ACHARYA NAGARJUNA UNIVERSITY
B.Sc. Electronics CBCS SYLLABUS
B. Sc ELECTRONICS SYLLABUS (2017-18)

VI SEMESTER

PAPER-VII   MICRO CONTROLLER AND INTERFACING

<u>Cluster-1</u>
PAPER- VIII (A1)   EMBEDDED SYSTEMS DESIGN
PAPER- IX (A2)   ELECTRONIC INSTRUMENTATION
PAPER- X (A3)   POWER ELECTRONICS

<u>Cluster-2</u>
PAPER-B   PC MAINTAINANCE AND TROUBLE SHOOTING
PAPER- VIII (B1)   COMPUTER NETWORKS
PAPER- IX (B2)   CONSUMER ELECTRONICS
PAPER- X (B3)   OPTICAL FIBER COMMUNICATION AND IT'S APPLICATION

LABS:

LAB-7: MICROCONTROLLER LAB
LAB-8: ELECTRONIC INSTRUMENTATION LAB
LAB-9: POWER ELECTRONICS LAB
LAB-10- PROJECT WORK.

ACHARYA NAGARJUNA UNIVERSITY
B.Sc. Electronics CBCS Syllabus

3RD YEAR

VI SEMESTER
PAPER-VII   MICRO CONTROLLERS AND INTERFACING

Sub: ELECTRONICS		Year:2017 – 18	Group: B.Sc	Credits -3

TITLE: MICRO CONTROLLERS AND INTERFACING
OBJECTIVES:
- To understand the concepts of microcontroller based system.
- To enable design and programming of microcontroller based system.
- To know about the interfacing Circuits.

UNIT-I: (10Hrs)

Introduction, comparison of Microprocessor and micro controller, Evolution of microcontrollers from 4-bit to 32 bit, Development tools for micro controllers, Assembler-Compiler-Simulator/Debugger.

UNIT -II: (10Hrs)
Microcontroller Architecture:

Overview and block diagram of 8051, Architecture of 8051, program counter and memory organization, Data types and directives, PSW register, Register banks and stack, pin diagram of 8051, Interrupts and timers brief only.

UNIT-III:(10Hrs)
Addressing modes, instruction set of 8051:

Addressing modes , instruction set: Arithmetic, Logical, Simple bit, jump, loop and call instructions. Time delay generation,

Unit -IV: (15Hrs)

Assemble language programming Examples: Addition, Multiplication, Subtraction, division, arranging a given set of numbers in largest/smallest order.

UNIT-V : (15Hrs)
Interfacing and Application of Microcontroller:

Interfacing of PPI 8255– DAC (0804), interfacing seven segment displays, displaying information on a LCD, control of a stepper Motor (Uni-Polar), Interfacing of a 4*3 matrix keypad.

TEXT BOOKS:
1. The 8051 microcontroller and embedded systems using assembly and c-kennet
   j.Ayalam, Dhananjay V.gadre, cengage publishers
2. The 8051 microcontrollers and Embedded systems - By Muhammad Ali Mazidi and
   Janice Gillespie Mazidi – Pearson Education Asia, 4th Reprint, 2002.

REFERENCE BOOKS:
   1. Microcontrollers Architecture Programming, Interfacing and System Design – **Raj kamal.**
   2. The 8051 Microcontroller Architecture, Programming and Application - **Kenneth J.Ajala ,** west publishing company (ST PAUL, NEW YORK, LOS ANGELES, SAN FRANCISCO).
   3. Microcontroller theory and application-Ajay V.Deshmukh

OUTCOMES:
   - The student can gain good knowledge on microcontrollers and implement in practical applications
   - learn Interfacing of Microcontroller
   - get familiar with real time operating system

ELECTRONICS LAB-VII
MICROCONTROLLER   LAB

LAB LIST:

1. Addition and Subtraction of Two 8-Bit Numbers.

2. Multiplication and Division of Two 8-Bit Numbers.

3. Exchange of Higher and Lower Nibbles in Accumulator.

4. BCD Operation and Reverse and X-Or of Given Numbers.

5. Addition of Two 8-Bit Numbers (Keil Software).

6. Addition of Two 16-Bt Numbers (Keil Software)

7. Subtraction of Two 8-Bit Numbers (Keil Software).

8. Subtraction of Two 16-Bit Numbers (Keil Software).

9. Multiplication of Two 8-Bit Numbers (Keil Software).

11. Program for Swapping and Compliment of 8-Bit Numbers (Keil Software).

12. Program To Find The Largest Number In Given Array (Keil Software).

13. Program To Find The Smallest Number In Given Array (Keil Software).

14. Interfacing Led To 8051 Microcontroller (Keil Software).

15. Interfacing Buzzer to 8051 Microcontroller (Keil Software).

16. Interfacing Relay to 8051 Microcontroller (Keil Software).

17. Interfacing Seven Segments to 8051 Microcontroller (Keil Software)

Title: Microcontroller and interfacing
MODEL PAPER
SECTION-A
Answer any FIVE of the following: 5x5=25M

1. Write about evolution of microcontrollers.

2. List and explain some 8051 16-bit registers.

3. Explain CALL instruction and stack.

4. Write an ALP program for two 8-bit numbers.

5. Explain the interfacing of 4*3 matrix keypad.

6. Write short notes on PSW register.

7. Explain about stack pointer.

8. Draw the pin diagram for DAC.

SECTION-B
Answer the following: 5x10=50M

1. a) Explain the difference between microprocessor and microcontroller.
                         (or)
   b) Explain development tools used for microcontroller.
2. a) Explain the architecture of 8051 and explain each pin in detail.
                         (or)
   b) Draw the pin diagram of 8051 and explain each pin in detail
3. a) Explain about different types of Addressing modes
                         (or)
   b) Explain about (i) single bit instruction (ii)loop instruction(iii)Air thematic
      instruction with one example each.
4. a) Write a ALP program on largest number in an array.
                         (or)
   b) Write an ALP (i) 8-bit addition (ii) multiplication of 8-bit.

5. a) Briefly explain the architecture of 8255(PPI).
                         (or)
   b) Explain about interfacing of stepper motor to 8051 microcontroller.

ACHARYA NAGARJUNA UNIVERSITY
B. Sc ELECTRONICS SYLLABUS (2017-18)
3RD YEAR
VI SEMESTER

Cluster-1
PAPER- VIII (A1)   EMBEDDED SYSTEMS DESIGN

Sub: ELECTRONICS		Year:2017-18	Group: B.Sc	Credits -34

TITLE: Embedded Systems Design

OBJECTIVES:

- design embedded computer system hardware
- design, implement, and debug multi-threaded application software that operates under real-time constraints on embedded computer systems
- use and describe the implementation of a real-time operating system on an embedded computer system
- formulate an embedded computer system design problem including multiple constraints, create a design that satisfies the constraints, implement the design in hardware and software, and measure performance against the design constraints
- create computer software and hardware implementations that operate according to well-known standards
- organize and write design documents and project reports
- organize and make technical presentations that describe a design.

UNIT 1: (10Hrs)

Introduction to Embedded Systems:
       Embedded systems overview, Processor Technology, IC Technology, and Design Technology.

UNIT 2: (15Hrs)
Custom Single Purpose Processor – Hardware Development:
       Introduction, Combinational logic, Sequential logic, Custom Single Purpose Processor Design, RT-Level Custom Single-Purpose Processor.

UNIT 3: (15Hrs)
General Purpose Processor – Software Development:
Introduction, Basic Architecture, Operation, Programmer's View, ASIPs, and Development Environment:, Linker / Locators for Embedded Software, Getting Embedded Software into the target system..

UNIT 4: (10Hrs)

RTWA for Embedded Systems:
Introduction, Timers, Counters and Watchdog Timers, UART, Pulse Width Modulators, LCD Controllers, Keypad Controllers, Stepper Motor Controllers.

UNIT 5: (10Hrs)
Advanced Communication Principles:
Parallel Communication, Serial Communication, Wireless Communication, **Serial Protocols:** I^2C, CAN, and USB. **Parallel Protocols:** PCI BUS and ARM BUS. **Wireless Protocols:** IrDA, Bluetooth.

TEXT BOOKS:

1. Embedded System Design – A Unified Hardware / Software Introduction By **Frank Vahid / Tony Givargis** – WILEY EDITION.

2. Embedded Systems Architecture, Programming and Design – 2nd Edition By **Raj Kamal** – Tata McGraw-Hill Education.

REFERENCES:

1. An Embedded Software Premier - **David E- Siman**, PEARSON Education

2. Embedded / real - time systems - **DR. K.V.K.K. Prasad**, dreamtech
3. The art of programming Embedded systems, **Jack G. Ganssle**, academic press
4. Intelligent Embedded systems, **Louis L. Odette, Adison Wesly**, 1991

OUTCOMES:
- The student can gain good knowledge on Embedded Systems and implement in practical applications.
- An ability effectively as a member or leader on a technical team
- A commitment to quality, timeliness and continuous improvement

PROJECT WORK-VIII

STUDENTS HAS TO DO A GROUP PROJECT WORK DURING THIRD YEAR

Title: Embedded systems Design
MODEL PAPER
SECTION-A

Answer any FIVE of the following: 5x5=25M

1. Write about embedded system.
2. Explain about Combinational logic.
3. Discuss about linker for embedded software.
4. Write about watchdog timers.
5. Write a short note on Bluetooth.
6. Write short notes on ARM bus.
7. Explain about IC technology.
8. Draw the pin diagram for Pulse width modulators.

SECTION-B

Answer the following: 5x10=50M

1. a) List various application areas of embedded systems and give examples for each application area?

(or)

 b) Explain about different technologies used in embedded systems.

2. a) Explain the design of custom single processor .

(or)

 b) Discuss about RT-level custom single processor.

3. a) Explain about basic architechure

(or)

 b) Describe the function of linker/locator for embedded software.

4. a) Explain about LCD controller

(or)

 b) Discuss briefly about Stepper motor controllers.

5. a) Briefly explain about serial communication.

(or)

 b) Explain the following terms in brief (i) I^2C (ii) CAN.

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3rd YEAR

VI SEMESTER
PAPER- IX (A2)   ELECTRONIC INSTRUMENTATION

Sub: ELECTRONICS		Year:2017-18	Group: B.Sc	Credits -3

TITLE: ELECTRONIC INSTRUMENTATION

OBJECTIVES:
 The student will be introduced to
- To introduce students to monitor, analyze and control any physical system
- To understand students how different types of meters work and their construction
- To Study of absolute is merely confirmed within laboratories
- To Study integrating instruments like ammeter, voltmeter
- To Measurement of impedance using bridges
- To Study of PLL ,ph-meter, PLC

UNIT-I   (10hrs)
 Measurements:
        Basic block diagram of measurement system, Accuracy and precision, resolution, sensitivity, linearity, Errors, systematic and random errors..
UNIT –II (10hrs)
 Basic Measurement Instruments:
        DC measurement-ammeter, voltmeter, ohm meter, AC measurement, Digital voltmeter systems (integrating and non-integrating). Digital multimeter-block diagram
 Measurement of Impedance:
        A.C. bridges, Measurement of Self Inductance (Anderson's bridge), Measurement of Capacitance (De - Sauty bridge), Measurement of frequency (Wien's bridge).
UNIT-III   (15hrs)
 Lock-in-amplifier:
         Basic Principles of phase locked loop (PLL), Phase detector (XOR& edge triggered), Voltage Controlled Oscillator (Basics, varactor), lock and capture.
 Signal Generators: Function generator, Pulse Generator, (Qualitative only).
UNIT-IV   (15hrs)
 Analytical instruments
        Spectrophotometer, working with block diagram, features of spectrophotometer, P$_H$ meter - principle working with block diagram, features of P$_H$ meter.

TEMPERATURE TRANSDUCERS

      Types of transducers, Thermometer, Thermo couple and their characteristics.

UNIT-V : (10hrs)

      Direct digital control (DDC), Distributed control system (DCS),
PLC'S: Block diagram, hardware, PLC operation, Applications of PLC'S.

TEXT BOOKS
1. Introduction to instrumentation and control By A.K.Ghosh
2. Sensors and transducers PHI 2Ed By D.Patranabis.
3. Industrial instrumentation –Eckman.P.
4. Instrument measurement analysis By Nakra and chaudhry.

Reference Books:
1. W.D. Cooper and A. D. Helfrick, Electronic Instrumentation and Measurement
Techniques, Prentice Hall (2005).
2. E.O. Doebelin, Measurement Systems: Application and Design, McGraw Hill Book -
fifth Edition (2003).
3. David A. Bell, Electronic Devices and Circuits, Oxford University Press (2015).
4. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier
(Butterworth Heinmann-2008).
OUTCOMES:
- Design a system, component or process to meet desired needs in electrical
  engineering.
- Measurement of R,L,C ,Voltage, Current, Power factor , Power, Energy
- Ability to balance Bridges to find unknown values.
- .Ability to measure frequency, phase with Oscilloscope
- Ability to use Digital voltmeters
- Ability to measure strain, displacement, Velocity, Angular Velocity, temperature,
  Pressure ,Vacuum, and Flow

ELECTRONICS LAB-IX

ELECTRONIC INSTRUMENTATION   LAB

LAB LIST:

1. Design of multi range ammeter and voltmeter using galvanometer.
2. Measurement of resistance by Wheatstone bridge and measurement of bridge sensitivity.
3. Measurement of Capacitance by De'Sautys.
4. Measure of low resistance by Kelvin's double bridge.
5. To determine the Characteristics of resistance transducer - Strain Gauge (Measurement of Strain using half and full bridge.)
6. To determine the Characteristics of LVDT.
7. To determine the Characteristics of Thermistors and RTD.
8. Measurement of temperature by Thermocouples and study of transducers like AD590 (two terminal temperature sensor), PT-100, J- type, K-type.
9. To study the Characteristics of LDR, Photodiode, and Phototransistor.

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Title: ELECTRONIC INSTRUMENTATION
MODEL PAPER
SECTION-A
Answer any FIVE of the following: 5x5=25M

1. Define the terms (i) Accuracy (ii) Precision

2. What is Digital multimeter?

3. Write a short note on lock in amplifier?

4. Explain about thermo couple and characteristics.

5. Write short notes on Temperature Transducer.
6. Mention some applications of PLC.
7. Define the terms (i) Resolution (ii) Sensitivity.
8. Explain about ohm meter.

SECTION-B
Answer the following: 5x10=50M
1. a) Explain briefly about the block diagram of measurement system.

                              (or)

   b) Define the following terms in brief:

                              (a) Systematic errors.
                              (b) Random errors.

2. a) Explain about Digital voltmeter systems in brief.

                              (or)

   b) Discuss briefly about measurement of frequency (Wien bridge) .
3. a) Define principle and working characteristics of PLL.

                              (or)

   b) Explain briefly about function generator.
4. a) Draw the block diagram of Spectrophotometer and explain.

                              (or)

   b) Define principle and working characteristics of P_H meter.

5. a) Discuss briefly about Direct digital control.

                              (or)

   b) Explain about the block diagram of PLC and it's operation.

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B.Sc. Electronics CBCS SYLLABUS
3rd YEAR
VI SEMESTER

Cluster-1
PAPER- X (A3)   POWER ELECTRONICS

Sub: ELECTRONICS		Year:2017-18	Group: B.Sc	Credits -34

TITLE: POWER ELECTRONICS

Objectives:
• To study the characteristics of various power semiconductor devices.
• To understand the operation of power inverters.
• To study the operation of rectifiers with different loads.
• To understand the operation of different types of choppers.
• To understand the operation and controlling of motors.

Unit- 1   (12 Lectures)
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.

Unit- 2   (14 Lectures)
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.
Application of SCR:
    SCR as a static switch, phase controlled rectification, single phase half wave, full wave and bridge rectifier switch inductive & non-inductive loads.

Unit- 3   (10 Lectures)

Choppers:

Basic chopper circuit, types of choppers (Type A-D), step-down chopper, step-up chopper, operation of d.c. chopper circuits using self commutation (A & B-type commutating circuit

Unit-4   (10 Lectures)

Power Inverters:

Need for commutating circuits and their various types, d.c. link inverters, Parallel capacitor commutated invertors with and without reactive feedback and its analysis.

Unit- 5   (14Lectures)

Electromechanical Machines:

DC Motors, Basic understanding of field and armature, Principle of operation, EMF equation, Back EMF, Factors controlling motor speed, Thyristor based speed control of DC motors, AC motor (Induction Motor only).

Outcomes:

Student should be able to

• Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's.

• Design firing circuits for SCR.

• Explain the operation of rectifiers with different loads.

• Analyze the operation of different types choppers.

Suggested Books:

1. Power Electronics, K. Hari Babu, Scitech Publication.
2. Power Electronics, P.C.Sen, TMH.
3. Power Electronics & Controls, S.K. Dutta.
4. Power Electronics, M.D.Singh&K.B. Khanchandani, TMH.
5. Power Electronics Circuits, Devices and Applications, 3rd Edition, .H.Rashid, Pearson Education.
6. Power Electronics, Applications and Design, Ned Mohan,Tore.
7. Power Electronics, P.C.Sen, TMH.
8. Power Electronics, M.S.Jamil Asghar,PHI.
9. A Textbook of Electrical Technology-Vol-II,B.L.Thareja,A.K.Thareja, S.Chand.

ELECTRONICS LAB-X

Power Electronics Lab

LAB LIST:

1. Study of I-V characteristics of DIAC

2. Study of I-V characteristics of a TRIAC

3. Study of I-V characteristics of a SCR

4. SCR as a half wave and full wave rectifier switch R and RL loads

5. DC motor control using SCR.

6. DC motor control using TRIAC.

7. AC voltage controller using TRIAC with UJT triggering.

8. Study of parallel and bridge inverter.

9. Design of snubber circuit

10. VI Characteristic of MOSFET and IGBT (Both)

11. Study of chopper circuits

ACHARYA NAGARJUNA UNIVERSITY
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3rd YEAR

VI SEMESTER

Cluster-2
PAPER-B   PC MAINTAINANCE AND TROUBLE SHOOTING

ELECTRONICS		Year 2017- 18	B.Sc (MECs)	Credits - 3

TITLE: PC MAINTENANCE AND TROUBLE SHOOTING

UNIT – I :12Hrs
INTRODUCTION TO COMPUTERS:
Block diagram & types of computers. Mother Board Characteristics, choosing a Motherboard, Installing a Mother board, Upgrading system BIOS. Bus Slots – ISA, MCA, EISA, PCI, USB and firmware (IEEE 1394). Features and comparison of 80286, 80386 and 80486,.

UNIT – II :12Hrs

BASIC TROUBLE SHOOTING: Introduction about proper tools in system maintenance, various test equipment for PC servicing, Reasons for failure of resistor, Reasons for failure of capacitor, Reasons for failure of other components, Safety precautions during trouble shooting.

Keyboard: Types of keyboards block diagram of keyboard, keyboard connectors. reasons for failure of keyboard.
Mouse: Working and components of mouse and different connectors.

UNIT – III :12Hrs
STORAGE DEVICES: Introduction about disk drives, Characteristics of different disk drives
FDD:- Different types, working and components of drives.
HDD:-Different types, working and components of HDD drives partitioning & Formatting HDD
CDROM:- Different types working and components of CDROM drives.

UNIT –IV :12Hrs
SMPS: linear, AT, ATX,
Block of SMPS and description of each block.
INTRODUCTION to UPS& SPS:
Reasons for power supply failure, Impact of power supply failure on PC
.

UNIT – V :12Hrs
PRINTERS:- Different types of printers, dot matrix, INKJET & LASER PRINTER – components and working.
PREVENTIVE MAINTANCE – Effect of heat and noise, Effect of corrosion on PC, Effect of power fluctuations,

TEXT BOOKS:
 1. UPGRADING AND REPAIRING PC – SCOTT MULLER.
2. IBM PC and Clones: Hardware, Troubleshooting and Maintenance - GOVINDARAJALU. B

REFERNCE BOOKS:
 1. I.T. HARDWARE   - NATSHELL.
 2. PRINTER MANUALS.

ELECTRONICS LAB

PC MAINTENANCE AND TROUBLE SHOOTING LAB

LAB LIST:

1. Identification of different peripherals and components in a PC.

2. Identification of different types of motherboards.

3. Identification of different expansion slots and add-on cards.

4. Assembling a PC

5. Study of CMOS ROM BIOS setup utilities.

6. . Change of CMOS password and boot sequence

7. Connecting hard drives, floppy drives and DVD writer

8. Creating partitions and formatting a hard drive.

9. Installation of windows 2000 Professional and windows XP

10. Installation of application software's and antivirus software

11. Installation of windows server 2003

12. Installation and configuring display sound and LAN cards.

3rd YEAR
VI SEMESTER
Cluster-2
PAPER- VIII (B1)   COMPUTER NETWORKS

ELECTRONICS		Year 2017- 18	B.Sc (MECs)	Credits - 3

TITLE: COMPUTER NETWORK

UNIT-I :12Hrs

INTRODUCTION to OSI,TCP/IP and other Network models,Examples of Networks,NovelNetworks,Arpanet,Internet,Networktopologies,WAN,LAN,MAN. PHYSICAL LAYER :Transmitted media copper,Twistedparewireless,switching and Encoding asynchronuscommunications,Narrowband,Broadband,ISDN& ATM.

UNIT-II :12Hrs

DATA LINK LAYER: Design issues,framing,error detection &correction,CRC,elementary protocol-Stop and wait,Slidingwindow,slip,data link layer in HDLC,Internet,ATM

UNIT-III :12Hrs

MEDIUM ACCESS SUB LAYER: ALOHA,MAC,Address,Carrier sense multiple access,IEEE 802.X standard Ethernet,WirelessLAN,Bridges.

UNIT-IV :12Hrs

NETWORK LAYER: Virtual circuits and data gram sub nets-routing algorithm,shortest path routing,fooding,Hierarchicalrouting,broadcast,multicast,distance vector routing

UNIT-V :12Hrs

TRANSPORT LAYER : Transport services,Connection management ,TCP & UDP protocols,ATM AAL layers protocol
APPLICATION LAYER- Network security,domain name system,SNMP,Electronicmail,The world web,multimedia

TEXT BOOKS:

Computer Networks   - Andrew S. Tanenbaum,4thEdition,Pearson education
Data communications & Networking   -Behrouz A.Forouzan.3rdEditionTMH

References
An engineering approach to Computer Networks   - S. Kesav   2ndEdition,Pearson education

ELECTRONICS LAB
COMPUTER NETWORK LAB

1.**Study of different types of network cables and practically implement the**

cross wired cable and straight through cable using clamping tool

2.study of network Devices in detail.

3.Study of network IP

4.connect the computers in local area network

5.study of basic network command and network configuration command

6.confiqure a network topology using packet tracer software

7.confiqure a network using link state vector routing protocol

3rd YEAR

VI SEMESTER

Cluster-2
PAPER- IX (B2)   CONSUMER ELECTRONICS

ELECTRONIC S		Year 2017- 18	B.Sc (MECs)	Credits - 3

TITLE: CONSUMER ELECTRONICS

Unit – I(12hrs)
1. MICROWAVE OVENS – Microwaves (Range used in Microwave ovens) – Microwave oven block diagram – LCD timer with alarm – Single-Chip Controllers – types of Microwave oven – Wiring and Safety instructions – care and Cleaning.

Unit – II(12hrs)
2. WASHING MACHINES – Electronic controller for washing machines – Washing machine hardware and software – Types of washing machines – Fuzzy logic washing machines Features of washing machines.

Unit – III(12hrs)
7. AIR CONDITIONERS AND REFRIGERATORS - Air Conditioning – Components of air conditioning systems – All water air conditioning systems – All air conditioning systems – Unitary and central air conditioning systems – Split air conditioners.

Unit – IV(12hrs)
   HOME/OFFICE DIGITAL DEVICES – Fascimile machine – Xerographic copier –   calculators – Structure of a calculator – Internal organization of a calculator – Servicing electronic calculators – Digital clocks – Block diagram of a digital clock.

Unit – V(12hrs)

DIGITAL ACCESS DEVICES – Digital computer – Internet access – online ticket reservation – functions and networks – barcode scanner and decoder – Electronic Fund Transfer – Automated Teller Machines(ATMs) – Set-Top boxes – Digital cable TV – Video on demand.

TEXTBOKS:
1. S.P. Bali, Consumer Electronics – Pearson Education , New Delhi,2005.
2. R.G. Gupta Audio and Video systems Tata McGraw Hill(2004)

ELECTRONICS LAB
CONSUMER ELECTRONICS LAB

(At least two Activities should be done)

1. Study of PA systems for various situations – Public gathering , closed theatre / Auditorium, Conference room, Prepare Bill of Material(Costing)

2. Installation of Audio/Video systems – site preparation , electrical requirements , cables and connectors

3. Market Survey of products (at least one from each module)

4. Identification of block and tracing the system. Assembly and Disassembly of system using Toolkit

5. Assembly and Disassembly of system and printer.

NOTE: one activity as directed in practical course is equivalent to 4 experiments.

ACHARYA NAGARJUNA UNIVERSITY

Sub: ELECTRONICS	Year:2017-18	Group: B.Sc	Credits 3

B.Sc ELECTRONICS SYLLABUS (2017-18)

3RD YEAR

VI SEMESTER
Cluster-2
PAPER- X (B3)   OPTICAL FIBER COMMUNICATION AND IT'S APPLICATION

TITLE: OPTICAL FIBER COMMUNICATION AND IT'SAPPLICATIONS

OBJECTIVES:
- To study about the concept of fiber optic communication.
- To study light source and detectors
- To study the different types of fiber measurements.
- To study the concept of link design
- Introduction to fiber optic communication Receiver
- To study about fiber optic measurement
- To study about Optic Fiber Sensors and applications.

UNIT I: (10Hrs)
Fiber optic communication:
The basic communications systems, Nature of light, Advantages of fiber, Applications of fiber optic communications, Light wave fundamentals- Electromagnetic waves, Dispersion, Pulse distortion and information rate, polarization, Resonant cavities, Reflection at a plane boundary, Critical – angle Reflections ; Optic fiber waveguides: - Step-index fiber, Graded-index fiber, Attenuation. (Elementary Treatment only) .

UNIT II: (10Hrs)
Light source and detectors:
Light emitting diodes Operating characteristics, Laser diodes, Laser diode operating characteristics, Distributed feedback laser diode, Optical amplifiers, Light detectors: Principles of photo detection, Photo multiplier, Semi conductor photo diode, PIN photo diode, Avalanche photo diode.

UNIT III: (15Hrs)
MODULATION :
Light Emitting Diode Modulation and circuits, Laser diode modulation and circuits, Analog Modulation Format, Digital modulations formats. **SYSTEM LINK DESIGN:** Analog system design, Digital system design, power budget analysis.

UNIT IV: (15Hrs)
Optical Fiber Communication Receiver:
Introduction : Signal Path through Optical Data link, Receiver configuration with noise, Receiver noises, Noise at the input to the Amplifier, Receiver Capacitance and Bandwidth , Block diagram of Optical Receiver, Automatic Gain Control (AGC) circuit **Fiber Optical Measurement:** Introduction: Attenuation Measurement, Optical Time Domain Reflecto-meter (OTDR), Time Domain Dispersion Measurement, Frequency Domain Dispersion Measurements, Numerical Aperture Measurement using Scanning photo detector, measurement of losses in Splice and Connectors.

UNIT V: (10Hrs)
Fiber Optical Sensors and Applications:
Fiber Optic Sensor: Generalised Optical Fiber sensors, Phase and Polarization Fiber sensor, Optical Fluid Level Detector, Optical Fiber Flow Sensors, Optical Displacement sensors, Long haul communications , Local Area Networks.

TEXT BOOKS:
1. Fiber Optic Communications by Joseph C.Palais (4th Edition, Pearson Education)
2. Opto-electronics and Fiber Optic communications by C.K.Sarkar and D.C.Samkar
3. Fiber Optic Communications by S.Sankar. (New age international)

REFERENCE BOOKS:
1. Fiber Optic communication by senior-PHI
2. Fiber Optic communications Technology – Djafar k.Mynbaev, Lowell L. Scheiner.
3. Otical fiber communication-Gerd Kaiser
4. Optical communication system-John Gowar.

OUTCOMES:
- This course provides the students with the basic understanding of the concepts and principles of optical fibre communications.
- Line transmission systems,- analog and digital transmission system standards.
- On completion of the course, the students will be able to apply the knowledge and principles leant to analyze, design, install and manage typical wired and wireless communication systems and networks

ELECTRONICS LAB-X

OPTICAL FIBER COMMUNICATION LAB

LAB LIST:

ABOUT FIBER OPTICS.

1: SETTING FIBER OPTIC ANALOG LINK

2: SETTING FIBER OPTIC DIGITAL LINK

3: STUDY OF LOSSES IN OPTICAL FIBER

4: BENDING LOSSES IN FIBER

5: STUDY OF NUMERICAL APERTURE OF OPTICAL FIBER

6: STUDY OF CHARACTERISTICS OF FIBER OPTIC LED.

7: STUDY OF TIME DIVISION MUTIPLEXING (DIGITAL)

Title: Optical fiber communication and it's applications

SECTION-A

Answer any FIVE of the following: 5x5=25M

1. Explain about Nature of light.
2. Write about semiconductor photo diode.
3. Discuss about power budget analysis.
4. Explain about signal path trough data link
5. Write short note on fiber flow sensor.

6. Define the following terms(i)polarization (ii)Resonant cavities.
7. Explain about PIN photodiode
8. Write about Optical amplifiers..

SECTION-B

Answer the following: 5x10=50M

1. a) Explain briefly about the advantages and applications of OFC.

(or)

b) Discuss about Reflection at a plane of boundary.

2. a)Define Laser principles and explain it's operating characteristics.

(or)

b) Define the following terms (i)APD (ii)PMT.

3. a) Define modulation and explain about Analog formats..

(or)

b) Discuss briefly about digital system design.

4. a) Draw the block diagram of optical receiver and explain in detail.

(or)

b) Explain numerical aperture measurement using scanning photo detector

5. a) Discuss briefly about fiber optic sensors.

(or)

b) Explain about Long haul communication.