the signature of viruses-Firewalls and latest diagnostic software	Difference between laptop and desktop-Types of laptop,Types and basic problems,RAM-Types,CPU-types-Ports.		III

		Data communication:Components of a data communication,Types:simplex-half duplex-full duplex Network devices:Features and concepts of switches-Routers(Wired and wireless)	Networks-Definiton-Network criteria-Types of connection:point to point-multipoint,Transmission Media:-Guided-Twisted pair,Coaxial,Fiber optics;Unguided-Ratio waves-Infrared-LOS-VSAT and TCP/IP		IV
		TCP/IP-Transport layers protocol-Connection oriented and connectionless services-Sockets-TCP & UDP-Unmanageable switch-Manageable switch	VLSM Technique-IPv6(concepts only).Switches-Routers(Wired and wireless).Connection oriented and connectionless services-Sockets-TCP&UDP.Gateways		V

DR.DHARMAMBAL GOVT POLYTECHNIC COLLEGE FOR WOMEN, THARAMANI, CHENNAI-13.
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
COMPARISION STATEMENT OF E SCHEME AND G SCHEME SYLLABUS

SEM	G SCHEME	DOTE N SCHEME
III	ENGINEERING MATHEMATICS - III	-
	ELECTRONIC DEVICES AND CIRCUITS ADDITIONAL CONTENTS Electronic components,Rectifier,Biasing of Transistor,Special purpose diodes ,Solar Cell	ELECTRONIC DEVICES AND CIRCUITS Amplifiers,Oscillaotrs & waveshaping included in Analog circuits of G Scheme
	ELECTRICAL CIRCUITS AND INSTRUMENTS Addl Contents Earth value tester, Insulation tester, Digital energy meter, Smart meters,PMMC & Multimeters	ELECTRICAL CIRCUITS AND INSTRUMENTATION Electrical motors,Generators included in Measurement systems and Electrical Vehicle Technology of G scheme
	DIGITAL ELECTRONICS Addl Contents Combinational & Sequential circuits extra topics included compared to N scheme and VLSI	ANALOG AND DIGITAL ELECTRONICS A to D and D to A converters,Memories are included in Analog circuits of G Scheme

IV	ANALOG CIRCUITS Addl Contents Small signal amplifiers,Power amplifiers,Tuned Amplifiers	-
	COMMUNICATION ENGINEERING I Addl Contents Signals & Systems and Computer Networks	ANALOG AND DIGITAL COMMUNICATION Microphone and Loud speaker included in Communication Engg I lab G scheme
	C PROGRAMMING Addl Contents Preprocessor directives and Dynamic Memory allocation ,Command line arguments	PROGRAMMING in C
	ENTREPRENEURSHIP & STARTUP DOTE N Scheme is followed	ENTREPRENEURSHIP & STARTUP
V	COMMUNICATION ENGINEERING II Addl Contents Mobile Communication	ANALOG AND DIGITAL COMMUNICATION SYSTEMS
	MEASUREMENT SYSTEM AND ELECTRICAL VECHILE TECHNOLOGY addl Contents Signal Generators& analysers,Digital Instruments	ECI &Electric Vehicle Technology and Policy of Dote N scheme is included in Measurement System And Electrical Vechile Technology
	8051 MICROCONTROLLER AND EMBEDDED SYSTEMS Merging 8051 microcontroller and embedded systems of VI semester combined. Internet of things new subject included in VI semester	MICROCONTROLLER AND ITS APPLICATIONS
	MOBILE & WIRELESS COMMUNICATION	MOBILE AND OPTICAL COMMUNICATION
	BIOMEDICAL INSTRUMENTATION DOTE N Scheme is followed	BIOMEDICAL INSTRUMENTATION
	E VEHICLE DOTE N Scheme is followed	E-Vehicle Technology & Policy ,The contents are included in MS&EVT Except Policy

VI	INDUSTRIAL ELECTRONICS AND MEDICAL ELECTRONICS Addl Contents Sensors ,SCADA & Bio medical Instrumentation topics	INDUSTRIAL ELECTRONICS Addl Contents Robotics
	INTERNET OF THINGS	-
	VERY LARGE SCALE INTEGRATION DOTE N Scheme is followed	VERY LARGE SCALE INTEGRATION
	COMPUTER HARDWARE AND NETWORKS Addl Contents SSD,Zip,Mini HDMI	COMPUTER HARDWARE SERVICING AND NETWORKING COMPUTER NETWORKS included in Commn Engg I
	CONSUMER ELECTRONICS DOTE N Scheme is followed	CONSUMER ELECTRONICS

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
COMPARISON OF SYLLABUS

Sem	Name of the subject	Equivalent Code			
		G scheme	2018-21	2015-18	2011-2014
III	Engineering Mathematics-III	ECG301	ECE 305	EC 305	EC 301
	Electronic Devices & Circuits	ECG302	ECE 306	EC 306	EC 302
	Electrical Circuits & Instruments	ECG303	ECE 307	EC 307	EC 303
	Digital Electronics	ECG304	ECE 308	EC 308	EC 304
	Electronic Devices & Circuits Lab	ECG371	ECE 374	EC 374	EC 371
	Electrical Circuits & Instruments Lab	ECG372	ECE 375	EC 375	EC 372
	Digital Electronics Lab	ECG373	ECE 376	EC 376	EC 373
IV	Analog Circuits	ECG401	ECE404	EC404	EC 401
	Communication Engineering I	ECG402	ECE405	EC405	EC 501
	C Programming	ECG403	ECE406	EC406	EC 503
	Analog Circuits Lab	ECG471	ECE474	EC474	EC471
	Communication Engineering I Lab	ECG472	ECE475	EC475	EC 571
	C Programming Lab	ECG473	ECE476	EC476	EC 573
	Entrepreneurship & Startup	ECG474	---	---	---
V	Communication Engineering - II	ECG501	ECE507	EC507	EC 601
	Measurement Systems & Electric Vehicle Technology	ECG502	---	---	---
	Measurement Systems & Electrical Machines	---	ECE508	EC508	EC 403
	8051 Microcontroller & Embedded Systems	ECG503	ECE607	EC607	EC 602
	Microcontroller & Interfacing	---	ECE509	EC509	EC 402
	Communication Engineering – II Lab	ECG571	ECE574	EC574	EC 671
	Measurement Systems & Simulation Lab	ECG572	ECE575	EC575	EC 473
	Embedded Systems Lab	ECG573	ECE678	EC678	EC 672
	Microcontroller & Interfacing Lab	---	ECE576	EC576	EC 472

VI	Industrial Electronics & Medical Electronics Internet of Things Industrial Electronics & Medical Electronics Lab Internet of Things Lab Project Work and Internship	ECG601 ECG602 ECG671 ECG672 ECG673	ECE 606 --- ECE 677 --- ECE 679	EC 606 --- EC 677 --- EC 679	EC 502 --- EC 572 --- EC 676
Electives	Biomedical Instrumentation Mobile & Wireless Communication E Vehicle Digital Communication Computer Hardware & Networks Very Large Scale Integration Consumer Electronics Very Large Scale Integration Lab Computer Hardware & Networks Lab Consumer Electronics Lab	ECG582 ECG581 ECG583 --- ECG682 ECG681 ECG683 ECG684 ECG685 ECG686	ECE 511 ECE 510 --- ECE 512 ECE 609 ECE 608 --- ECE 683 ECE 684 ---	EC 511 EC 510 --- EC 512 EC 609 EC 608 --- EC 683 EC 684 ---	EC 505 EC 504 --- --- EC 604 EC 603 --- EC 673 EC 674 ---
I	Communication Skills - Practical	BEG177	BEE183	BE183	BE 183