MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI-12, TAMILNADU

B.Sc .Electronics (2017-2018 onwards)

Sl.No	Category of Subjects	Contact Hrs/week	Credits
	SEMESTER I		
1.	Language-Tamil/Other	6	4
2.	Language-English	6	4
3.	Core-Basic Electronic Devices	5	4
4.	Major Practical I-Basic Electronic Devices Lab	4	2
5.	Allied I-Basic Electronics	3	3
6.	Allied Practical I-Basic Electronics Lab	4	2
7.	Common-Environmental studies	2	2
	Subtotal	**30**	**21**
	SEMESTER II		
8.	Language-Tamil/Other	6	4
9.	Language-English	6	4
10.	Core-Digital Electronics	5	4
11.	Major Practical II-Digital Electronics Lab	4	2
12.	Allied II-Introduction to Digital Electronics	3	3
13.	Allied Practical II-Digital Electronic Circuits Lab	4	2
14.	Common-Value Based Education	2	2
	Subtotal	**30**	**21**
	SEMESTER III		
15.	Core- Applied Electronics	4	4
16.	Core- Electronic Measurement and Circuit Theory	5	4
17.	Major Practical III-Circuits Lab	4	2
18.	Major Practical IV- Measurements Lab	4	2
19.	Allied III-Electronic Devices	3	3
20.	Allied Practical III-Electronic Devices Lab	4	2
21.	Skill Based Core-Consumer Electronic Appliances	4	4
22.	Non- Major Elective 1.Electronic Troubleshooting (Select any one) 2.Computer Hardware	2	2
23.	Common-Yoga	2	2
	Subtotal	**32**	**25**

	SEMESTER IV		
24.	Core-Linear Integrated Circuits	4	4
25.	Core-Computer Networks	5	4
26.	Major Practical V-Linear Integrated Circuits Lab	4	2
27.	Major Practical VI- Electronic Circuits Lab	4	2
28.	Allied IV-Digital Circuits	3	3
29.	Allied Practical IV-Digital Circuits Lab	4	2
30.	Skill Based Core-Maintenance and Troubleshooting of Audio-Video Equipment	4	4
31.	Non- Major Elective 1.Radio and Television (Select any one) 2.Radar and Navigation	2	2
32.	Extension Activitiy –NCC,NSS,YRC,YWF,PE-	0	1
33.	Common-Computers for Digital Era	2	2
	Subtotal	32	26
	SEMESTER V		
34.	Core-Microprocessor and Microcontroller	4	4
35.	Core-Medical Electronics	4	4
36.	Core-Mathematics for Electronics	4	4
37.	Core-Computer hardware and Maintenance	4	4
38.	Major Practical VII- Microprocessors and Microcontrollers Lab	4	2
39.	Major Elective 1.Television Engineering (Select any one) 2. Mobile Communication	4	4
40.	Skill Based Common- Personality Development/Effective Communication/Youth Leadership	2	2
41.	Mini Project	4	6
	Subtotal	30	30
	SEMESTER VI		
42.	Core-Power Electronics	4	4
43.	Core-Semiconductor Fabrication Technology	4	4
44.	Core-Robotics and Automation	4	4
45.	Core- Communication Systems	4	4
46.	Major Practical IX-Power Electronics and System Design Lab	4	2
47.	Major Elective 1.PCB Design (Select any one) 2.Embedded System and RTOS	4	4
48.	Major Project	6	7
	Subtotal	30	29
	Total		152

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI
B.Sc ELECTRONICS (CBCS)

(2017-2018 onwards)

I SEMESTER

I Semester-Core subject: 1

BASIC ELECTRONIC DEVICES

LTPC
3 2 0 4

Preamble: To equip the students with basic components in electronics and to understand the principles of operation of fundamental electronic devices. Prerequisite needed is background of the basic science at school level.Students on completion of this course will have good knowledge about the basic devices, its operation, Characteristics in detail.

UNIT I
PASSIVE DEVICES
Types of resistor – color code –Construction of various types of resistors (carbon composition.carbon film, wire-wound etc.) – power ratings- Capacitors (ceramic, mica polystrene, electrolytic etc.) – fixed and variable capacitors – Inductors, types.

(12L)

UNIT II
ATOMIC STRUCTURE
Atomic structure Bohr atom model – energy levels -energy bands –important energy band in solids- classification of solids and energy bands – forbidden Energy gap – intrinsic and extrinsic semiconductors P type and N type semiconductors– majority and minority carriers

(13L)

UNIT III
PN JUNCTION
PN junction- Biasing a PN junction – forward and reverse biasing – PN junction diode: Characteristics -static and dynamic resistance - Diode Rectifiers, clippers and clampers - Zener diode –Characteristics-voltage regulation using zener diode.

(12L)

UNIT IV
TRANSISTORS
Bipolar transistor– Common Base, Common Emitter & Common Collector configurations and their characteristics – load line – operating point – cut off and saturation regions – transistor biasing methods -Transistor as switch,Amplifier– UJT – SCR.

(11L)

UNIT V

     F.E.T

FET Constructional features-working Principle, features and characteristics – JFET and MOSFET and their characteristics – enhancement and depletion type – LED, LDR and photodiode.

                          (12L)

                       (Total: 60L)

TEXT BOOK:

1. V.K.Mehta, "Principles of Electronics", S.Chand & Co
2. B.L.Theraja, "Basic solid state Electronics", S.Chand & Co

BASIC ELECTRONIC DEVICES LAB

LTPC
0 0 4 2

1. Characteristics of PN Junction diode

2. Characteristics of Zener diode

3. Transistor Characteristics – Common base

4. Transistor Characteristics – Common emitter

5. Transistor Characteristics – Common collector

6. Measurement of stability factor of self biasing method

7. Measurement of stability factor of fixed biasing method

8. FET Characteristics

9. Photoconductivity of LDR

10. Characteristics of Photo diode

11. Characteristics of SCR

12. Characteristics of Photo transistor.

I Semester-Allied Theory
Allied Electronics for other major students

BASIC ELECTRONICS

LTPC
3 0 0 3

Preamble: To acquire the knowledge about passive components and various electronic devices and their characteristics.prerequisite for this course is basic science.On completion students will have thorough knowledge of basic semiconductor devices.

UNIT I
SEMICONDUCTOR BASICS

Introduction to semiconductor materials, intrinsic & extrinsic semiconductors. P type semiconductor, N type semiconductor p-n junction diode

(9L)

UNIT II
DIODE CIRCUITS

Clipper circuits, clamping circuits. Half wave rectifier, Center tapped and bridge full wave rectifiers, DC power supply: Block diagram of a power supply, Zener diode as voltage regulator.

(9L)

UNIT III
THE BJT

Basic transistor action, Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, UJT: construction, working.

(9L)

UNIT IV
FEEDBACK AMPLIFIERS

Concept of feedback, negative and positive feedback, Positive feedback: Barkhausen criteria for oscillations, Study of Hartley, Colpitts oscillator and Crystal oscillator.

(9L)

UNIT V
JUNCTION FIELD EFFECT TRANSISTOR (JFET)

Construction of JFET, Metal Oxide Field Effect Transistor (MOSFET): Basic Construction of MOSFET and working, enhancement and depletion modes.

(9L)
(Total: 45L)

TEXT BOOK:

Basic and Applied Electronics-T.K Bandyopadhyay, Books and Allied Pvt Ltd (2002)

BOOKS FOR REFERENCE:

1. V.K.Mehta, "Principles of Electronics", S.Chand & Co
2. B.L.Theraja, "Basic solid state Electronics", S.Chand &Co
3. R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education (2006).
4. N Bhargava, D C Kulshreshtha and S C Gupta, Basic Electronics and linear Circuits, Tata McGraw-Hill (2007)
5. J. Millman and C. Halkias, Integrated Electronics, Tata McGraw Hill (2001).
6. David A. Bell, Electronic Devices & Circuits, Oxford University Press, Fifth Edition
7. Mottershed, Electronic Devices, PHI Publication, 1st Edition.

I semester Allied Practical
Allied Practical for other major students

BASIC ELECTRONICS LAB

LTPC
0 0 4 2

1. Characteristics of PN diode

2. Characteristics of Zener diode

3. Transistor Characteristics – Common base

4. Transistor Characteristics – Common emitter

5. Transistor Characteristics – Common collector

6. Measurement of stability factor of self biasing method

7. Measurement of stability factor of fixed biasing method

8. FET Characteristics

9. Photoconductivity of LDR

10. Characteristics of Photo diode

11. Characteristics of SCR

12. Characteristics of Photo transistor

II SEMESTER

II Semester-Core subject: 1

DIGITAL ELECTRONICS

LTPC
3 2 0 4

Preamble: The design of the subject is to impart the knowledge about code conversion, Boolean algebra, logic gates, combinational and sequential logic, and converters. Prerequisite for this course is Basic arithematic.Upon Completion of the course, the student will be able to Convert one Number system to another number system, Construct truth tables for logic gates, Simplify Boolean expression.

UNIT I
NUMBER SYSTEM AND CODES:
Decimal, Binary, Octal and Hexadecimal number systems, base conversions. Representation of signed and unsigned numbers, BCD code. Binary, octal and hexadecimal.

(12L)

UNIT II
DIGITAL LOGIC FAMILIES:
Fan-in, Fan out, Noise Margin, Power Dissipation, Figure of merit, Speed power product, comparison of TTL and CMOS families.
Truth Tables of OR, AND, NOT, NOR, NAND, EXOR, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem. Karnaugh Maps: Two variable K-Map

(12L)

UNIT III
ARITHMETIC CIRCUITS:
Binary Addition. Half and Full Adder. Half and Full Subtractor, Binary Adder/Subtractor. Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker – parity generators – code converters - Magnitude Comparator.

(12L)

UNIT IV
LATCHES:
Latches, Flip-flops - SR, JK and Master-Slave -Edge triggering – Level Triggering Asynchronous Ripple or serial counter – Asynchronous Up/Down counter - Synchronous counters – Synchronous Up/Down counters – Programmable counters – Modulo–n counter, Registers – shift registers - Universal shift registers – Shift register counters – Ring counters.

(12L)

UNIT V
   MEMORY DEVICES

Classification of memories – ROM - PROM – EPROM – EEPROM – EAPROM, RAM– Static RAM Cell- Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) .

(12L)
(Total: 60L)

BOOKS FOR STUDY:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)

DIGITAL ELECTRONICS LAB

LTPC
0 0 4 2

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC

2. Designing of all the logic gates using NAND gate IC

3. Designing of all the logic gates using NOR gate IC

4. Verification of Demorgan's theorems

5. Construction of gates using discrete components

6. Code conversion

7. Half adder and Full adder

8. Half subtractor and Full subtractor

9. Multiplexer and De-Multiplexer

10. Encoder and Decoder

11. Study of Flip flops

12. Shift register

13. Ripple counter

II Semester-Allied Theory 2

Allied Electronics for other major students

INTRODUCTION TO DIGITAL ELECTRONICS

LTPC
3 0 0 3

Preamble: The objective of the paper is to facilitate the student with the knowledge of Digital Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture. Prerequisite is knowledge of basic mathematics.

Upon completion of the course student is expected to develop an understanding of simple digital systems and develop the logic behind the organization of various computer components.

UNIT I
   NUMBER SYSTEM AND CODES:
Decimal, Binary, Octal and Hexadecimal number systems, base conversions. BCD code. Binary, octal and hexadecimal arithmetic.

(9L)

UNIT II
   DIGITAL LOGIC FAMILIES,
Truth Tables of OR, AND, NOT, NOR, NAND, EXOR, gates, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem.

(9L)

UNIT III
   ARITHMETIC CIRCUITS:
Binary Addition. Half and Full Adder. Multiplexers, De-multiplexers, Decoders, Encoders, code converters

(9L)

UNIT IV
   FLIP FLOPS
 S-R Flip flop, J-K Flip flop, Counters (synchronous and asynchronous, ring and modulo- n counter Registers – shift registers.

(9L)

UNIT V
    MEMORY DEVICES

Classification of memories – ROM PROM – EPROM – EEPROM – EAPROM, RAM – Static RAM Cell- Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA)

(9L)
(Total: 45L)

BOOKS FOR STUDY:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)

II semester Allied Practical
Allied Practical for other major students

DIGITAL ELECTRONIC CIRCUITS LAB

**LTPC
0 0 4 2**

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC

2. Designing of all the logic gates using NAND gate IC

3. Designing of all the logic gates using NOR gate IC

4. Verification of Demorgan's theorems

5. Construction of gates using discrete components

6. Code conversion

7. Half adder and Full adder

8. Half subtractor and Full subtractor

9. Multiplexer and De-Multiplexer

10. Encoder and Decoder

11. Study of Flip flops

12. Shift register

13. Ripple counter

SEMESTER III

III Semester-Core subject: 1

APPLIED ELECTRONICS

LTPC
4 0 0 4

Preamble: The objective of this paper is to study the classification and operation of rectifiers and filter circuits amplifiers, oscillators, this paper enables the students to become an electronic technician and circuit designer. Prerequisites of this paper is Background knowledge of basic electronics.Upon completion of the subject, the student should be able to design and troubleshoot amplifiers, oscillators, power supply and filters.

UNIT I
RECTIFIERS
Rectifiers- half wave rectifier, full wave rectifier, bridge rectifier, Inductor- Capacitor-L type filters-ripple factor-Voltage regulator(series type)-current limit over load production-introduction to IC fixed and variable IC 723,78XX,79XX-voltage regulators.
Transformers-Working principle of transformers-Transformer construction-Core type transformer.

(12L)

UNIT II
AMPLIFIERS
Amplifiers-general principle of operation-classification of amplifiers-classification of distortion (amplitudes, frequency, phase)-RC coupled amplifier-gain-frequency response-input and output impedance -multistage amplifiers-transformer couple amplifiers-frequency response.

(12L)

UNIT III
POWER AMPLIFIERS
Introduction-classification power amplifier-class A power amplifier-class A push pull amplifier- class B power amplifier- class B push pull amplifier- class C power amplifier-class C push pull amplifier-power dissipation output power-distortion.

(12L)

UNIT IV
FEEDBACK AMPLIFIERS
Feed back-basic concepts-characteristics-effect of negative feed back- on gain-stability- distortion-band width- analysis of voltage and current feed back amplifier circuits.

UNIT V
OSCILLATORS

Classification of oscillators-use of positive feed back – barkhausen criterion for oscillation- colpitts oscillator-Hartley oscillator-wein bridge oscillator- phase shift oscillator-crystal oscillator-frequency stability of oscillators-multivibrators.

(12L)
(Total: 60L)

BOOKS FOR STUDY:

1. Electronic devices and circuits-Millman & Halkias.
2. Electronic devices and applications and Integrated circuits-Mathu.
3. Basic Electronics-B.L.Theraja.
4. Electronic devices and circuits- G.K.Mithal,Khanna publishers.
5. Electronic devices and circuits – Allen mottershead.
6. Problems and solutions of electronic devices and circuits-Experience teachers (CBS publication, New Delhi).
7. Electrical Technology-B.L Theraja A.K Theraja
8. Basic electrical Engg -P.S Dhogal TMH

ELECTRONIC MEASUREMENTS AND CIRCUIT THEORY

LTPC
4 1 0 4

Preamble: The objective of this paper is to introduce the basic concepts related to the operation of Electrical and Electronic Measuring Instruments. To understand basic electronic instrument terminology and to understand the proper application of electronic instruments. To apply circuit theorems to simplify and to find solutions to electrical circuits. To Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems. Prerequisites of this paper is Background knowledge of basic electricity and science. Upon completion of the subject, the student should be able to understand various instruments and their working, and will have basic problem solving skills through organizing available information and applying circuit laws.

UNIT I
MEASUREMENTS
Measurements, errors in measurements- measurement standard, Classification and characteristics of Transducers, AC/DC Bridge measurements and their applications.

(12L)

UNIT II
MEASURING INSTRUMENTS
PMMC – DC ammeter – DC voltmeter - Voltmeter sensitivity - Ohm meter – VOM or Multimeter – Calibration Digital Voltmeters and Multimeters, AC Voltmeter-Vector Voltmeter- CRO-Block Diagram – single beam – dual trace – Sampling Oscilloscope.

(12L)

UNIT III
DC CIRCUITS
Ohms Law-power Energy-resistors in series, parallel- Kirchoff's Laws and their applications – Branch and loop currents- mesh and node analysis- Simple Problems.

(12L)

UNIT IV
AC CIRCUITS
Fundamental ideas of AC circuits - impedance of RL, RC, RLC circuits-Resonance in AC circuits- series and parallel,-Simple Problems.

(12L)

UNIT V
NETWORKS
Network graph of a network- concept of tree- branches and chords dual networks- Network theorems: Superposition, Thevenin, Norton, Maximum Power transfer Theorem Simple Problems.

BOOKS FOR STUDY:

1. C.S.Rangan "Instrumentation Devices and Systems" Tata McGraw Hill, 1998.
2. Copper "Electronic Instrumentation and Measurement Techniques" PHI
3. A.J. Bouwels "Digital Instrumentation", McGraw Hill, 1986
4. C.Barney "Intelligent Instrumentation" Prentice Hall of India, 1985
5. Oliver and Cage "Electronic Measurements and Instrumentation" McGraw HILL, 1975
6. Deobelin "Measurements Systems" McGraw HILL, 1990
7. Electronic circuits – Edminister (Schaum outline series – TMH)
8. Circuits and networks, Analysis and synthesis – A.Sudakar & S.P. Shyammohan (TMH).
9. Networks, analysis and synthesis – Umesh sinha.
10. Electronic circuits Theory – Dr.M.Arumugam & Dr.N.Prem Kumaran (Khanna Publishers)

CIRCUITS LAB

LTPC
0 0 4 2

1. To familiarize with basic electronic components (R, C, L, diodes, transistors), Digital Multimeter, Function Generator and Oscilloscope.
2. Resistors and capacitors in series and parallel
3. Verification of Ohm's Law
4. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope.
5. Verification of Kirchoff's laws.
6. Verification of Thevenin's theorem
7. Verification of Norton's theorem.
8. Verification of Superposition Theorem.
9. Verification of Reciprocity Theorem.
10. Verification of Millmans theorem.
11. Verification of Maximum Power Transfer Theorem.
12. Transient Response
13. Series resonance.
14. Parallel Resonance.

MEASUREMENTS LAB

LTPC
0 0 4 2

1. Wheatstone bridge

2. Kelvin double bridge

3. Maxwell bridge

4. Hay bridge

5. Schering bridge

6. LVDT

7. Displacement meter using strain gauge

8. Transducer Applications and Measurement

9. Extension of range of PMMC meter

10. Current Measurement using sensors

11. Measurement of displacement, rotary displacement using magnetic pickup.

12. Measurement of load using strain gauge based load cell.

13. Measurement of flow rate by anemometer

14. Measurement of temperature by RTD.

15. Measurement of temperature by thermocouple

Allied Electronics for other major students

ELECTRONIC DEVICES

LTPC

3 0 0 3

Preamble: To acquire the knowledge about passive components and various electronic devices and their characteristics.prerequisite for this course is basic science.On completion students will have thorough knowledge of basic semiconductor devices.

UNIT I
BASIC COMPONENTS
Basic components used in Electronics **-**Resistor, capacitor, inductor and their different types - Diodes - Light Emitting diode (LED), Photo diode - Zener diode, LDR

(9L)

UNIT II
POWER SUPPLIES
Need of a power supply - Types of power supplies - Different types of unregulated and regulated power supplies - IC Regulated power supply - switched mode power supply.

(9L)

UNIT III
AMPLIFIERS-
Transistor amplifier circuit - Types of Amplifiers - Single stage transistor amplifier - Feedback in amplifiers - Advantages of Negative feed back amplifiers.

(9L)

UNIT IV
OSCILLATORS
Oscillators Application, Classification, Sinusoidal Oscillator- Barhausen criteria - Hartley and colpitt's oscillators - Crystal oscillators

(9L)

UNIT V
ELECTRICAL ELEMENTS
Electrical elements   -Potential difference- Electric current-Electromotive force-Ohms law- Kirchoff's law- Kirchoff's current law- resistance in series circuits, parallel circuits and Concept of voltage source and current source

(9L)

(Total: 45L)

TEXT BOOK:

1. Principles of Electronics - V.K. Mehta - S.Chand Publication, New Delhi
2. Basic and Applied Electronics-T.K Bandyopadhyay, Books and Allied Pvt Ltd (2002)
3. Electronic devices and circuits - G.J.Mithal, Khana publishers, New Delhi
4. Basic Electronics - B.L. Theraja - S.Chand publication, New Delhi

BOOK FOR REFERENCE:

1. Electronic devices and circuits - B.Sasikala, S.Poornachandra Scitech publication India Pvt. Ltd., Chennai.
2. Electronic devices and Application and integrated circuits - Mathur kulashethra & Chandra Umesh publication, New Delhi.
3. Hand book of Electronics - Gupta & Kumar, Pragathi prakashan, Delhi.

ELECTRONIC DEVICES LAB

LTPC
0 0 4 2

1. Characteristics of PN diode

2. Characteristics of Zener diode

3. Transistor Characteristics – Common base

4. Transistor Characteristics – Common emitter

5. Transistor Characteristics – Common collector

6. Measurement of stability factor of self biasing method

7. Measurement of stability factor of fixed biasing method

8. FET Characteristics

9. Photoconductivity of LDR

10. Characteristics of Photo diode

11. Characteristics of SCR

12. Characteristics of Photo transistor

CONSUMER ELECTRONIC APPLIANCES

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge in various electronic devices used in everyday life and to understand the principles of operation of the electronic household or office devices, its care and Maintenance. Prerequisite needed is background of the basic science and electricity at school level.Students on completion of this course will have good knowledge about the basic everyday household electronic devices, its operation, Characteristics in detail.

UNIT I
MICROWAVE OVENS

Microwaves - Properties and generation Magnetrons,Waveguides- Microwave oven block diagram - LCD timer with alarm – Single chip controllers – Types of Microwave Ovens-Microwave cooking-Features and parts of Microwave oven-Wiring and Safety instructions – Microwave cookware-Operating problem and solutions- Care and Cleaning.

(12L)

UNIT II
WASHING MACHINES

Electronic controller for washing machines - Washing machine hardware –Washing cycle-Hardware and software development - Types of washing machines - Fuzzy logic washing machines - Features of washing machines.

(10L)

UNIT III
AIR CONDITIONERS AND REFRIGERATORS

Air Conditioning - Components of air conditioning systems - All water air conditioning systems - All air conditioning systems –Remote control buttons-Combination systems-Unitary and central air conditioning systems - Split air conditioners-Refrigeration-Refrigerants-Refrigeration systems-Domestic Refrigerators.

(12L)

UNIT IV
HOME / OFFICE DIGITAL DEVICES

Facsimile machine –Basic fax machine operations-Group 3 fax machines- Xerographic copier,Process-Extension to dynamic copier - Calculators - Structure of a calculator - Internal Organization of a calculators - Servicing electronic calculators - Digital clocks - Block diagram of a digital clock.LSI digital clock.

UNIT V
DIGITAL ACCESS SERVICES
Data services-Advantages od digital-Digital exchanges-The BORSCHT functions-Local distribution networks-Data services-Message switching-Message switching and circuit switching-Packet switching- Packet and message switching-Packet format-LAN,MAN and WAN-ISDN-The Internet- Online ticket reservation - Functions and networks – Barcode-Barcode Scanner and decoder - Electronic Fund Transfer - Automated Teller Machines (ATMs) - Set-Top boxes - Digital cable TV - Video on demand.

(14L)
(Total: 60L)

 TEXT BOOK:

1. Consumer Electronic - S.P. Bali, Pearson Education, New Delhi, 2005.

III Semester-: Non Major Elective
Non Major Elective for other major students
(Select any one course 1 or 2)

1. ELECTRONIC TROUBLESHOOTING

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge in troubleshooting various electronic devices used in measurement and industry and to understand the principles of testing these devices, its care and Maintenance. Prerequisite needed is background of the basic science and knowledge of measuring devices. Students on completion of this course will have good knowledge about the maintenance of electronic measurement devices, its operation, testing and troubleshooting in detail.

UNIT I
RELIABILITY OF ELECTRONIC EQUIPMENT
Failures-Causes of Failures-Maintenance-Advantages of proper Maintenance, Maintenance policy-Preventive Maintenance, Corrective Maintenance-Basic Procedure of Service and Maintenance

(6L)

UNIT II
PREPARATIONS AND PRECAUTIONS BEFORE TROUBLE SHOOTING
Troubleshooting Procedure-Fault Location-Fault Repair-Repair Verification-Perform Root cause Analysis-Fault Finding Aids-Service Manual-Test and Measurement Equipment-Multimeters-C.R.O, Function Generators.

(6L)

UNIT III
TROUBLESHOOTING TECHNIQUES
Functional Area Approach-Split Half Technique-Input to Output Technique-Output to input Technique-Divergent Paths Technique-Convergent paths Technique-Feedback Paths Technique-Switching Paths Technique, Measurement Techniques

(6L)

UNIT IV
TESTING OF PASSIVE COMPONENTS
Resistors, Preset, L.D.R, Capacitors, Inductors, Transformers, Passive component testing using C.R.O-Testing Semiconductor Devices-Diode, Zener diode, L.E.D, Transistor, Mosfet, Thyristors, Testing of Active components using C.R.O.

UNIT V
TROUBLE SHOOTING DIGITAL SYSTEMS
Summary of Gates, Digital Logic Families-I.C packages, Digital Test Instruments-Logic Probe-Logic Pulser-Logic Clip-DigitalI.C Tester, Faults in Digital circuits, Precautions during Digital Troubleshooting-Troubleshooting-Power supply, SMPS, Oscilloscope.

(6L)
(Total: 30L)

TEXT BOOK

Maintenance of Electronic Equipments-K.Sudeep Singh - Kataria and Sons

2. COMPUTER HARDWARE

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge of Architecture and Design of a Personal Computer and Related Peripherals used in everyday life and to enable the student to get a detailed knowledge of all the hardware components of a personal computer and different interfaces and to understand different storage media.. Prerequisite needed is background of the basic science and computers.Students on completion of this course will understand the components on the motherboard, can address issues related to CPU and Memory.They will have good knowledge on Data storage devices and issues related to it.

UNIT I
CPU
CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel's CPU

(6L)

UNIT II
MEMORY CONCEPT
Essential memory concepts – memory organizations – memory packages –modules – logical memory organizations – memory considerations – memory types – memory techniques – selecting and installing memory.

(6L)

UNIT III
MOTHERBOARD
Active motherboards – sockets and slots – Intel D850GB – Pentium4 mother board – expansion slots – form factor – upgrading a mother board – chipsets –north bridge – south bridge

(6L)

UNIT IV
POWER SUPPLY
Power supplies and power management – concepts of switching regulation – potential Power problems – power management. The floppy drive – magnetic storage – magnetic recording principles – data and disk organization – floppy drive – hard drive – data organization and hard drive – sector layout

(6L)

UNIT V

DRIVES

IDE drive standard and features – Hard drive electronics – CDROM drive – construction – CDROM electronics – DVD-ROM – DVD media – DVD drive and decoder.

(6L)

(Total: 30L)

TEXT BOOK:

1. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs", Tata McGraw-Hill, New Delhi, 2001.

BOOK FOR REFERENCE:

1. Craig Zacker & John Rourke, "The complete reference: PC hardware", Tata McGraw-Hill, New Delhi, 2001.
2. Mike Meyers, "Introduction to PC Hardware and Trouble shooting", Tata McGraw-Hill, New Delhi, 2003.
3. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and Maintenance", Tata McGraw-Hill, New Delhi, 2002.

SEMESTER IV

IV Semester-Core subject: 1

LINEAR INTEGRATED CIRCUITS

LTPC
4 0 0 4

Preamble: To equip the students with detailed knowledge of Analog IC's like OPAMP 741, IC 555 etc and to☐ learn the basics of differential Amplifiers, Characteristics of OPAMP, filters, wave form generators, comparators, multivibrators and various OP AMP applications. Prerequisites needed are the background of the basic electronics. By the end of the programme, students should have a thorough knowledge about all the electrical and electronic characteristic of analog integrated circuit devices present.

UNIT I
DIFFERENTIAL AMPLIFIERS
Differential amplifiers-dual input-balance output differential amplifier- current mirror- level translator- block diagram representation of typical op amp- interpreting a typical set of data sheets- the ideal opamp- equivalent circuit of an op amp- ideal voltage transfer curve.

(12L)

UNIT II
OP AMP CHARACTERISTICS
Input off set voltage – input bias current- input offset current- total output offset voltage-input and output resistance-thermal drift-CMRR-voltage shunt and voltage series feed back amplifiers.

(10L)

UNIT III
FREQUENCY RESPONSE
Frequency response of initially compensated op amp- circuit stability-slew rate. Filters low pass filters- high pass filters- band pass filters-band reject filters-all pass filters.

(12L)

UNIT IV
OP AMP APPLICATIONS
Adder-subtractor-Integrator-differentiator – V to I and I to V converter. Oscillator Principles-types-frequency stability phase shift oscillator-wein bridge oscillator- square wave generator –triangular wave generator.

(14L)

UNIT V

   COMPARATOR

Comparator-Schmitt trigger-clipper and clamper-peak detector-zero crossing detectors- IC-555 function block diagram-mono stable operation –astable operation –applications

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Linear Integrated Circuits- D.Roychoudry & Shail Jain (New age publications 1999).
2. Operational amplifiers and linear integrated circuits-F.Couglin & Drison (4th edition prentice hall of India, 1992).
3. Operational amplifiers and linear integrated circuits- Denton J.Dailey, McGraw Hill 1989.
4. Operational amplifiers and linear integrated circuits-Ramakant A.Gayakwad 3rd edition PHI.
5. Second Edn. Operational amplifiers and Linear Ics-David A. Bell.

COMPUTER NETWORKS

LTPC
3 2 0 4

Preamble: To understand the concept of data communication and networking models and to study   the functions of OSI layered architecture and its protocols. To recognize the real time multimedia application in wired and wireless networks Prerequisite is knowledge of computers and electronics on completion of course students will be able to demonstrate the layered protocols and their functions of wired and wireless networks.They identify the networking devices and supporting software in computer networks. Create a network scenario and analyse its performance using network simulator. Choose security component for five layers of networks and identify the important application layer protocols.

UNIT I
DATA COMMUNICATION CONCEPTS:
Transmission media – Data encoding – Interface and Modems – Multiplexing – Error detection and correction – Digital subscriber line – Circuit switching – Packet switching – Message switching

(12L)

UNIT II
WIDE AREA NETWORKS:
ISO – OSI layered architecture – Function of the layers – Data link protocols – HDLC, LAPB, LAPD, Inter networking devices – Repeaters, Bridges, Routers, Routing algorithms – Distance vector routing, link state routing, X.25protocol,congestioncontrol.

(12L)

UNIT III
FRAME RELAY AND ATM NETWORKS:
Frame relay operation – layers and traffic control; ATM networks – Architecture switching, layers service classes.

(12L)

UNIT IV
LOCAL AREA NETWORK:
LAN topology – Ethernet – Token bus – Token ring – FDDI – Wireless LAN, ATM LAN – IEEE 802 Medium access control layer standard –Random access protocols – ALOHA – SlottedALOHA.

(12L)

UNIT V
       OSI LAYERS:
Transport layer issues – Session layer – Synchronization – Presentation layer – Encryption, decryption, Application layer – Message handling system, file transfer, virtual terminal – E-mail.

                                                                              (12L)
                                                                        (Total: 60L)

TEXT BOOK

1. William Stallings, "Data and Computer Communication", sixth edition, Pearson
   Education Asia, 2000.

REFERENCES

1. Behrouz A, Forouzan, "Data Communication and Networking", second edition,
   Tata McGraw-Hill, 2000.
2. Fred Halsall, "Data Communication, Computer networks and Open Systems",
   Fourth edition, Addison Wesley, 1995.
3. Andrew S.Tanenbaum, "Computer networks", Third edition, PHI, 1996,

LINEAR INTEGRATED CIRCUITS LAB

LTPC
0 0 4 2

1. Inverting and Non Inverting Amplifier.

2. Integrator and Differentiator.

3. Instrumentation Amplifier.

4. High pass, Low pass filters.

5. Band pass filter.

6. Astable multivibrator using OP-AMP.

7. Monostable multivibrator using OP-AMP.

8. Phase shift oscillator using OP-AMP.

9. Wien Bridge oscillator using OP-AMP.

10. Digital to Analog Converter.

11. Analog to Digital Converter.

12. Astable Multivibrator using IC555.

13. Monostable Multivibrator using IC555.

14. Schmitt Trigger and Comparator using OP-AMP.

15. Design of light switch using LDR and Relay.

ELECTRONIC CIRCUITS LAB

LTPC
0 0 4 2

1. Half wave rectifier

2. Full wave rectifier

3. Construction of power supply using C filter and zener diode as regulator

4. Construction of variable power supply using IC723

5. Construction of variable power supply using LM317

6. Characteristics of Class A Power Amplifier

7. Characteristics of Class B Power Amplifier

8. Design a Single Stage CE amplifier.

9. Design of Two stage RC coupled Amplifier.

10. Darlington pair Amplifier.

11. Clipping circuits.

12. Clamping circuits.

13. Hartley Oscillator.

14. Colpitt's Oscillator.

15. Astable Multivibrator using BJT.

Allied Electronics for other major students

DIGITAL CIRCUITS

LTPC
3 0 0 3

Preamble: To equip the students with detailed knowledge in digital electronics, digital IC's in the CMOS series. Many of the ideas are important to learn microprocessors.The students will learn different number systems, logic gates, comparators, flip flops etc.Prerequisites is the knowledge about the origin of numbers, counting etc. Introduction of zero and positional number system etc.Upon completion of this course student will be thorough with binary arithematic, logical expression simplification working of flip flops, shift registers counters etc.

UNIT I
NUMBER SYSTEM
Basics and Number systems-Digital signals – Basic Digital circuits – NAND, NOR, EX-OR – Universality of NAND and NOR – Number systems – Conversions.

(9L)

UNIT II
LOGICAL CIRCUITS
Combinational Logic Design-Boolean Algebra – Demorgan's Theorem – Karnaugh Map – Don't care condition – Multiplexer – Demultiplexer.

(9L)

UNIT III
FLIP FLOPS
Flipflops-Rs flipflop – JKFF – D FF – T FF – Master slaVe FF – Applications

(9L)

UNIT IV
SHIFT REGISTERS
 Shift Registers and counters-Registers – Left shift, Right shift, Parallel in parallel out Counters – Ripple counter, Decade counter – Modulo counters.

(9L)

UNIT V
MEMORY
RAM – static, Dynamic – Diode ROM – PROM – EPROM – E2 PROM

(9L)
(Total: 45L)

TEXT BOOK

1. Modern Digital electronics: R.P. Jain, TataMcGraw Hill 1997
2. Digital Electronics, V.K. Puri, Tata Mc Graw Hill
3. Computer System Aaraachitecture, 2nd Edition, M. Marris mano, Prentice Hall, 1998

DIGITAL CIRCUITS LAB

LTPC
0 0 4 2

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC

2. Designing of all the logic gates using NAND gate IC

3. Designing of all the logic gates using NOR gate IC

4. Verification of Demorgan's theorems

5. Construction of gates using discrete components

6. Code conversion

7. Half adder and Full adder

8. Half subtractor and Full subtractor

9. Multiplexer and De-Multiplexer

10. Encoder and Decoder

11. Study of Flip flops

12. Shift register

13. Ripple counter

MAINTENANCE AND TROUBLE SHOOTING OF AUDIO AND VIDEO EQUIPMENTS

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge in various electronic devices used in everyday life and to understand the principles of operation of the electronic household devices, its care and Maintenance and troubleshooting. Prerequisite needed is background of the basic science and knowledge of working.Students on completion of this course will have good knowledge about the basic everyday household electronic devices, its operation, maintenance and troubleshooting in detail.

UNIT I
RECORDING
Recording and reproduction principles - Optical recording - Different types - Methods of recording and reproduction - Optical recording on compact disc - play back process - Advantage of compact disc - Trouble shooting in compact disc

(12L)

UNIT II
AUDIO SYSTEMS
Stereophony - Stereophonic recording on disc and reproduction - Hi-Fi Stereo reproducing system - Block diagram of Public Addressing system - Requirement of Public Addressing system - Typical PA installation planning for a public meeting - PA system for an auditorium troubleshooting in PA system.

(12L)

UNIT III
TELEVISION
Monochrome, PAL colour TV transmitters Faults in TV transmitter - Testing of TV transmissions monochrome TV receiver - Fault in monochrome TV receiver - PAL colour TV receiver - Faults in colour TV receiver - Testing of TV receiver.

(12L)

UNIT IV
VIDEO DISC
Video disc format - Video recording on disk - Very High density disk - High definition TV system - Block diagram of MAC encoder - MAC receiver - Advantages.

(12L)

UNIT V

DIGITAL TV

Digital TV system - Cable TV concepts set top box - Dish TV and connections - Closed circuit television - Introduction to FLAT LCD and Plasma television systems.

(12L)
(Total: 60L)

TEXTBOOKS

1. Audio and Video systems Principles, Maintenance and Troubleshooting. - R.G. Gupta Tata Mc Graw Hill Publishing Co.Ltd.
2. Colour Television Theory and Practice - S.P. Bali, Tata Mc Graw Hill Publishing Co.Ltd.

REFERENCE BOOKS

1. Electronic Instruments and systems, Principles, Maintenance and Troubleshooting - R.G. Gupta Tata Mc Graw Hill Publishing Co.Ltd.

2. Monochrome and Colour Television - R. Gulati. New Age Interbational (P) Ltd. New Delhi.

Non Major Elective for other major students

(Select any one course 1 or 2)

1. RADIO AND TELEVISION

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge in Radio andTelevision Technology which has now become a vital tool to the information revolution that is sweeping across the countries of the world. The syllabus aims at a comprehensive coverage of basics of waves and wave propogation, working of Radio andTelevision Systems Prerequisite is knowledge in fields and electronics science.Upon completion of the course student will be well versed with radio and television transmission and reception and abot propogation of radio waves.

UNIT I
    RADIO COMMUNICATIONS
Radio waves – Frequency & Wavelength – Modulation – Propagation of radio waves – Ground, Sky and Space waves – Fading – Radio Broadcast – Transmission and Reception.

(6L)

UNIT II
    RADIO TRANSMISSION
Classification of radio waves – Amplitude modulation – Frequency modulation – Radio transmitter – AM transmitter – Antennas (transmitting antenna), Basic ideas.

(6L)

UNIT III
    RADIO RECEPTION
Reception and detection of amplitude modulated waves – Function of a radio receiver – Characteristics of a receiver – Super heterodyne receiver – FM Broadcast receiver.

(6L)

Unit IV
    TV TRANSMISSION
TV broadcasting system – scanning – Synchronization – Blanking – Video Signal – Television band and channels – Camera tubes – Image orthicon Vision.

(6L)

UNIT V
    TV RECEPTION
TV receiver – Tuner – Picture section – Receiver sweep section – Sound section power supply section – Color Mixing principles in color TV.

(6L)
(Total: 30L)

TEXT BOOKS

1. Basic Television and Video Systems, B.Grob, McGraw Hill

2. Electronics and Radio Engineering, F.E. Terman, McGraw Hill

REFERENCE BOOK

1. Monochrome and Color Television, R.R. Gulari, Wiley Eastern Ltd.,

2. RADAR AND NAVIGATION

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge in study the Doppler principle to radars and to detect moving targets, cluster and tracking radars. Learn the principles of transmitters, receivers, antennas and propagation as related to radars. Understand principles of navigation, in addition to approach and landing aids as related to navigation.Prerequisite is knowledge in science and electronics.Upon completion of the course student will be able to illustrate the principles of navigation, in addition to approach and landing aids as related to navigation.Acquire knowledge about the Range equation and the nature of detection Recognize the navigation systems using the satellite. Apply the concepts to the design of different types of radar and navigation systems. Analyze the characteristics of navigation systems

UNIT I
BASIC RADAR:
Basic Radar, The simple form of the Radar Equation Block schematic of pulse radar- Radar frequencies- Applications of radar, the origins of Radar

(6L)

UNIT-II
CW RADAR
Applications of CW radar- CW radar with nonzero IF- FM CW radar-FM CW altimeter- MTI and Pulse Doppler radar.

(6L)

UNIT-III
DOPPLER RADAR
Introduction to Doppler and MTI radar delay line Cancellers, digital MTI processing, Moving target detector, pulse Doppler radar.

(6L)

UNIT IV
NAVIGATION
Direction finders- Instrument Landing System- Radio ranges. Navigation- Hyperbolic navigation- LORAN. Satellite navigation- Doppler navigation

(6L)

UNIT-V
GPS
Global positioning system- Different types of microwave antennas-basic principles. Microwave passive devices, Coaxial connectors and adapters, Phase shifters, Attenuators, Waveguide Tees, Magic tees,

(6L)
(Total: 30L)

TEXT BOOKS

1. Microwave Devices and circuits- Liao / Pearson Education
2. Introduction to Radar systems-Merrill I Skolnik, 3rd Ed, TMH, 2001.
3 Microwave Engineering – Annapurna Das, Sisir K Das TMH Publication, 2001

REFERENCE BOOK

1. Microwave Engineering – David M Pozar, John Wiley, 2e, 2004
2. Microwave devices and circuit: Samuel Liao, PHI.
3. Microwave and radar — A K Maini, Khanna Publishers.
4. Microwave and Radar Engg. — M Kulkarni.
5. Introduction to radar systems — Merrill I Skolnik, McGraw Hill.
6. Radar systems and radio aids to navigation — A K Sen & A B Bhattacharya.

SEMESTER V

V Semester-Core subject: 1

MICROPROCESSORS AND MICROCONTROLLERS

LTPC
4 0 0 4

Preamble: To equip the students to understand architecture and assembly language programming of microprocessor and microcontroller, to understand the concept of interrupts and interfacing with various peripherals and to realize the features of a microcontroller and its timer applications.Prerequisite is knowledge of digital electronics.Upon completion of course student will be able to apply the basic concepts of digital fundamentals to Microprocessor based personal computer system.Able to program microprocessor applications using assembly language programming. Able to illustrate how the different peripherals (8255, 8279, 8253, 8237, 8251) are interfaced with Microprocessor.Able to Program,design, develop and interface complete microcontroller based systems to peripheral devices using 8051 microcontroller.Able to illustrate how the different peripherals are interfaced with microcontroller.

UNIT I
8085 ARCHITECTURE
Architecture of 8085 -Instruction set – Data Transfer, Arithmetic, Logical, Branching and I/O Instruction, Instruction types- various Addressing Modes. Timing sequence- Instruction cycle- Machine cycle- Halt wait state-. ALP- Mnemonic - simple Assembly language program flow chart stack and subroutines- Interrupts.

(12L)

UNIT II
INTERFACE CONTROLLERS
Peripheral device – Programmable peripheral Interface (8255 A) - Programmable Interrupt controller (8259 A) - USART- Serial Communication Interface. Programmable DMA Controller (8257), Interfacing –Analog to Digital Converter- Stepper Motor – Key Board & Display Interface.

(12L)

UNIT III
8051 MICROCONTROLLER
Intel 8051 microcontroller – Block Diagram, pin out – oscillator and clock – Program Counter and Data pointer, A and B registers, flags and program status word – Internal RAM – the Stack and Stack pointer –special functions registers – Internal ROM – I/O Pins, ports and circuits – External memory. Counters, Timers and Addressing Modes

(12L)

UNIT IV

8051 INSTRUCTIONS

Data exchanges – Logical operations – Byte level operation – Bit level logical operations – Rotate and swap operations – Arithmetic operations – Jump and call instructions – Jump and call program range – Jumps – Calls and subroutines – Interrupts and return.

(12L)

UNIT V

8051 PROGRAMMING

Assembly Language programming for 8051 Micro controller family – Programs 8–Bit addition – 8–Bit subtraction – 8-Bit Multiplication – 8-Bit Division - Greatest and smallest number in an array – ascending and Descending –Interfacing Keyboard– Interfacing LED, LCD Display– A/D and D/A Interfacing.

(12L)
(Total: 60L)

BOOKS FOR STUDY:

1. Microprocessor and Interfacing: Programming and Hard ware, Douglas V.Hall,Mc GrawHill, New York (1988)
2. Microprocessor Architecture Programming and applications with 8085/ 8080A. S.Ramesh Goankar, Wiley Eastern Limited(1986)
3. Digital systems & Microprocessor Douglas V.Hall, Mcgraw Hill.
4. Microprocessor- Srinath, PHI Ltd.
5. 8051 Micro controller Architecture, Kennath J. Ayala, Programming and Applications, Penram International Publishing
6. Microprocessor Principles and Applications – 2nd Edition, Gilmore – Tata McGraw Hill.

V Semester-Core subject: 2

MEDICAL ELECTRONICS

LTPC
4 0 0 4

Preamble: To equip the students to understand various bio-potentials and Transducers, various systems and measuring instruments related to human body andworking principles of medical instruments. Prerequisite is knowledge of instrumentation and anatomy. On successful completion of the course the students should have understood the concept of bio-potential; concepts of medical instrument its maintenance and develop the troubleshooting skills of medical instruments.

UNIT I
TRANSDUCER AND ITS PRINCIPLES
Active transducers-passive transducers- transducers in bio medical applications-resting and action potentials-propagation of action potentials-bio electric potentials- bio potential electrodes.

(12L)

UNIT II
THE HEART AND CARDIO VASCULAR SYSTEM
Blood pressure-characteristics of blood flow-heart sounds-electro cardio graphy ECG Recorder Principles-measurement of blood pressure, blood flow and cardiac output-pletnysmography- measurement of hearts sounds.

(12L)

UNIT III
PATIENT CARE AND MONITORING
The elements of intensive care monitoring-diagnosis calibration and reparability of Patient monitoring equipment-pace makers-defibrillators.

(12L)

UNIT IV
PSYCHO PHYSIOLOGICAL MEASUREMENTS
Testing motor responses-sensory measurements –bio feed back instrumentation-bio telemetry introduction physiological parameters- bio telemetry components-application of telemetry.

(12L)

UNIT V
IMAGING SYSTEM
X-ray machine-computer tomography (CT scanner) - Magnetic Resonance Imaging system- Ultra sonic imaging system. Colour Doppler.

(12L)
(Total: 60L)

TEXT BOOKS

1. Bio medical instrumentation and measurements – Leslie Cromwell, Fred J.Weibell and Erich A Pfeiffer-PHI, second edition-1996

2. Hand book of Bio medical instrumentation- R.S.Khandpur, Tata McGraw Hill 1997   (Unit V: Chapter 19, 20, 21).

MATHEMATICS FOR ELECTRONICS

LTPC
4 0 0 4

Preamble: To equip the students to identify and classify the numerical problem to be solved choose the most appropriate numerical method for its solution based on characteristics of the problem to understand the characteristics of the method to correctly interpret the results and to understand the basic methods, algorithms and programming techniques to solve mathematical problems.Prerequisite is high school mathematics.Upon completion of this course students will be well versed in solving Homogeneous difference equations,Interpolation.Find solution of variousequation using various methods.

UNIT I
FINITE DIFFERENCES
Difference table operator E, Δ, D-Relations between these operators-Difference equations-Linear difference equation Homogeneous linear difference equation with constant coefficients

(12L)

UNIT II
INTERPOLATION USING FINITE DIFFERENCES
Newton Gregory formula for forward interpolation-Divided differences-properties-Newtons formula for unequal intervals-Lagranges formula-Relation between ordinary differences and divided differences

(12L)

UNIT III
SOLUTIONS OF ALGEBRAIC AND TRANSCEDENTAL EQUATION
Iterative method, Bisection method, Newton raphson method. Solution of simultaneous Linear equations-Gauss method-Gauss Jordan method –Iteration method-Gauss Seidel method

(12L)

UNIT IV
THEORY OF EQUATION
Relation between roots and coefficients-Transformation of equation

(12L)

UNIT V
RECIPROCAL EQUATION
Approximate solution of equation-Newton's method and Horner's method

(12L)
(Total: 60L)

BOOKS FOR STUDY

1. Mathematics For Electronics-K.C Pillai
2. Numerical analysis-Armugam and Isaac
3. Numerical analysis-Gupta and Kapoor
4. Theory ofequation-Armugam and Isaac
5. Algebra-Manikavasagam pillai

COMPUTER HARDWARE AND MAINTENANCE

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge of Architecture and Design of a Personal Computer and Related Peripherals used in everyday life and to enable the student to get a detailed knowledge of all the hardware components of a personal computer and different interfaces and to understand different storage media.. Prerequisite needed is background of the basic science and computers.Students on completion of this course will understand the components on the motherboard**,** can address issues related to CPU and Memory.They will have good knowledge on Data storage devices andtroublshooting techniques related to it.

UNIT I
COMPUTER HARDWARE OVERVIEW
Computer organization – PC hardware – Functional block of a PC – Buses – Bus concept – Bus cycle – Bus interface unit – Peripheral devices – Keyboard – CRT display – Monitor – Printer – Floppy disk drive – SMPS

(12L)

UNIT II
MOTHER BOARD FUNCTIONS
Functional units and inter communication – Reset logic – CPU nucleus logic – DMA logic – Wait state logic – Bus arbitration logic – RAM logic – NMI logic – Speaker logic – Mode switch input logic – New generation mother board

(12L)

UNIT III
FLOPPY DISK CONTROLLER
 Floppy disk controller overview – Disk format – FDC system interface – FDD interface – Overall operation of floppy disk subsystem – New generation floppy disk controller Display adapter introduction – CRT display – 6845 CRT controller – CGA & AGA – Device interface

(12L)

UNIT IV
HARD DISK CONTROLLER AND PRINTER
 Overview of HDC organization – Disc drives types and interface – Hard disk card – Hard disk format Printer introduction: Centronics interface programming – Programming sequence – Hardware overview – Printer controller

(12L)

UNIT V

TROUBLE SHOOTING

Types of faults – Hardware and software – Nature of faults – Solids and intermittent – Fault elimination process – Systematic troubleshooting – FDC & HDC problems – CRT monitor problems – Keyboard problems – SMPS problems.

(12L)

(Total: 60L)

TEXT BOOK

1. Govinda Rajulu B, ―PC IBM and Clones – Hardware, Troubleshooting and Maintenance, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991

MICROPROCESSOR AND MICROCONTROLLER LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily from A and B

A. Microprocessor Lab

1. Program for 8 Bit Addition and Subtraction
2. Program for16 Bit Addition and subtraction
3. Program for 8 Bit Multiplication and division
4. Program for 16Bit Multiplication and Division
5. Program for Square and Square root of a number
6. Program for Sorting and Searching
7. Program for Smallest and Largest number in an array.
8. Program for Reversing a String
9. Program for Fibonacci series.
10. Program for Factorial of a number
11. Program for B.C.D to Binary, Binary to B.C.D, A S C I I to Binary,
12. Binary to ASCI I Conversion
13. Six letter word display.
14. Rolling display
15. Interfacing seven segment display to display any character.
16. Program to display Time(Hours and Minutes)
17. Program for 1's complement and 2's complement of 8 bit and 16 bit data
18. Interfacing Traffic light controller
19. Interfacing Stepper motor control
20. Interfacing Matrix Keyboard
21. Interfacing A.D.C
22. Interfacing D.A.C
23. Study of 8255 chip and generation of

> 1. Square wave
> 2. Triangular wave
> 3. Saw Tooth wave

B. Microcontroller 8051 Lab

1. Addition – 8 bit, 16 bit.
2. Subtraction – 8 bit, 16 bit.
3. Multiplication 8 bit
4. Division 8 bit
5. Array addition (multibyte)
6. Logical Operations – AND, OR, NOT
7. Decimal to ASCII and ASCII to Decimal.
8. Decimal to Hexa and Hexa to Decimal.
9. Ascending Order.
10. Descending Order
11. Up/down Counter
12. Block data transfer
13. Interfacing with LCD.
14. Interfacing with Matrix Keypad.
15. Square wave generator
16. Interfacing with ADC.
17. Interfacing with DAC.
18. Digital Clock.
19. Interfacing with Stepper Motor.

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(Select any one course 1 or 2)

1. TELEVISION ENGINEERING

LTPC
4 0 0 4

Preamble: To equip the students to understand various aspects ofTelevision Technology which has now become a vital tool to the information revolution that is sweeping across the countries of the world. The syllabus aims at a comprehensive coverage of Television Systems with all the new developments in Television Engineering.Prerequisite is basic electronics and science.On completion of the course student will be well versed with TV Pictures, composite Video Signal, Receiver Picture Tubes and Television Camera Tubes, principles of Monochrome Television Transmitter and Receiver systems, Various Color Television systems with a greater emphasis on PAL system. And the advanced topics in Television systems and Video Engineering

UNIT I
ELEMENTS OF TELEVISION SYSTEM:
Basic block schematic of television transmitter and receiver, Analysis of Television pictures, Scanning, human factor consideration, flicker, interlaced scanning, number of scanning lines, Horizontal and vertical resolution, Composite video signal, video signal dimensions, channel bandwidth, vestigial side band transmission, channel bandwidth and allocations for colour transmission.

(12L)

UNIT II
TELEVISION CAMERA AND TRANSMITTERS:
Photoelectric effects, Working principle of image orthicon, vidicon, plumbicon, CCD, structure of CCD and its working, Monochrome and Colour television camera: block schematic explanation, TV transmitters: Positive and negative modulation and its comparison, Colour TV picture tubes: purity and convergence, Delta gun, PIL, Trinitron tubes, LCD screens.

(12L)

UNIT III
MONOCHROME AND COLOUR RECEPTION:
Monochrome receiver: Detailed block schematic, Antenna system,RF section,IFsection,VSB correction,Choice of intermediate frequencies,Picture Tube circuitary and controls, Sound signal seperation,Sound section,Sync Processing and AFC circuit, horizontal and vertical deflection circuits Low voltage Power supply,EHT Power supply, SMPS and block schematic explanation,

(12L)

UNIT 1V
     COLOUR TELEVISION:

Compatibility consideration, Colour response of human eye, Three colour theory, additive mixing of colours, chromaticity diagram, Luminance and chrominance, colour difference signal and its generation, Polarity of colour difference signal, Frequency interleaving and Colour burst signal, delay lines, Basic colour television systems: PAL and NTSC, Block schematic explanation.

                                       (12L)

UNIT V
     TELEVISION APPLICATIONS:

CCTV and its functional block schematic, Cable television: converters, cable connections, and Satellite television: Dish antenna, LNB, down converters, Video discs: VCD and DVD, Digital recording, LASER source, High definition television.

                                       (12L)
                                    (Total: 60L)

  BOOKS FOR STUDY:

1. Monochrome and colour television: R R Gulati, Wiley Eastern.
2. Colour Television, Theory and Practice: S P Bali, Tata Mc Graw Hill.
3. Television engineering: A M Dhake, Tata Mc Graw Hill
4. Basic Television Engineering: Bernad Grob, Mc Graw Hill.

2. MOBILE COMMUNICATION

LTPC
4 0 0 4

Preamble: To equip the students to understand the basic foundation in mobile communication and understand cellular design concepts and apply those in wireless communication.To design a 3G and 4G wireless communication system to meet desired needs within realistic constraints. Pre-Requisite is knowledge in Digital Communication.On completion Student will be able to understand the concepts and techniques of mobile radio communication fundamentals like reflection, diffraction, scattering and fading. Know various multiple access techniques and fundamentals of equalization in wireless communication. Understand cellular design concepts and apply them in wireless communication.Design GSM and CDMA and its components in mobile and wireless communication.Design a 3G and 4G wireless communication systems to meet desired needs within realistic constraints.

UNIT I
    INTRODUCTION
 Introduction to cellular mobile system, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

(12L)

UNIT II
    INTERFERENCE
Introduction to co-channel interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co channel interference-different types, Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

(12L)

UNIT III
SIGNAL TRANSMISSION

Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas, Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment, Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

(12L)

UNIT IV
MOBILE STANDARDS

Second generation and Third generation Wireless Networks and Standards, WLL, Bluetooth, GSM, IS-95, DECT, GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

(12L)

UNIT V
CELL CONCEPTS

Intelligent Cell Concept, Advanced Intelligent Network, SS7 Network and ISDN for AIN, AIN for Mobile communication, Asynchronous TransferMode Technology, Future Public Land Mobile Telecommunication System, Wireless Information Superhighway.

(12L)
(Total: 60L)

BOOKS FOR STUDY

1. W.C.Y. Lee, "Mobile Cellular Telecommunications", 2nd Edition, Tata McGraw Hill, 2006.
2. Gordon L. Stuber, "Principles of Mobile Communications", 2nd Edition, Springer International, 2007.
3. Theodore. S. Rapport, "Wireless Communications", 3rd Edition, Pearson Education, 2003.
4. Lee, "Wireless and Mobile Communications", 3rd Edition, McGraw Hill, 2006.
5. Jon W. Mark and Weihua Zhqung, "Wireless Communication and Networking", PHI, 2005.
6. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

LTPC
0 0 4 6

Course Objectives
- To develop skills to formulate a technical project.
- To give guidance on the various tasks of the project and standard procedures.
- To teach use of new tools, algorithms and techniques required to carry out the projects.
- To give guidance on the various procedures for validation of the product and analyse the cost effectiveness.
- To provide guidelines to prepare technical report of the project.

Course Outcomes
1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Identify technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Perform test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Explain the acquired knowledge through preparation of report and oral presentations

Mini Project shall be a group activity with a maximum of 5 students in a group.

Students are adviced to select topics of their own interest in hardware and develop their hardware skills by designing a circuit of their own.Periodical assesment may be done to evaluate their skills.

VI SEMESTER

VI Semester-Core subject: 1

POWER ELECTRONICS

LTPC
4 0 0 4

Preamble: To equip the students with a basic knowledge in power devices. Learn the working of power devices . Learn the basics of inverters and static switches To learn the circuits dc choppers and power supplies To study the basics of battery charging, DC motors welding. This subject presents the principles and applications of industrial and power electronics.

Prerequisites are basic electronics. On successful completion of the course the students should have: Developed the circuit designing skills in power electronics. Understood the concepts in industrial electronics system design.

UNIT I
   POWER DEVICES:
Need for semiconductor power devices, Power diodes, Enhancement of reverse blocking capacity, Introduction to family of thyristors. Silicon Controlled Rectifier (SCR): structure, I-V characteristics, Turn-On and Turn-Off characteristics, ratings, Factors affecting the characteristics/ratings of SCR, Gate-triggering circuits, Control circuits design and Protection circuits, Snubber circuit.

(12L)

UNIT II
   DIAC AND TRIAC:
Basic structure, working and V-I characteristic of, application of a Diac as a triggering device for a Triac. Insulated Gate Bipolar Transistors (IGBT): Basic structure, I-V Characteristics, switching characteristics, device limitations and safe operating area (SOA) etc. Power MOSFETs: operation modes, switching characteristics, power BJT, second breakdown, saturation and quasi-saturation state.

(12L)

UNIT III
   CHOPPERS:
 basic chopper circuit, types of choppers step-down chopper, step-up chopper, operation of d.c. chopper circuits using self commutation, cathode pulse turn-off chopper, load sensitive cathode pulse turn-off chopper (Jones Chopper), Morgan's chopper Application of SCR: SCR as a static switch, phase controlled rectification, single phase half wave, full wave and bridge rectifiers with inductive & non-inductive loads; AC voltage control using SCR and Triac as a switch.

(12L)

UNIT IV

D.C MOTORS:

Motor Principle-Comparison of motor and generator action. – AC motors – Induction motors – Speed control – Synchronous motors .Relays and their characteristic and applications

(12L)

UNIT V

WELDING

Welding – Resistance welding – Seam welding –Heating, Induction heaters – High voltage DC transmission – Fan regulator using TRIAC. Electromechanical Machines: Principle of operation Thyristor based speed control of dc motors, AC motor.

(12L)

(Total: 60L)

BOOKS FOR STUDY

1. Power Electronics, P.C. Sen, TMH
2. Power Electronics & Controls, S.K. Dutta
3. Power Electronics, M.D. Singh & K.B. Khanchandani, TMH
4. Power Electronics Circuits, Devices and Applications, 3rd Edition, M.H. Rashid, Pearson Education
5. Power Electronics, Applications and Design, Ned Mohan, Tore.
6. Power Electronics, K. HariBabu, Scitech Publication.
7. Power Electronics, M.S. Jamil Asghar, PHI.
8. A Textbook of Electrical Technology, B.L. Thereja, A.K. Thereja, S.Chand
9. Industrial electronics – G.K. Mithal, Khanna Publications – Delhi – 15th Ed. 1992.
10. Industrial and power electronics – C. Harish – Raj Umesh Publications – 4th Edn. 1992.
11. Basic electronics and linear circuits – N.N. Bhargava, D.C.Kulsheshtha and S.C.Gupta – Tata McGraw Hill - 1987.

SEMICONDUCTOR FABRICATION TECHNOLOGY

LTPC
4 0 0 4

Preamble: To equip the students with basic understanding in Semiconductor fabrication technology and VLSI devices. Providing exposure to different methods of VLSI design and the principles behind such design. To understand the concepts of MOSFETs to analyze the working of various MOS based invertors. Pre-Requisite is Electronics devices, Electronics Circuits, IC Technology. On completion of course Students will be able to: Understand various VLSI design methodologies and fabrication techniques required for modern VLSI circuits. Apply basic concepts of MOSFETs to analyze the working of various MOS based invertors.   Realize and implement various Boolean functions using CMOS invertors. Understand the working and design of different types of semiconductor memories to meet needs related to storage of large data in very small area.

UNIT I
   INTRODUCTION
General classification of integrated circuits – Scale of integration – Advantages over discrete components.   **(12L)**

UNIT II
   THICK FILM TECHNOLOGY
 Features of hybrid IC technology – Thick film conductors – Dielectric – Resistors – Thick film processing – Thick film substrate – Design ideas – Advantages and applications.
                                                                                                                           (12L)

UNIT III
   THIN FILM TECHNOLOGY
Thin film conductors – resistors – dielectric – substrates – thin film processing – Advantages and applications – Monolithic IC process : Growth and refining of Si crystals – Substrate slicing and polishing – Wafer preparation – Diffusion – Ion implantation – Oxidation – Photolithography – CVD – Epitaxial grown – Metallization – Monolithic resistors and capacitors.
                                                                                                                           (12L)

UNIT IV
   MODERN VLSI DEVICES
Introduction – Modern VLSI devices – High field effect – MOSFET devices – long channel & short channel MOSFET.
                                                                                                                           (12L)

UNIT V
BIPOLAR DEVICES

Bipolar devices – n.p.n. transistor – characteristics of typical n.p.n. transistor – Bipolar device design – Design of emitter, base and collector region – concept of HDL.

(12L)
(Total: 60L)

TEXT BOOKS

1. Integrated Circuits (K.R. Botkar). Unit (i, ii, iii).
2. Fundamentals of Modern VLSI Devices by Yuan Taur and Tak H. NING Cambridge Publishers. Unit (iv and v)

BOOKS FOR REFERENCE:

1. Basic VLSI Design Systems and Circuits by Dougles A. Pucknell and Kamran Eshragian, PHI.
2. Device Electronics for Integrated Circuits – Richard Maller.
3. Integrated Electronics – Millman & Halkars.
4. VLSI Technology – S.M. Sze.

ROBOTICS AND AUTOMATION

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about Robotics its working and its role in automation and its applications.To learnabout programming of a robot,its industrial application.To learn about various drives,Actuators and sensors.Study the role of CNC machines in automation.Learn about Programmable Logic Controllers.Prerequisite is knowledge of instrumentation and electronics Upon completion of the course the student should understand the Basic concepts and the applications of robots in automation.CNC machines and PLC Controllers.

UNIT I
INTRODUCTION
Introduction Robotics and programmable automation, historical background, laws of robotics, robot definition, robot anatomy and systems, human systems and robotics. Specification of robotics

(12L)

UNIT II
ROBOT DRIVES
Actuators and control, Function of drive systems, general types of fluids, pump classification pneumatic system, Hydraulic system, Directional control valves, Process control valves, Rotary actuators electrical drives, DC: motors, stepper motor and drives mechanisms

(12L)

UNIT III
ROBOT END-EFFECTORS
Robot End-Effectors Classification of end-effectors, drive system for grippers, mechanical, magnetic, vacuum and adhesive grippers, hooks, scoops and others devices, active and passive Grippers

(12L)

UNIT IV
SENSORS AND INTELLIGENT ROBOTS
Sensors And Intelligent Robots Artificial intelligence and automated manufacturing, AI and robotics, need for sensing systems, sensory devices, types of sensors, robot vision systems-Robot Languages and programming Different languages, Computer numerical control-Features of CNC-CNC machine control unit CNC software

(12L)

UNIT V
PROGRAMMABLE LOGIC CONTROLLERS (PLC)

Discrete Process control-Logic control, Sequencing-Ladder logic diagrams-Programmable logic controllers-Components of the PLC, PLC operating cycle-Addiditional capabilities of PLC, Programming the PLC-Personal computers using soft logic. Introduction to HMI, DCS and SCADA systems.

(12L)
(Total: 60L)

TEXT BOOK

l. Robotics techology and flexible automation by S.R. DEB   Tata Mc Graw Hill
2. Mikell P.Groover, "Automation Production systems and Computer Integrated Manufacturing", Prentice-Hall India, New Delhi, 1987. / Pearson Education, New Delhi
3. W. Bolton, "Mechatronics", Pearson Education Asia, 2002.
4. Introduction to robotics, mechnics and control by John J. Craig from Addison Wesley;

REFERENCE BOOKS

1. Robotics principles and practice   by Dr. K.C. Jain and Dr. L.N Agarwal from Khanna publishers
2. Introduction to robotics, mechnics and control by John J. Craig from Addison Wesley;
3. Mikell P. Groover, "Industrial Robotics - Technology, Programming and Applications", McGraw Hill, New Delhi, 1986
4. K.S. Fu, R.C. Gonzalez and C S G Lee, "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, New Delhi, 1987.

COMMUNICATION SYSTEM

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about various forms of communication   such as Optical fiber transmission,Cable Transmission,Telephone instruments,Telephone switching and transmission,Cellular phones and satellite communications ,Prerequisite is knowledge of electronics .On completion of this course student will be well versed in Opticalfibre transmission media,its connections its coupling devices,Telephone instrument and signal transmission.Operation of telephone exchange,Parts of telephone.Cellular phones its transmission and satellite communications

UNIT-I
OPTICAL FIBER TRANSMISSION MEDIA
Optical Communication-Advantages of optical fibers-Block diagram of an Optical fiber communication system.Optical fiber construction, Light Propogation-Refraction, Refractive index, Snells law-Optical fiber configurations-Coupling fibers-Fiber splicing-Optical fiber connections-Coupling losses;Optical sources-L.E.D's,ILD,Light Detectors-PIN Diodes.

(12L)

UNIT –II
TELEPHONE INSTRUMENT AND SIGNALS
Introduction-Carbon granule transmuitter,Receiving transducer,Simple local battery telephone circuit-Functions of Telephone set,Block diagram of Telephone set,Basic telephone call procecdures,Call progress tones and signals-Dial tone,DTMF tone,Dial Pulse,Station busy,Equipment busy,Ringing,Ring-back,Receiver on/off hook,Cordless Telephones,Caller ID,Electronic telephones

(12L)

UNIT –III
PUBLIC TELEPHONE NETWORK AND SWITCHING
Instruments,Local Loops,Trunk Circuits and Exchanges,Local central office   Telephone Exchanges,Operator assisted local exchanges,Automated central office switches and exchanges,Matrix switching,Step by step switching.

(12L)

UNIT-IV
CELLULAR TELEPHONE CONCEPT
Cellular Telephone-Fundamental concepts of cellular Telephones:Frequency Reuse,Interference-Co-channel,Adjacent Channel,Cell splitting,Sectoring,Segmentation and Duplication,Cellular system topology,Roaming ,Handoff,Cellular Telephone Network components-Electronic switching center,Cell site controller,Radio Transceiver,System interconnects,Mobile and portable telephone units,Communication Protocols

(12L)

UNIT-V
SATELLITE COMMUNICATIONS

Keplers Laws,Satellite orbital pattern,Geosynchronous Satellites,Satellite classifications, Spacing and frequency allocation,Satellite antenna Radiation patterns,Footprints,Satellite system link models-Uplink,Transponder,Downlink,Cross-Links.

(12L)
(Total: 60L)

BOOKS FOR STUDY
1. Advanced Electronic Communication systems-Wayne Tomasi, PHI 6th Edition.
2. Telecommunication Systems-P.H Smale, Wheeler Publication 2nd Edition.
3. Optical Fiber Communications-Gerd Kaiser, Mc Graw-hill 2nd Edition.
4. Satellite Communications-Roddy, Mc Graw-hill 4th Edition.

POWER ELECTRONICS AND SYSTEM DESIGN LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily from A and B

A .Power Electronics Lab Practical

1. Characteristics of S.C.R
2. Characteristics of U.J.T
3. Characteristics of D.I.A.C
4. Characteristics of Triac
5. Characteristics of Power MOSFET
6. Characteristics of IGBT
7. R Triggering for Thyristors
8. R C Triggering for Thyristors
9. U.J.T Triggering For Thyristors
10. Speed control of D.C Motor
11. UJT Relaxation Oscillator
12. AC Power Control.

B. Electronics Design Lab Practical

Students must use dotted boards or Group boards and interconnect the joints by soldering.

Soldering Practice

1. Design and construction of fixed voltage power supply

2. Design and construction of Dual power supply

2. Design and construction of switching power supply

3. Design and construction of 1.5 to 12 V power supply using multi tap transformer.

4. Design and construction of Burglar alarm using L.D.R

5. Design and construction of Temperature switch using Thermistor

6. Design and construction of Light sensitive switch using Photo diode

7. Design and construction of Audio amplifier using LM 380

8. Design and construction of Timer circuit

9. Design and construction of Decade counter/ Seven segment decoder

10. Design and construction of Logic probe

(Select any one course 1 or 2)

1. PCB DESIGN

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about Printed Circuit boards To study the basics of Printed circuit boards, To know the layout planning and design, To know the design considerations for special circuits.Prerequisite is knowledge of electronic components.On completion of course student will be having good knowledge on PCB designing ,manufacturing , its characteristics,Various types,Application.Drawing schematics and preparing PCB's and testing.

UNIT I

PCB BASICS

Advantages of PCB's – Components of a PCB – PCB Classification – Manufacturing of PCB's. Layout Planning: Electrical Design Considerations – Conductor Patterns – Component Placement Rules. Design Rules for Analogue, Digital and Power Electronic Circuits.

(12L)

UNIT II

ARTWORK GENERATION AND IMAGE TRANSFER

Basic Approach to Manual Artwork – Guidelines for Artwork Preparation – Artwork Generation Guidelines. Laminates: Anatomy, Properties and Types. Image Transfer Techniques: Laminate Surface Preparation – Screen Printing – Pattern Transferring Techniques – Printing Process – Photo Printing.

(12L)

UNIT III

PLATING, ETCHING AND MECHANICAL OPERATIONS

Electroplating Process – Plating Techniques – Problems in Plating. Etching Techniques: Etching Solutions and Chemistry – Etching Arrangements – Equipment and Techniques – Etching Problems. Mechanical Operations: Need – Cutting Methods – Hole Punching – Drilling.

(12L)

UNIT IV

FLEXIBLE PCB'S AND SOLDERING

Construction of Flexible PCB's – Rigid Flex PCB's – Terminations – Advantages – Special Applications. Soldering: Theory – Variables – Materials – Soldering and Brazing – Soldering Tools – Hand Soldering – Mass Soldering – Post Soldering and Cleaning – Rework and Repair of PCB's.

(12L)

UNIT V
      ENVIRONMENTAL CONCERNS

Pollution Control in PCB Industry – Pollutiong Agents – Recycling of Water – Recovery Techniques – Air Pollution – Recycling of PCB's – Environmental Standards – Safety Precautions – Toxic Chemicals.

(12L)
(Total: 60L)

TEXT BOOKS:

 1. R S Khandpur - Printed Circuit Boards: Design, Fabrication, Assembly and Testing – McGraw Hill, India – 2005
2. Christopher T. Robertson - Printed Circuit Board Designer's Reference: Basics – Prentice International, U.S. – 2004
3. PCB Design & Fabrication – Walter.C. Bosshart – TMH

2. EMBEDDED SYSTEM AND RTOS

LTPC
4 0 0 4

Preamble: To equip the students to undertake the design and development process for embedded computer systems in relation to the environment in which they operate and to know how to integrate embedded hardware, software, and operating systems to meet the functional requirements of embedded applications. Prerequisite is knowledge of microprocessor and microcontroller .On completion of course student will be thorough to the embedded systems, its hardware and software. Learnt devices and buses used for embedded networking.explain programming concepts and embedded programming in C and C++. Explain real time operating systems, inter-task communication and an exemplary case of RTOS

UNIT I
INTRODUCTION TO EMBEDDED SYSTEMS:
Embedded systems - Application of Embedded Systems - processors in the system - Other Hardware units - software embedded to a system - Exemplar embedded system - Embedded system – on - chip (SOC) and in VLSI circuit
.
(12L)

UNIT II
DEVICES AND BUSES FOR DEVICE NETWORK:
I/O Device - timer and counting devices - serial communication using I2C, CAN and USB. Parallel communication using PCI, PCIX and advanced parallel High Speed Buses.
(12L)

UNIT III
DRIVERS FOR DEVICE AND INTERRUPTS SERVING MECHANISM:
Device drives-parallel port devices drive in a system, serial port Device Drivers in a system, Drivers for internal programmable timing Devices – Interrupt servicing Mechanism – Context and the periods for context switching, Deadline and Interrupt Latency.
(12L)

UNIT IV
EMBEDDED SOFTWARE DELOPMENT USING IDE:
Introduction to Integrated development environment (IDE) – programming concepts and embedded programming in Assembly and C – creating a New project – Adding Files to a project – Building a project – Debugging and simulating the application – Getting Embedded software into the Target system.
(12L)

UNIT V
REAL TIME OPERATING SYSTEM (RTOS):
Introduction to basic concepts of RTOS, Basics of real time& embedded system operating systems, RTOS-Interrupt handling, task scheduling; embedded system design issues in system development process-Action plan, use of target system, emulator,use of software tools.
(12L)
(Total: 60L)

TEXT BOOKS

1. Rajkamal,"Embedded System-Architecture, Programming, Design"Tata Mc Graw Hill 2006.
2. Daniel W.Lewis"Fundamentals of Embedded Software" Prentice Hall of India, 2004.

REFERENCE BOOKS

1. David E Simon," An Embedded Software Primer" person Education Asia, 2006.
2. Frank Vahid, Embedded System Design – A Unified hardware & Software Introduction John Wiley, 2002.
3. SriramV.Iyer, Pankaj Gupte, Embedded Real Time Systems Programming"Tata Mc Graw Hill, 2004.
4. Steve Heath, " Embedded System Design"II edition, Elsevier, 2003.
5. Arnold Berger," Embedded System Design: An Introduction to processes, Tools, and Techniques", CMP Books, 2001.
6. Wayne Wolf, "Computers as components" Morgan Kaufmann Publishers, 2005.
7. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", Tata McGraw – Hill, Second Edition, 2001.

VI Semester Major Project

PROJECT WORK

LTPC
0 0 6 7

The objective of the project work is to motivate the students for doing research and to inculcate in them the self confidence to work independently. Each student should do an individual project and they can freely choose their own topic of experimental nature. The project should be of <u>investigative</u> type not a hobby project one.

Students are encouraged to take the project work as a challenge so that their project will boost up their industrial career.

Periodic Seminars should be conducted to assess the students. The students should present the progress of the project to their respective guides and get the required assistance from them

At the completion of the project .The student will submit Project Report in the form of Dissertation which will be examined by the examiners.

The examination shall consist of i) evaluation of the dissertation and ii) comprehensive viva-voce