K.L.E SOCIETY'S

P.C.JABIN SCIENCE COLLEGE, HUBLI.

AUTONOMOUS

DEPARTMENT OF ELECTRONICS

Class:B.Sc.-Ist sem

ELEMENTS OF ELECTRONICS **60 hours**

UNIT – I : NETWORK ANALYSIS

Introduction, voltage source and current source, Network theorems: Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Miller's theorem, Superposition theorem, Reciprocity theorem, Millman's theorem and Compensation theorem for dc circuits. Numerical problems

12 hours

UNIT – II : SEMICONDUCTOR DEVICE PHYSICS

Chemical bonds in semiconductors, band gap, intrinsic and extrinsic semiconductors, charge density in semiconductors drift and diffusion current, mobility, drift velocity and conductivity of intrinsic semiconductors, impurity semiconductors, thermal isolation of impurity states, energy band diagram and Fermi level, pn junction barrier voltage across pn junction, biasing of pn junction, current across pn junction, diode equation, diode resistance, transition and diffusion capacitance. Numerical problems.

12 hours

UNIT – III : DIODE CIRCUITS

Rectification, dynamic characteristic of diode, rectifier operation : half wave, full wave and bridge rectifiers (efficiency, ripple factor, voltage regulation, PIV and TUF)

Filter circuits : Full wave rectifier with filter- capacitor filter, inductor filter. LC filter and CLC filter, Voltage multiplier, clipping and clamping circuits.

14 hours

UNIT – IV : REGULATED POWER SUPPLY AND OPTO-ELECTRONIC DEVICES.

Concept of voltage regulation, unregulated and regulated power supply, dual power supply, block diagram of regulated power supply, line and load regulation, stability factor.

Zener diode and its characteristics, zener diode as voltage regulators, concept of IC, voltage regulation using three pin IC (block diagram with three terminals 78 XX series).

Optoelectronic devices- Introduction, spectral response of human eye, construction, working characteristics of light emitting diode, photo emissive devices, photo multiplier tube, photo transistor, photo voltaic device, solar cell, photo conductive cell and photo diode and its types.

14 hours

UNIT – V: BIASING CIRCUITS SMALL SIGNAL TRANSISTOR AMPLIFIERS

Biasing circuits: Introduction, selection of operating point, need for bias stabilization, fixed bias circuit, collector to base bias circuit, bias circuit with emitter resistor, voltage divider bias, and emitter bias circuit.

***h*-model concept:** Introduction,CB ,CB, CC circuit analysis, comparison of CC, CE, and CB circuits, RC coupled voltage amplifier and frequency response single and double stage.

Power amplifier : Introduction, Classification of power amplifiers, conversion efficiency of class A amplifier, class B amplifier, class C amplifier and class D amplifier. Numerical problems.

12 hours

TEXT BOOKS :

1. Basic Electronics solid state -B.L.Theraja
2. Integrated Electronics - Millman and Halkias
3. Handbook of Electronics - Gupta and Kumar,
4. Principles of electronics Volume –III - B.V.Narayan Rao
5. Basic Electronics and Linear circuits - Bhargav, Kulshrestra & Gupta

PRACTICALS ON ELEMENTS OF ELECTRONICS
LIST OF EXPERIMENTS

1. Verification of Thevinin's and Norton's theorem (Ladder network).
2. Maximum power transfer theorem.
3. Millman's theorem.
4. Superposition theorem.
5. Zener diode characteristics.
6. Zener diode as a voltage regulator.
7. Clipping and clamping circuits.
8. Full wave bridge rectifier with LC/π-section filter.
9. LED characteristics Photovoltaic cell emf development for different color LED.
10. CE Amplifier.
11. Two stage RC coupled CE Amplifier.
12. CC Amplifier.
13. CB Amplifier.
14. Photo conductive cell.
15. Biasing circuits. I) Fixed biasing
    ii)Base bias with collector feedback
16. Biasing circuits. I)Base bias with emitter feedback
    ii)Voltage divider

Note: Minimum 10 experiments to be performed.

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Class:B.Sc.-IInd sem
ELECTRONIC CIRCUIT DESIGN **60 hours**

UNIT-I: POWER ELECTRONICS

SCR, DIAC and TRIAC (construction, working and characteristics). Application of SCR as half wave and full wave rectifier and power control device, DIAC as lamp dimmer and TRIAC as electronic switch. UJT-construction, working and characteristics. UJT as relaxation oscillator (derive an expression for frequency of oscillation). Tunnel diode (construction, characteristics and working). Numerical problems.

12 hours

UNIT –II: FEEDBACK AND OSCILLATORS

Introduction to feedback, Transfer gain of feedback amplifier, feedback amplifier, topologies and effect of negative feedback

Oscillators : Barkhausen criterion for sustained oscillations, classification of oscillators- Hartley, Colpitts, Phase shift, Wien bridge, Tuned and Crystal oscillator.

Transistor multivibrators: Astable, Monostable and Bistable multivibrators. Numerical problems.

12 hours

UNIT –III: Field Effect Transistor

Introduction, Comparison of BJT and JFET, Types JFET- P Channel and N Channel (construction ,working and characteristics), FET Parameters. MOSFET-PMOS, NMOS (Construction and working). Enhancement MOSFET and depletion MOSFET, (construction working and characteristics),CMOS – construction and use. Numerical problems

12 hours

UNIT – IV: PASSIVE FILTERS

Introduction, classification of passive filters, constant k-type both T and π section (low pass, high pass filter, band pass and band stop filter), m Derived filters both T and π (low pass and high pass filters). Numerical problems.

12 hours

UNIT-V : TRANSDUCERS AND ITS APPLICATIONS

Transducers: Introduction, Classification of Transducers. Basic requirements of transducers. Types of transducers. Capaciotive ,inductive, LVDT, Oscillation transducers Potentiometric transducers, Thermistor (Working, Principle, Applications)Electrical strain gauge, Bounded strain gauge. Thermocouple. Hall effect, Piezo electric transducers Photo electric transducer.
Biomedical Instrmentation:ECG, EEG, EMG Measurements
Numerical problems

12 hours

REFERENCE BOOKS :

1. Principles of electronics - B.V.Narayana Rao Vol –II
2. Electronics Devices and circuits - David.A.Bell 4th edition.
3. Elements of Electronics - Bagde and Singh
4. Basic Electronics and Linear circuits - Bhargav, Kulshrestra & Gupta
5. Principles of Electronics - V.K.Mehta
6. Electrical and Electronic Measurements and instrumentation-A.K.Sawhney.
7. Biomedical intstrumentation - Dr.M.Arumugam

B.Sc.-IInd sem

PRACTICALS ON ELECTRONIC CIRCUIT DESIGN

LIST OF EXPERIMENTS

1. LDR characteristics.
2. Thermistor Characteristics.
3. Hartley oscillator.Design concept
4. Collpit's oscillator.
5. Phase shift oscillator.
6. Astable multivibrator using transistor.
7. FET Characterisitics.
8. Low pass filter.
9. High pass filter.
10. UJT characteristics.
11. UJT relaxation oscillator.
12. SCR characteristics.

Note: Minimum 10 experiments to be performed.

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Class: B.Sc.-IIIrd sem
DIGITAL ELECTRONICS **60 hours**

UNIT - I : NUMBER SYSTEM, BOOLEAN ALGEBRA AND LOGIC GATES

NUMBER SYSTEM: Introduction to binary, decimal , octal and hexadecimal number systems and their interconversion. r's and (r-1)' s complements, binary addition and subtraction, binary subtraction using 1's and 2' s complements. BCD (8421 code), unweighted codes, Gray codes- use of XOR gate for gray to binary conversions and vice versa, Excess-3 codes, ASCII and EBCDIC.

12 hours

UNIT - II : BOOLEAN ALGEBRA AND LOGIC GATES: Basic theorems of Boolean algebra, De Morgan's theorems. Basic logic gates : AND, OR and NOT, implementation of basic gates using diode and transistor and timing diagram. Study of NAND and NOR gates. NAND and NOR as universal gates, XOR and X-NOR gates. Study of logic families: RTL, DTL and TTL. Fan-in, fan-out and propagation delay. Problems

12 hours

UNIT - III: SIMPLIFICATION OF BOOLEAN ALGEBRA AND ARITHMETIC LOGIC CIRCUITS.

Simplification of Boolean algebra, Boolean functions using Boolean algebra, SOP and POS expressions. Karnaugh map (2, 3 and 4 variable map) Pair, quad and octets. Simplification of Boolean function using K-map (Overlapping groups, rolling the map, redundant group and Don't care conditions). Simplification Boolean functions by Tabulation Method. VENN diagrams and simplification. Arithmetic logic circuits: Half adder, full adder, half subtractor and full subtractor. Numerical problems

12 hours

UNIT –III : COMBINATIONAL LOGIC CIRCUITS

Two bit comparator, four bit comparator, IC-7485, decimal to BCD priority encoder: IC-74147, BCD to decimal, decoder- IC 7445. BCD to 7-segment decoder-IC 7447-logic diagrams of each IC. Multiplexer – 4:1, 8:1 and 16:1. IC-74150 and applications. De-multiplexer -1:4, 1:8 and 1:16. IC-74154 and applications. Code generation : encoders and decoders, parity codes, parity checkers and generation using basic gates. Parallel and serial functioning of 7-segment display. Problems

12 hours

UNIT –IV : SEQUENTIAL LOGIC CIRCUITS

Detailed analysis of RS, D, JK, T and Master Slave JK flip-flops, edge triggered flip-flops, characteristic truth table and excitation tables.

Counters: Asynchronous counters and synchronous counters (binary, decade and modulus counters) and application of counters.

Concept of Shift registers: Serial-in serial-out shift register (SISO), Serial-in parallel-out shift register (SIPO), Parallel-in parallel-out shift register (PIPO) and Parallel-in serial-out shift register (PISO) and application of shift register. Study of IC -7490, IC-7493 and IC-7495. Numerical problems

12 hours

REFERENCE BOOKS :

1. Digital Fundamentals - Floyd
2. Digital Principles & Applications - Malvino and Leech
3. Digital logic and computer design - M. Morris Mano

B.Sc.-IIIrd sem (Practicals)

PRACTICALS ON DIGITAL ELECTRONICS

LIST OF EXPERIMENTS

1. Realization of logic gates using IC-7400 and IC-7401.
2. Verification of boolean expressions using basic and NAND gates
3. Realization of logic gates using DTL.
4. Realization of logic gates using RTL.
5. Verification of De Morgan's theorems using basic and NAND gates.
6. Half adder and full adder using logic gates.
7. Half subtractor and full subtractor using logic gates.
8. Gray to binary conversion and binary to gray conversion using XOR gates.
9. Multiplexer and Demultiplexer using logic gates.
10. Magnitude comparator using logic gates.
11. RS, JK, D and T flip-flop using logic gates.
12. 4 bit binary and decade counter using JK flip-flop (IC-7476).
13. Shift Registers using D-flip-Flop.

Note: Minimum 10 experiments to be performed.

Mini projects

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Class: B.Sc.-IVth sem

OPERATIONAL AMPLIFIER LAPLACE TRANSFOMS AND NETWORK SYNTHESIS

60 hours

UNIT I: OPERATIONAL AMPLIFIER

Introduction: Qualitative study of four modes of differential amplifiers, block diagram of op-amp, pin configuration of IC -741, op-amp parameters, ideal version of op-amp, equivalent circuit of op-amp, ideal voltage transfer characteristics and explanation of voltage offset null circuit for IC-741. Open-loop op-amp configurations, limitations of open loop op-amp configurations. Closed loop op-amp configurations :Voltage series amplifier (non inverting amplifier), Voltage shunt amplifier (inverting amplifier) – derivation of voltage gain, input resistance, output resistance and bandwidth. Numerical problems

12 hours

UNIT II: APPLICATIONS OF OPERATIONAL AMPLIFIER

AC amplifier, Peaking amplifier, summing, scaling, averaging amplifier amplifier, instrumentation amplifier, current to voltage converter and voltage to current converter circuits, low voltage DC voltmeter, integrator, differenciator, qualitative study of op-amp as comparator. Astable, monostable multivibrator circuits and weinbridge oscillators circuits (design and working) Numerical problems

12 hours

UNIT III: ACTIVE FILTERS AND PLL.

First and second order Butterworth filters, design and its response (low pass, high pass, band pass, band elimination, narrow band, all pass filters). Universal active filters and switched capacitor filter IC applications- 555 timer (monostable and astable multivibrator), Phase locked loops (operating principles and its applications). Numerical problems

12 hours

UNIT IV:LAPLACE TRANSFORMATION

Singularity function and it's LT. Properties of Laplace transformation (Linearity, scale changing, differentiation, integration and initial and final value theorems). Inverse Laplace transforms: method of residues, Heaviside formula. Applications of Laplace transforms to solve simple differential equations and electrical network problems. Driving point functions, transfer functions and properties of network functions- study of poles and zeros. Numerical problems

12 hours

UNIT V: NETWORK SYNTHESIS

Introduction, positive real functions conditional test for positive real functions, Properties of positive real functions, Hurwitz polynomials and elementary synthesis procedure for RC, RL and LC networks with use of Foster's and Cauer's type realization. Numerical problems

12 hours

REFERENCE BOOKS:

1.Operational Amplifier and Linear Integrated circuits - Ramakant A Gaykawad
2.Linear Integrated circuits - D. Roy Choudhary and S Jain
3.Op-amp and Linear Integrated circuits -Coughlin & Drischoll
4.Network analysis -M.E.Valkenburg
5.Network Synthesis - M.E.Valkenburg

B.Sc.-IVth sem (Practicals)

PRACTICALS ON OPERATIONAL AMPLIFIER LAPLACE TRANSFOMS AND NETWORK SYNTHESIS

LIST OF EXPERIMENTS

1. Operational amplifier characteristics.
2. Op amp as ac and dc inverting amplifier.
3. Op amp as ac and dc non-inverting amplifier.
4. Op amp as adder and subtractor.
5. Op amp as phase shift oscillator.
6. Op amp as Wein bridge oscillator.
7. Op amp as integrator and differentiator.
8. Op amp as D to A converter.
9. Op amp as instrumentation amplifier.
10. Op amp as low pass filter
11. Op amp as high pass filter.
12. Op-amp as triangular sawtooth and square wave generator.
13. Op-amp as precision rectifier.
14. IC-555 as astable multivibrator.
15. IC-555 as monostable multivibrator.
16. IC-555 Bistable Multivibrator.
17. Study of poles and zeros.
18. PLL

Note: Minimum 10 experiments to be performed.

Mini projects

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Class: B.Sc.-Vth sem
ANALOG AND DIGITAL COMMUNICATION **42 hours**
PAPER – I

UNIT-I: MODULATION AND DEMODULATION

Modulation: Introduction, qualitative idea of noise, need for modulation, types of modulation , theory of amplitude modulation, modulation index, SSB , power relations, liner modulation, Square law modulation, Diode Modulator, transistor modulator (collector and base). FM modulation: Expressions for FM wave, modulation index, Deviation ratio, FM side bands. Phase Modulation: Expression for phase modulation.

Demodulation: Diode AM detector, Transistor AM detector, FM detector – Balanced slope detector, Foster – Seeley discriminator and ratio detector (Qualitative)

Radio receivers - superhetrodyne (AM and FM). Numerical problems

10 hours

UNIT –II: TRANSMISSION LINES AND OFC.

Transmission Lines: Introduction, different types of transmission lines (parallel and co-axial lines) current and voltage relation on RF transmission lines.

Antenna: Theory of dipole antenna, radiation mechanism, concept of polar diagrams of dipole antenna, radiation resistance efficiency, dish and yagi antenna.

OFC: Introduction, block diagram of optical fibre communication system, principle of light transmission in a fibre, expression for numerical aperture, optical fibre modes and configurations, fibre materials and losses in fibers. Numerical problems

11 hours

UNIT-III: DIGITAL COMMUNICATION AND CODING

Introduction, Block diagram of digital communication system. Difference between analog and digital communication systems, bandwidth of digital data and sampling theorem.

Pulse code modulation, delta modulation. Adaptive delta modulation, differential pulse code modulation, comparison of digital pulse modulation methods, Time Division Multiplexing. Numerical problems

10 hours

UNIT-IV: DIGITAL MODULATION TECHNIQUES

Introduction, binary Phase Shift Keying, Quadrature Phase Shift Keying , M-ary Phase Shift Keying , Quadrature Amplitude Shift Keying , binary Frequency Shift Keying , Minimum shift keying and Amplitude Shift Keying , Comparison of digital modulation techniques Numerical problems

11 hours

REFERENCE BOOKS

1. Electronic Communication Systems - by Kennedy and Davis (TATA McGraw –HILL EDITION)
2. Analog and digital communication - by Simon Haykin (Wiley student edition)

B.Sc.-Vth sem (Practicals)

PAPER - I

PRACTICALS ON ANALOG AND DIGITAL COMMUNICATION.

LIST OF EXPERIMENTS

1. Amplitude modulation and demodulation.
2. Frequency modulation and demodulation.
3. Pulse amplitude modulation and demodulation.
4. Pulse width modulaton and demodulation.
5. Pulse position modulation and demodulation.
6. Frequency shift keying modulation and demodulation.
7. ASK modulation and demodulation.
8. Phase shift keying.
9. Pulse code modulation and demodulation.
10. Sampling theorem verification.
11. Time division multiplexing.
12. Numerical aperture of optical fibre.
13. Bending loss in optical fibre.

Class: B.Sc.-Vth sem
MICROPROCESSOR AND MICROCONTROLLER **42 hours**
PAPER – II

UNIT- I: MICROPROCESSOR 8085 ARCHITECTURE AND INSTRUCTIONS

Microprocessor – introduction, application, basic block diagram, speed, word size memory capacity and classification.

Microprocessor 8085 – features and architecture. Supporting circuits – clock circuits, request circuits, generation of control signals. Bus drivers. Pin diagram of 8085. Instruction set-classification, addressing modes and instruction formats, operation code, operand, mnemonics. Delay loops, uses of counters-timing diagrams- instruction cycle, machine cycle and T-states time delays.

10 hours

UNIT-II: PROGRAMMING AND INTERFACING OF 8085

Programs of data transfer and memory operation (direct and indirect addressing) addition and subtraction of 8 bit and 16 bit numbers, multiplication and division of 8 bit numbers, display of largest and smallest numbers in a given array of numbers.

Interfacing with 8085

Basic interfacing concepts, compatible IC of 8085, memory interfacing. Interfacing I/O devices, Programmable interval timer(8253) and D to A converter using 8085 and op-amp, programmable peripheral Interface IC 8255 pin diagram (functional block diagram ports and their model).

11 hours

UNIT-III: MICROCONTROLLER 8051 PROCESSOR ARCHITECTURE AND INSTRUCTION SET

Introduction to Microcontrollers, comparison of microcontrollers and microprocessors, embedded versus external memory devices, 8-bit Microcontrollers, CISC and RISC processors.

8051 Microcontrollers: MCS-51 architecture, Registers in MCS-51, pin description of IC-8051, parallel input/output ports and memory organization. 8051 addressing modes and Instruction set.

10 hours

UNIT-IV: 8051 PROGRAMMING AND ATMEL MICROCONTROLLERS

Referring and understanding datasheets of 8051, Assembly level language tools, development system and tools. MCS-51: Interrupts, timers/counters and serial communication.

Design with ATMEL: ATMEL microcontrollers, architectural overview of ATMEL 89C51, pin description of 89C51 and 89C2051, using flash memory devices, ATMEL 89CXX and 89C20XX.

11 hours

REFERNCE BOOKS:

1. Microprocessor Architecture, Programming and applications with the 8085 - Ramesh Gaonkar.
2. Microprocessor - B.Ram
3. The 8051 Microcontroller Architecture, Programming and applications - Kenneth Ayala
4. Programming and Customizing, The 8051 Microcontroller - Myke Predko

B.Sc.-Vth sem (Practicals)

PAPER – II

PRACTICAL ON MICROPROCESSOR AND MICROCONTROLLER

LIST OF EXPERIMENTS

a) Programming on 8085

1. Register to Register Movement and 1's and 2's complement of a number.
2. Addition and Subtraction.
3. Multiplication and Division.
4. Largest and smallest of an array.
5. Arranging an array of numbers in ascending and descending order.

Interfacing experiments on 8085

1. D/A converter using 8255 and op-amp.
2. IC 8253 as a square wave generator.
3. Sine wave generator.

b) Programming on 8051

1. Addition and Subtraction .
2. Multiplication and Division .
3. Largest and smallest of an array.
4. Arranging an array of numbers in ascending order and descending order.

Interfacing experiments on 8051

1. 7 Segment Display.
2. Stepper motor.
3. Temperature measurement.

Class: B.Sc.-VIth sem
VHDL: VHSIC Hardware Description Language **60 hours**
PAPER – I

UNIT I:INTRODUCTION TO VHDL

Basic terminology, entity declaration, architecture body, configuration declaration, package declaration, package body, model analysis, simulation, Basic language elements: Identifiers, Data objects, Data types, Operators.

Behavioral modeling: Entity declaration , architecture body , process statement, variable assignment statement ,signal assignment statement, wait statement, if statement, case statement, null statement, loop statement, exit statement, next statement ,assertion statement, report statement , other sequential statements, multiple processes and postponed processed.

10 hours

UNIT II: DATA FLOW AND STRUCTURAL MODELING

Data flow modeling: Concurrent signal assignment statement, concurrent versus sequential signal assignment, delta delay revisited, multiple drivers, conditional signal, and assignment statement. Selected signal assignment statement, UNAFFECTED value, block statement, concurrent assertion statement, value of signal.

Structural modeling: Component declaration, component instantiation, resolving signal values.

11 hours

UNIT III: GENERICS AND CONFIGURATIONS

Generics and configurations: generics, why configurations? Configurations specifications, configuration declarations, default rules, conversion functions, direct instantiation, incremental binding.

Subprograms and overloading: subprograms, subprogram overloading operator overloading signatures, default values for parameters.

Packages and libraries: package declaration, package body, design file, design libraries, order of analysis, implicit visibility explicit visibility.

10 hours

UNIT IV: MODEL SIMULATION AND VHDL SYNTHESIS

Model simulation: simulation, writing a test bench, converting real and integer to time, dumping results into a text file, reading vectors from text file. a text bench examples, initializing a memory, variable file names.

VHDL synthesis: RTL level description, constraints, attributes, technology libraries, simple gate, if control flow statement, some circuit examples like sequential circuits, four bit shifter, state machine examples.

11 hours

REFERENCE BOOKS:

VHDL primer (Third Edition)-J.Bhasker (Pearson Education Asia)

VHDL programming by example –by Douglas.L.Perry(TATA McGRAW-HILL EDITION)

B.Sc.-VIth sem (Practicals)

PAPER-I

PRACTICALS ON VHDL

1. VHDL Program to realize all the logic gates.
2. VHDL Program for the following combinational designs:

a) 2 to 4 decoder

b) 8 to 3 encoder

3. VHDL Program for the following combinational designs:

b) 4:1 Multiplexer

c) 1:4 Demultiplexer

4. VHDL Program for the following converters:

b) 4 bit binary to gray converter

c) 4 bit gray to binary converter

5. VHDL Program for the following comparators :

b) One bit Comparator

c) Two bit Comparator

d) Four bit Comparator

6. VHDL Program for following adder circuits.

b) Half adder

c) Full adder

7. VHDL Program for following subtractor circuits.

b) Half subtractor

c) Full subtractor

8. VHDL Program for SR Flip Flop.
9. VHDL Program for D Flip Flops.
10. VHDL Program for JK Flip Flop.
11. VHDL Program for T Flip Flops.
12. Write VHDL code to Simulate and synthesize a 4 bit binary, BCD counter (synchronous and asynchronous) and any sequence generator.
13. Write a model for 32 bit ALU.
14. Write VHDL code to display messages on the given 7 segment display.
15. Write VHDL code to display messages on LCD and accepting Hex key pad input data.

Class: B.Sc.-VIth sem
SIGNALS, SYSTEMS AND VLSI TECHNOLOGY **60 hours**
PAPER – II

UNIT I: SIGNALS AND SYSTEMS

Introduction**,** Definition of signal. Definition of system Elementary continuous –time signals. Elementary Discrete – time signals. Basic operations on signals. Classification of signals. System viewed as Interconnection of operations. Properties of system.

10 hours

UNIT II: TIME – DOMAIN REPRESENTATION FOR LTI SYSTEMS

Introduction, Impulse response representations for LTI systems. Properties of impulse response representations for LTI systems. Differential/ difference equation representations for LTI systems. Block diagram representations.

11 hours

UNIT III: **MATLAB**

Introduction, Basics of MATLAB-MATLAB windows, input/output, file types, Platform dependence and general commands. Tutorial Lessons.

10 hours

UNIT IV: VLSI

Epitaxy: Introduction, Vapour-Phase epitaxy, Molecular beam epitaxy, silicon on insulators, Epitaxial Evaluation.

Lithography: Introduction, Optical, Electron, X-ray and Ion Lithography.

11 hours

REFERENCE BOOKS

1. Signals and System - Simon Haykin and Barry Van veen
   John Weley and sons inc.
2. Getting started with MATLAB - Rudrapratap.

B.Sc SEMESTER – VI
PAPER-II

EL - 612 : PROJECT

Certificate course : PCB Designing

Unit I

CIRCUIT DESIGNING

Circuit: Need of Circuit Designing. Introduction to Basic Components like Resistor, Capacitor, Inductor etc.

10 hours

PCB DESIGNING

PCB : Introduction to PCB and Need of PCB .Types of PCBs, Machines used for designing, The Designing Process(Theory) .

10 hours

EAGLE SOFTWARE

Introduction to the software EAGLE CAD soft knowledge. Creating new circuit keys schematic layouts. 10 hours

PRACTICALS

SCHEMATIC LAYOUT :

Beginning a new Schematic , Placing items in the schematic, placing symbols and ports labeling components,editing the schematic, working with Sheets and Ports, Checking the Schematic for Errors. 12hours

PCB LAYOUT:

Beginning a New Layout, Placing Items in the Layout,Editing the Layout,Placing Power and Ground Planes ,Changing the Board's Perimeter,Linking the Schematic and PCB Keyboard Shortcuts Troubleshooting error. 20 Hours

PCB PRINTING AND ETCHING :

Introduction to printing process,Placing of circuit on copper clad, Etching process for final PCB 20 hours

DRILLING AND SOLDERING:

Drilling of designed PCB,Soldering Process of Components, Testing & Troubleshooting

20 Hours

VALUE ADDITION COURSE: ELECTRONIC LAB EQUIPMENT SERVICE

Theory: 10 Hours

Module 1 Regulated power supply

1. Introduction
2. Theory of Electronic Lab equipments.
3. Blockdiagram of Regulated power supply.
4. Working of regulated power supply.
5. General problems occurred in power supply.

Module 2: AC- Mill voltmeter

1. Introduction
2. Theory of AC Milli voltmeter.
3. Block diagram of AC Milli voltmeter.
4. Working of AC Millivoltmeter.
5. General problems occurred in AC Millivoltmeter.

Module 3:CRO

1. Introduction
2. Theory of CRO
3. Block diagram of CRO.
4. Working of CRO.
5. General problems occurred in CRO.

Module 4: Function Generator

1. Introduction
2. Theory of Electronic Lab equipments.
3. Block diagram of Regulated power supply.
4. Working of regulated power supply.
5. General problems occurred in power supply.

Module 5: Multimeter

1. Introduction
2. Theory of Multimeter.
3. Blockdiagram of Multimeter.
4. Working of Multimeter.
5.General problems occurred Multimeter.

Lab Sessions: 20 Hours

Each session carries 4 Hours

Lab1: Fault detection and Troubleshooting in power supplies.

Lab2: Fault detection and Troubleshooting in AC Millivoltmetwr.

Lab3: Fault detection and Troubleshooting in CRO.

Lab4: Fault detection and Troubleshooting in Function generator

Lab5: Fault detection and Troubleshooting in multimeter.

About Value addition course:

Electronics technicians help design, develop, test, manufacture, install, and repair electrical and electronic equipment such as communication equipment, medical monitoring devices, navigational equipment, and computers. They may be employed in product evaluation and testing, using measuring and diagnostic devices to adjust, test, and repair equipment. Electronics technicians may also work as sales workers or field representatives for manufacturers, wholesalers, or retailers giving advice on the installation, operation, and maintenance of complex equipment and may write specifications and technical manuals. Electronics technicians represent over 33% of all engineering technicians in the U.S. In 2009, there were over 160,000 electronics technicians employed in the U.S. Electronics technicians are accredited by organizations such as the Electronics Technicians Association (ETA), or International Society of Certified Electronics Technicians (ISCET).

About course

Most employers prefer to hire electronics technicians with an associate degree or other post-secondary training in engineering technology. Training is available at technical institutes, at community colleges, at extension divisions of colleges and universities, at public and private vocational-technical schools, and in the Armed Forces. Naval electronics technicians are the largest group of engineering technicians in the military (see Electronics Technician (US Navy)). Many 2-year associate degree programs accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) include at least college algebra and trigonometry and one or two basic science courses. Depending on the specialty, more math or science may be required. About 200 ABET-accredited programs are offered in engineering technology specialities.[2] ABET-accredited electronics technician programs usually require at least two mathematics courses and two physics courses in addition to the core competencies.

Electronics technician curriculum generally consists of courses in basic electricity and electronics, including Ohm's Law, Parallel and Series Circuits, Magnetism, AC/DC Circuits,Capacitance, Inductance, Transformers, Resonance, Filters, Semiconductors, Transistors , Amplifiers, Integrated Circuits and Digital electronics.[3] In addition to vocational learning outcomes associated with the study of electronics and control systems, graduates of electronics technician programs are also expected to have essential employability skills and meet certain general education learning outcomes. Individual schools largely determine the specific program structure, delivery methods, and other curriculum components to be used to assist students in achieving the required program outcomes.

A significant component of course material includes laboratory experimentation. These lab courses and projects often represent up to 50% of the course material and are used to reinforce theoretical concepts associated with the study of electronics. Schools offering electronics technician programs will have electronics laboratories to support the delivery of course curriculum. Historically, these laboratories have been traditional "hands on" learning environments, although in recent years the trend is moving towards electronics simulation software such as Multisim and CircuitLogix. Electronics software simulation is also used in conjunction with traditional labs to provide greater opportunities for students to complete laboratory projects as part of their studies.

Career prospects

The demand for jobs in the electronics engineering and service fields is the result of a recent proliferation of both consumer and industrial electronics products. The design, installation, servicing and maintenance of this equipment has created significant employment opportunities in the electronics industry.

Typical job-related activities may involve:

- assembly
- installation
- maintenance
- testing
- troubleshooting
- repair
- upgrading of associated electronic equipment and systems.

Job opportunities for electrical and electronics technologists and technicians are increasing because many industries use electronic products and systems. Key sectors are telecommunications,audio/video,computers, robotics, energyconversion efficiency, power generation, transmission and distribution, and electrical equipment manufacturing. Employment opportunities for electronics technicians vary and are largely based on their areas of expertise. For example, employment growth for Electronics technicians in areas such as robotics, energy conversion, and power generation is expected to grow by 5%/yr from 2010 through 2020.