Ballari V.V Sangha's

VIJAYANAGARA COLLEGE HOSAPETE
Department Of Electronics

Program outcome and course outcome for the academic year 2020-21

Program Outcome:

1. To give knowledge of some basic electronic components and circuits.
2. To introduce basics of diode and transistor circuits.
3. Compare design issues, advantages, disadvantages and limitations of basic electronics.
4. Analyze output in different operating modes of different semiconductor devices.
5. To study different biasing techniques to operate transistor, FET, MOSFET and operational amplifier in different modes.
6. To study basics of semiconductor & devices and their applications in different areas.
7. To encourage innovation and research through projects and developmental activities with industries, institutions and government.
8. To produce excellent engineers, innovators, entrepreneurs and academicians for the growth of the society.

Course Objective: This course provides the student with the fundamental skills to understand the basic of semiconductor and components like diode, transistor, FET, MOSFET and operational amplifier It will build mathematical and numerical background for design of electronics circuit & component value. Students equipped with the knowledge and training provided in the course will be able to participate in design, development and operation in the different area of electronics system**.**

Course Outcome:

FIRST SEMESTER

1.1 Circuit Fundamentals:

After completing this courses, students understands Review the theory of passive components –R, L & C- features, types, uses. color coding of resistors.& capacitors. charging & discharging of capacitor & growth and decay of current in inductor through resister.. They will understand the various concepts transformer- features, construction & working, trans ratio, losses & types of transformers. Energy sources - concept of voltage and current source- Characteristics. and can grasp experimental knowledge of above concepts by taking multiple examples.

1.2 A.C Circuits:

After completing this chapter, students learn Fundamentals of AC circuits, Characteristics of sine wave, Basic definitions of sine wave- Amplitude, period, frequency, average & rms value, form factor, phase and phase difference , vector diagrams, complex numbers, J operator Series RL, RC & RLC circuit They will understand the various concepts like CRO& DMM: - Functions of cathode ray oscilloscope and digital multimeter and measurements various parameters using CRO & DMM and can grasp the experimental knowledge of above concepts by taking multiple examples.

1.3 Network Theorems:

In this course, students can understand the Statement, proof, explanation and problems of the following theorems T & π Networks (star &delta) and their conversions , Voltage divider theorem

,Kirchaffs laws , Reciprocity theorem. In Unit-3, students understood Maximum power transfer theorem , Superposition theorem ,Thevinin's theorem , Norton's theorem and can grasp experimental knowledge of above concepts by taking multiple examples.

1.4 Theory Of Semiconductors:

In this course, students can understand the Review of semiconductor materials, energy band theory of crystals Intrinsic semiconductors- Atomic structure of Germanium and Silicon Current Conduction and drift current in intrinsic semiconductors, Extrinsic semiconductor – P-type and N-type, conduction in both types of semiconductors) . In Unit-4, students understood the concepts like Breakdown voltage, junction capacitance, operating/rating/ Specifications of PN junction diode, diode testing & ideal diode characteristics..

1.5 Special Purpose Diodes :

After completing this course, the students can understand the Study the construction, working, characteristics and uses of the following special purpose semiconductor devices. zener diode- zener diode regulator , varactor diode etc.They will understand the various concepts like light emitting diode & LCD-seven segment led display, photo diode , photocells (solar cells) – types of solar cells , schotky diode and can grasp experimental knowledge of above concepts by taking multiple examples.

1.6 Transistors:

In this course, students can understand The bipolar junction transistor, types and symbols, working of NPN & PNP Transistor. Transistor configurations- CB, CE & CC. Current Amplification factors in - CB, CE & CC modes and their relations.. In Unit-6, students understood the concepts FET, MOSFET, UJT & CMOS Applications - FET as an amplifier, UJT as a relaxation oscillator.

SECOND SEMESTER

2.1 DC Regulated Power Supply:

After completing this course, the students can understand the basic concept Block diagram of regulated power supply, Rectification: Half wave rectifier, center tapped Full wave rectifier and Bridge rectifier- determination of efficiency and ripple factors. Filters: function of Series inductor filter, shunt capacitor filter. They will understand the various concepts like Voltage regulators:

zener diode regulator, series transistor and shunt transistor regulator and IC regulator 78XX and 79XX series. LM 317 & 337 regulator, SMPS.

2.2 Transistor Biasing:

In this course, students can understand the Need for biasing, essentials of transistor biasing DC load line Analysis, Operating point- determination of operating point- problems. Temperature effect on Q-point, Thermal Runaway . In Unit-II, students understood Biasing circuits: - designing , stability factors of the following biasing circuits. • Base resister bias / fixed bias • Base bias with emitter Feed back • Base bias with collector feed back • Voltage divider/ universal biasing method. – Problems etc.

2.3 Single Stage Transistor Amplifier:

In this course, students can understand the CE amplifier with voltage divider network- circuit, function and AC equivalent circuits. Hybrid parameter- definitions, CE, CC & CB hybrid equivalent models and expressions. In Unit-3, students understood Derivations for voltage gain, current gain, input impedance and output impedance of CE amplifier in terms of h- parameters and can grasp experimental knowledge of above concepts by taking multiple examples.

2.4 Multi Stage Transistor Amplifier:

In this course, students can understand the Classification of amplifier based on different parameters, different amplifier couplings and their comparison RC-coupled two stage amplifier freq.-response and band width advantage of RC coupled amplifier. In Unit-4, students understands Emitter follower circuit - construction, working and analysis. Darling ton pair of transistors and can grasp experimental knowledge of above concepts by taking multiple examples.

2.5 Power Amplifiers:

In this course, students can understand Transistor audio power amplifier. Difference b/w voltage and power amplifiers Transformer coupled class –A power amplifiers –expression for maximum efficiency Class-B push –pull amplifiers. In Unit-5, student understands concept of heat sink used in power transistor single tuned amplifiers and can grasp experimental knowledge of above concepts by taking multiple examples.

2.6 Feedback In Amplifiers:

In this course, students can understand concept of feed back in amplifiers - positive & negative feedback effect of –ve feed back on amplifier characteristics - expression for voltage gain ,input

impedance ,output impedance & band width. In Unit-6, student understands Comparative study of negative feedback on amplifiers characteristics with positive feedback. and can grasp experimental knowledge of above concepts by taking multiple examples.

THIRD SEMESTER

3.1ElectronicDevices&Circuits:

After completing these courses, the students can understand the basic concept of the linear and non-linear wave shaping, And they can understand the RC and RL differentiating and integrating circuits and their waveforms. They will understand the various concepts like clippers and clampers and their types with waveforms and can grasp experimental knowledge of above concepts by taking multiple examples.

3.2Sinusoidal Oscillators:

In this course, students can understand the classification of oscillators and their types, etc. The students can understand the different types of oscillatory circuits such as barkhausen criterion ,Hartley oscillator ,colpitts oscillators and their working . In Unit-II, students understood how limitations of LC and RC oscillators and learns transistor crystal oscillators etc, and can grasp experimental knowledge of above concepts by taking multiple examples.

3.3Non-Sinusoidal Oscillators:

In this course, students can understand the classification of non-oscillators and their types, etc. The students can understand the different types of multivibrators such as astablemultivibrator , monostable multivibrator , bistable multivibrator and their working . In Unit-3, students understood the definitions of pulse parameters ,time delay, rise time, fall time etc, and can grasp experimental knowledge of above concepts by taking multiple examples.

3.4Operational Amplifier:

In this course, students can understand the advantages and disadvantages of IC technology, IC packages, scale of integration, IC terminology etc. The students can understand the different types of Emitter coupled differential amplifier- differential and common mode operation, CMRR, block diagram of OPAMP. Characteristics of ideal OPAMP. Inverting and non inverting opamp expressions for closed loop voltage gain. In Unit-4, students understood the definitions , op amp parameters-input bias current, input offset voltage, output offset voltage and input and output impedances,

CMRR and slew rate etc.and can grasp experimental knowledge of above concepts by taking multiple examples.

3.5 Op Amp Applications:

In this course, students can learn OPAMP as an integrator , differentiator- circuit function and wave forms etc. The students can understand Active filters- OPAMP low pass, High pass, band pass and band reject filters- circuit construction, function and frequency response. In Unit-5, students understood the OPAMP oscillators- comparator, Schmitt trigger phase shift oscillator, wein bridge oscillator, astable, bistable and monostable multivibrator- circuit and working. and can grasp experimental knowledge of above concepts by taking multiple examples.

3.6 Analog Computation:

In this course, students can learn linear computing circuits and symbols using OPAMP- scale changer, adder, sub tractor, multiplication by a constantetc. In Unit-6, students understood theSolutions of linear ordinary differential equation with constant coefficients (Bootstrap method). Analog computer symbols, operation modes of analog computer, time scaling and amplitude scaling, examplesand can grasp experimental knowledge of above concepts by taking multiple examples.

FOURTH SEMESTER

4.1Number Systems&Boolean Algebra:

After completing this chapter, the students can understand the Binary, Octal & Hexadecimal systems and their inter conversions. Codes- BCD (8421), Excess- 3 code, Gray code, Binary operations- addition, subtraction, 1' & 2' complementary method of subtraction. They will understand the various concepts like BOOLEAN ALGEBRA: positive, negative logics, Boolean identities. Laws and Theorems of Boolean algebra. Demorgan's theorems. Simplifications of Boolean expressions using laws & theoremsand can grasp experimental knowledge of above concepts by taking multiple examples.

4.2 Logic Gates and Logic Design:

In this course, students can learn AND, OR, NOT – Basic gates: construction, working using diodes and transistors. Truth tables, symbols and IC's. Universal gates: NAND & NOR gates truth tables, symbols & Boolean expressions. Combinational gates: XOR & XNOR gates truth tables, symbols & Boolean expressions. Binary adder: Half adder & Full adder, 4-bit Binary adders. In Unit-2, students

understood the Logic design: Implementation of logic circuits for given Boolean expressions and design. Simplifying the logic circuits SOP & POS expressions, K-Map construction & simplifications to solve 3 & 4 variable Boolean expressions, don't care conditions and can grasp experimental knowledge of above concepts by taking multiple examples.

4.3 Logic Family IC's & Flip-Flops:

After completing this chapter, the students can understand RT, DTL & TTL families – characteristics, TTL NAND & NOR gates, CMOS series, Merits and demerits of TTL & CMOS. They will understand the various concepts like Flip-flops: Basic RS flipflop (bistable) using transistor. Flipflop as a memory cell. RS- NAND & NOR latches, clocked RS flipflop, D & T flipflop, JK flipflop, master slave flipflopand can grasp experimental knowledge of above concepts by taking multiple examples.

4.4 'C' Programming :

In this course, students can learn Basic computer system- block diagram &function, hardware, software. Introduction to 'C' language, characteristics and applications. In Unit-4, students understood the character set, C- tokens, constants and variables, data types, operators- arithmetic, logical, bitwise and special operators, Expressions, Basic structure of 'C' programming, compiling and executing of 'C' programsand can grasp experimental knowledge of above concepts by taking multiple examples.

4.5 Statements Of 'C' Language:

After completing this chapter, the students can understand Conditional control statements: if statement, If-else statement, nested-if statement and switch statement. They will understand Unconditional control statements that is go-to statement and Loop control statements: while statement, do while statement, for statement , nested for statement and jump statements and can grasp experimental knowledge of above concepts by taking multiple examples.

4.6Arrays &Functions:

In this course, students can learnArrays : Definitions, classification, declaration and One dimensional and two dimensional arrays and examples. In Unit-6, students understood the Functions: Definitions, Arguments & parameters, category of functions, function declarations and

Parameter passing mechanisms- call by value, call by reference and Recursion- examples.and can grasp experimental knowledge of above concepts by taking multiple examples.

FIFTH SEMESTER

5.1.1 Antennas & Radio Wave Propagation:

In this chapter, students learn Antenna requirements, antenna parameters, resonant antenna, dipole antenna, folded dipole antenna, reflectors, directors and yagi-uda antenna. In Unit-1, students understood EM theory- qualitative analysis of electromagnetic theory, Maxwell's equations,(no derivations) pointing theorem Propagation of radio waves, ionosphere-formation and composition, mechanism of radio wave propagation, different modes of radio wave propagation (qualitative analysis)and can grasp experimental knowledge of above concepts by taking multiple examples.

5.1.2 Transmission Lines (T-Lines):

After completing this chapter, the students can understand Introduction to T- lines, Types of T-lines, distributed parameters of T- lines, basic T- line equation, characteristic impedance, impedance matching. They will understand the various concepts like , propagation constant (attenuation and phase constants), frequency and phase distortion, condition for distortion less T- line, Standing wave ratio (SWR) and VSWR.

5.1.3 Amplitude Modulation (AM):

In this chapter, students learnDefine modulation, Need for modulation, different types of modulations – AM, FM and PM, Expression for instantaneous voltage of AM waves, modulation index, frequency spectrum and bandwidth, power relation in AM waves. In Unit-3, students understood AM modulators - emitter modulator, base modulator and collector modulation. AM detectors- square law diode detector and linear diode detectorand can grasp experimental knowledge of above concepts by taking multiple examples.

5.1.4 Frequency Modulation (FM) :

In this chapter, students learn Advantages of FM over AM, Expression for instantaneous voltage of frequency modulated wave, modulation index and international standards on FM broadcasting.. In Unit-4, students understood FM modulator - varactor diode modulator and theory of FET reactance modulator, FM detectors- slop detector, balanced slop detector and Foster-seelay discriminator. and can grasp experimental knowledge of above concepts by taking multiple examples.

5.1.5Transmitters And Receivers:

In this chapter, students learn Function of AM transmitters and FM transmitters with block diagrams, Receiver characteristics, AM-TRF receiver and super heterodyne receivers, need for Automatic gain control (AGC) circuit. In Unit-5, students understood FM super heterodyne receiver explanation with block diagram, comparison of AM &FM receiversand can grasp experimental knowledge of above concepts by taking multiple examples.

5.2.1 Registers And Counters:

In this chapter, students learn Introduction, types of registers,4- bit serial in serial out, serial in parallel out, parallel in serial out and parallel in parallel out shift registers. Asynchronous counters logic diagram, truth table and timing diagram. In Unit-1, students understood 3-bit ripple counter, 4-bit up-down counter and modified counters – mod-3, mod-5, mod-7. 4- bit synchronous counter decade counter, IC7490. Synchronous up-down counter, design using K-map, ring counter and applications and can grasp experimental knowledge of above concepts by taking multiple examples.

5.2.2 Data Processing Circuits & Converters:

In this chapter, students learn Multiplexers: block diagram, truth table and logic circuit of 4-to-1 multiplexer and 16 to1multiplexer .The 74150 TTL multiplexer-pin out diagram, truth table explanation Demultiplexer-1-to4, 1-to-16 demultiplexer block diagram, truth table and logic diagram and explanation. The 74154demultiplexer-pin out diagram, truth table explanation. In Unit-2, students Data converters- D to A converters-Binary weighted resister network and R-2R ladder network. A to D converters- Dual slope integrating type, successive approximation method, flash converter, resolution and accuracy for the above convertersand can grasp experimental knowledge of above concepts by taking multiple examples.

5.2.3Memory Devices:

In this chapter, students learn Basic memory cell, classification, primary and secondary memories. Semiconductor memories- diode matrix, Magnetic memory, hard disc and floppy disc, optical memory-CD ROM, CD-RW and DVD.In Unit-3, students understood RAM- static and dynamic cells, ROM, EPROM, EEPROM, CCD'sand can grasp experimental knowledge of above concepts by taking multiple examples.

5.2.48085 Microprocessor:

After completing this chapter, the students can Introduction to 8085 based microcomputer system, 8085 MPU, Architecture and pin configuration of 8085, Flags and special purpose registers. They will understand the various concepts like , Instruction and timings- instruction classification, instruction format, instruction timing and operation status, instruction set, addressing mode and groups, instruction cycle.

5.2.58085 Programming And Interfacing:

In this chapter, students learn Programs on Data transfer instruction, arithmetic operation, logic operation, branch operation, flow chart and executing, writing assembly language programs. In Unit-5, students understood Need of interfacing devices, parallel and serial interfacing, PPI 8255, USART8251and can grasp experimental knowledge of above concepts by taking multiple examples.

SIXTH SEMESTER

6.1.1 Basic Television Principles :

In this chapter, students learn Introduction, Elements of TV broad casting system, block diagram and function of monochrome TV transmitter & receiver, Scanning- aspect ratio, progressive, horizontal, vertical, & interlaced scanning, composite video signal, blanking and synchronizing pulses, channel band width, CCIR –B TV channels allotment of frequencies. In Unit-1, Camera tubes-introduction, types, construction, working and characteristics of vidicon and image orthicon camera tubes.

6.1.2Color Television:

In this chapter, students learn Introduction, essentials of CTV , mixing of colours, additive &subtractive mixing, colour TV signals, luminance and chrominance signals, colour TV camera. In Unit-2, students understood colour sub carrier frequency, PAL colour TV system, PAL encoder & decoder, colour picture tube, block diagram & function of colour TV receiver.

6.1.3Satellite Communication:

In this chapter, students learnkepler's laws, (statements only) satellite orbits, circular, elliptical & geosynchronous satellite orbits, satellite links, the uplink & downlink, the transponder, path loss, multiple access methods,- Qualitative study of FDMA, TDMA, CDMA. In Unit-3, students understood cellular/mobile communication, requirements, PCS system, computer network,- LAN&WAN, internet

& its servicesand can grasp experimental knowledge of above concepts by taking multiple examples.

6.1.4Digital Communication:

In this chapter, students learn basic digital communication, pulse modulation systems, PAM, PTM , PWM &PPM, Synchronous and Asynchronous transmission, probability of bit error, matched filter, Pulse code modulation systems, block diagram &working of PCM system, delta modulation. In Unit-4, students understood digital carrier systems, Block diagram &function of ASK, FSK, PSK, QPSK &DPSK.

6.1.5Optic Fibers & Communication:

In this chapter, students learn block diagram & function of optical communication system, advantages of optical communication, optical fiber & cable, types of optical fibers, modes of propagation, step index & graded index fiber. In Unit-3, students understood , single and multimode fibers, propagation of light within a fiber Launching angle expression for numerical aperture(NA) , fiber materials,and can grasp experimental knowledge of above concepts by taking multiple examples.

6.2.1Instrumentation- Sensors & Applications:

In this chapter, students learn Resistance type temperature sensors- metallic resistance thermometer, semiconductor resistance thermometer (thermistors), thermocouples, solid state sensors, quartz thermometers. Radiation type sensors - optical pyrometers. In Unit-1, students understood Displacement and strain transducers: LVDT, strain gauge-type of strain gauges, material for strain gauge. Pressure transducer: elastic transducer, bourdon or helical tubes, piezoelectric pressure transducer.

6.2.2 Signal Conditioners:

In this chapter, students learn Filters- integrators, differentiators and active filters- low pass, high pass, band pass, band rejection filters. In Unit-2, students understood Precision rectifier using opamp, peak detectors, sample and hold circuits, phase sensitive detector, instrumentation amplifier, isolation amplifier, lock in amplifierand can grasp experimental knowledge of above concepts by taking multiple examples.

6.2.38051 Microcontroller:

In this chapter, students learn Microcontroller and embedded processors, overview of 8051 family, 8051 architecture, registers and memories in 8051, register banks, flag bits, PSW register. In Unit-3,students understood data types, JUMP, LOOP and CALL instructionsand can grasp experimental knowledge of above concepts by taking multiple examples.

6.2.4 8051 Addressing Modes & Instruction Set:

In this chapter, students learnI/O programming of 8051- I/O programming, bit manipulation, addressing modes. In Unit-4, students understood arithmetic, logical and single bit instructions and programmingand can grasp experimental knowledge of above concepts by taking multiple examples.

6.2.5 8051 Timer/Counter Programming& Interfacing:

In this chapter, students learn 8051 Timer/Counter programming, TCON register, Baud rate and Interrupts in 8051. In Unit-5, students understood stepper motor description and stepper motor interfacing via ULN2003, interfacing of ADC and DAC to 8051and can grasp experimental knowledge of above concepts by taking multiple examples

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PROGRAM SPECIFIC OUTCOME:

After learning the Electronics program students equipped with knowledge and training provided in the course and will be able to participate in design, development and operation in the different area of electronic system.

- After learning the basic knowledge of cicuit components like resistor, capacitors, inductors and transformers.students can design various types of transformers.

- After learning the basics of semiconductors and understanding the devices like diodes ,special diodes like LED ,photodiode, and Transistors.
- After learning the Power supply systems students can design different power supplies using IC's (78XX,79XX,LM315,317 & 337 , SMPS etc).
- After learning the basics of Oscillators, Multivibrators and Operational amplifiers students can design different Op amp applications and Filters.
- After learning basics of Digital principals student grasp the digital electronic systems and learned C programming language and writing simple programs.
- After learning basics of communications student can able to understand principles and technical skills of radio transmitters and receivers.
- After learning basics of digital logical circuits like counters, register , data processing circuits and learnt the 8085 microprocessor programming and interfacing techinques with practical skills.
- After learning Television and digital communication systems student can understand basic TV principles like B&W TV and color TV.also the transmission and receivers technical skills. And advanced satellite communication systems, digital communication systems and understand basic knowledge of above systems.
- After learning the basics of instrumentations and 8051 microcontroller student can learn and able to write the simple programs using microcontroller kit.