BSc Electronics Syllabus CBCS ANU 2016-17.pdf

Electronics_IIsem_2016-17AB.pdf

B.Sc. Electronics III Semester syllabus.pdf

Electronics_IVsem_2015-16AB.pdf

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Electronics_VI Sem_2015-16AB_web.pdf

ADIKAVI NANNAYA UNIVERSITY

RAJAMAHENDRAVARAM

CBCS / Semester System

(W.e.f. 2016-17 Admitted Batch)

I Semester Syllabus

ELECTRONICS

BASIC CIRCUIT THEORY

UNIT- 1:   **(12hrs)**

SINUSOIDAL ALTERNATING WAVEFORMS:
Definition of current and voltage. The sine wave, general format of sine wave for voltage or current, phase relations, average value, effective (R.M.S) values. Differences between A.C and D.C.
Basic elements and phasors: V-I relations of R, L & C elements, frequency response of basic elements**. (problems)**

UNIT-II: **(12hrs)**
PASSIVE NETWORKS: (D.C)
Kirchhoff's current and Voltage Law's ,Resistor, Capacitor, and Inductor, series and parallel networks. Mesh Analysis, Nodal Analysis, star to delta and delta to star conversions.

UNIT-III: **(14hrs)**
NETWORKS THEOREMS: (D.C)
Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power, Milliman and Reciprocity theorems **(problems).**

UNIT-IV: **(12hrs)**
RC AND RL CIRCUITS:
Transient response of RC and RL circuits with dc input, Time constants, Frequency response of RC and RL circuits, their action as low pass, high pass and Band pass filters. Passive differentiating and integrating circuits. (problems)

UNIT-V: **(10hrs)**
SERIES AND PARALLEL RESONANCE CIRCUITS:
Series resonance and parallel resonance circuits, Q - Factor, Selectivity and band width, Comparison of series and parallel resonance.

TEXT BOOKS:
1. Introductory circuit Analysis (UBS Publications) ---- **Robert L. Boylestad.**
2. Electronic Devices and Circuit Theory --- **Robert L. Boylestad & Louis Nashelsky.**
3. Circuit Analysis by **P.Gnanasivam- Pearson Education**

REFERENCE BOOKS:

1. Engineering Circuit Analysis **By: Hayt & Kemmerly   - MG.**

2. Networks and Systems – **D.Roy Chowdary.**

3. Unified Electronics (Circuit Analysis and Electronic Devices) by **Agarwal-Arora**

4. Electric Circuit Analysis- **S.R. Paranjothi**- New Age International.

ELECTRONICS LAB-1

(CIRCUIT LAB)

Demonstration of C.R.O: Demonstration using CRO Kit - Block diagram concepts etc., in lab session (Using slides.)
(Assignments are to be given-Marks shall be allotted to this work as internal part.)
LAB LIST:

1. Measurements of D.C & A.C voltage, frequency using CRO

2. Verification of Kirchhoff's laws

3. Thevenin's Theorem-verification

4. Norton's Theorem-verification

5. Maximum Power Transfer Theorem-verification

6. RC circuit-Frequency response (low and High pass)

7. RL circuit-Frequency response (low and High pass)

8. LCR series resonance circuits-Frequency response-Determination of Q and Band Width.

9.LCR parallel resonance circuits-Frequency response-Determination of Q and Band width

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

ADIKAVI NANNAYA UNIVERSITY
CBCS/SEMESTER SYSTEM
II SEMESTER : B.Sc. Electronics
for 2016-17 admitted batch
w.e.f. 2015-16 (revised in April 2016)

Paper – II : Electronic Devices and Circuits

UNIT 1: (12Hrs)
PN JUNCTION DIODES:

P-N junction Diode, Depletion region, Barrier Potential, Working in Forward and Reverse bias condition – Junction capacitance ,Diode current equation– Effect of temperature on reverse saturation current – construction, working, V-I characteristics and simple applications of varactor diode, Zener diode and Tunnel diode.

UNIT –II:(12hrs)
BIPOLAR JUNCTION TRANSISTOR AND ITS BIASING: (D.C)

Introduction, Transistor Construction, Operation, and characteristics of CB, CE Configurations, Transistor as a switch
BJT Biasing: Fixed-Bias Circuit, Emitter-Stabilized Bias Circuit, Voltage-Divider Bias, Bias Stabilization.

UNIT-III:(16hrs)
FIELD EFFECT TRANSISTORS , UJT & SCR:

Introduction, Construction, Operation and Characteristics of FET/JFET, Drain and Transfer characteristics, Depletion-type, and Enhancement-Type MOSFETs.
UJT construction-working, V-I characteristics, UJT as a Relaxation oscillator.
Silicon Controlled Rectifier (SCR):
Structure and working of SCR. Two transistor representation, Characteristics of SCR. Application of SCR for power control.

UNIT IV: (08hrs)
PHOTO ELECTRIC DEVICES:

Light-Emitting Diodes (LEDs), IR Emitters, Photo diode, Photo transistors, Structure and operation of LDR.

UNIT-V:(12hrs)
POWER SUPPLIES:

Rectifiers::Half wave ,full wave and bridge rectifiers-Efficiency-ripple factor-Regulation, Types of filters-L-section&π-section filters.
Three terminal fixed voltage I.C.regulators(78XX and &79XX)-Principle and working of SMPS(switch mode power supplies)

TEXT BOOKS:

1. Electronic Devices and Circuit Theory --- **Robert L. Boylestad & Louis Nashelsky.**
2. Electronic Devices and Circuits I – **T.L.Floyd- PHI Fifth Edition**

REFERENCE BOOKS:

1. Integrated Electronics – **Millmam & Halkias.**
2. Electronic Devices & Circuits – **Bogart.**
3. Sedha R.S., A Text Book Of Applied Electronics, S.Chand & Company Ltd

ELECTRONICS LAB-2
(ELECTRONIC DEVICES AND CIRCUITS LAB)
LAB LIST:

1. V-I Characteristics of junction diode

2. V-I Characteristics of zener diode

3. Regulated power supply using zener diode

4. BJT input and output characteristics

5. FET input and output characteristics

6. UJT characteristics

7. LDR characteristics

8. IC regulated power supply(IC-7805)

9. V-I characteristics of SCR**.**

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

ADIKAVI NANNAYA UNIVERSITY

RAJAMAHENDRAVARAM

CBCS / Semester System

(W.e.f. 2015-16 Admitted Batch)

III Semester Syllabus

ELECTRONICS

DIGITAL ELECTRONICS

Unit – I   **(9hrs)**

NUMBER SYSTEM AND CODES: Decimal, Binary, Hexadecimal, Octal, BCD, Conversions, Complements (1's and 2's,), Addition, Subtraction, Gray, Excess-3   Code conversion from one to another.

Unit- II   **(12hrs)**

BOOLEAN ALGEBRA AND THEOREMS: Boolean Theorems, De-Morgan's laws. Digital logic gates, NAND & NOR as universal gates. Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh Map Method: 4 variables),don't care condition.

Unit-III   **(15hrs)**

COMBINATIONAL DIGITAL CIRCUITS:

Adders-Half & full adder, Subtractor-Half and full subtractors, Parallel binary adder.

Multiplexers (2:1,4:1)) and Demultiplexers (1:2,4:1), Encoder (8-line-to-3-line) and Decoder (3-line-to-8-line). IC-LOGIC FAMILIES**:** TTL logic (NAND gate), DTL logic, RTL Logic, CMOS Logic families (NOR gate).

UNIT-IV   **(14hrs)**

SEQUENTIAL DIGITAL CIRCUITS:
Flip Flops: S-R FF , J-K FF, T and D type FFs, Master-Slave FFs, Truth tables, Registers:-shift left register, shift right register, Counters - Asynchronous-Mod16,Mod-10, Down counter.

UNIT-V   **(10hrs)**
MEMORY DEVICES:
General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAROM, PLA(Programmable logic Array),PAL(Programmable Array Logic)

TEXT BOOKS:

1. M.Morris Mano, " Digital Design " 3rd Edition, PHI, New Delhi.
2. Ronald J. Tocci. "Digital Systems-Principles and Applications" 6/e. PHI. New Delhi. 1999.(UNITS I to IV)
3. G.K.Kharate-Digital electronics-oxford university press
4. S.Salivahana&S.Arivazhagan-Digital circuits and design
5. Fundamentals of Digital Circuits by Anand Kumar

Reference Books :
1. Herbert Taub and Donald Schilling. "Digital Integrated Electronics" . McGraw Hill. 1985.
2. S.K. Bose. "Digital Systems". 2/e. New Age International. 1992.
3. D.K. Anvekar and B.S. Sonade. "Electronic Data Converters : Fundamentals & Applications". TMH. 1994.

4. Malvino and Leach. " Digital Principles and Applications". TMG Hill Edition.

ELECTRONICS LAB-3

(DIGITAL ELECTRONICS LAB)
LAB LIST:

1. Verification of IC-logic gates

2. Realization of basic gates using discrete components (resistor, diodes & transistor)

3 .Realization of basic gates using Universal gates (NAND & NOR gates)

4. Verify Half adder and full adder using gates

5. Verify Half subtractor and full subtractor using gates.

6. Verify the truth table of RS , JK, T-F/F using NAND gates

7. 4-bit binary parallel adder and subtractor using IC 7483

8. BCD to Seven Segment Decoder using IC -7447/7448

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

PAPER – 4 Analog and Digital ic-pplictions

Unit – I (10hrs)
OPERATIONAL AMPLIFIERS: Definition, Basic op-amp Ideal op-amp, Block diagram of op-amp, inverting, noninverting, virtualground, Adders, subtractors, summing amplifier, voltage follower, op-amp parameters, voltage to current convertor ,integrator, differentiator, differential amplifier, Logarithmic amplifier.

Unit- II   (15 hrs)
OP-AMP CIRCUITS: voltage regulator, comparator ,zerocross detecting circuit, instrumentational amplifier, multivibrators-astable, monostable, Bi-stable, Schmitt trigger. sine wave generator, square wave generator, triangular wave generator, Active filters(Basics)-low pass, high pass, band pass filters

IC-555 –functional block diagram and mention it's applications

Unit-III (15hrs):

COMBINATIONAL & SEQUENTIAL LOGIC CIRCUITS (IC-Applications):

Design of Code convertor: BCD to Seven Segment ,BCD to Grey, Grey to Binary.

Design of Counters using State Machine: Mod N counter, Preset Table,Binary Up/Down

Counter. Design of Universal Shift Register

UNIT-IV (10hrs)

DATA CONVERTERS:

A/D converter:- Successive Approximation ADC,-Single slope and dual slope converter, Sigma-delta ADC, D/A converter: R-2R Ladder network, Binary Weighted .

UNIT-V (10hrs)
DIGITAL SYSTEM INTERFACING AND APPLICATIONS: interfacing of LED's
Applications of Counters: Digital Clock
Applications of Shift Registers: Parallel to Serial ,Serial to Parallel, UART

TEXT BOOKS:
1. G.K.Kharate-Digital electronics-oxford university press
2. M.Morris Mano, " Digital Design " 3rd Edition, PHI, New Delhi.
3. Op Amp and Linear Integrated Circuits By Ramakant Gaykwad
4. Linear Integrated Circuits By Roy Choudary

Reference Books :
1. Jacob Millan ,Micro Electronics,McGraw Hill.
2. Mithal G K, Electronic Devices and Circuits Thana Publishers.
3. Allan Motter shead ,Electronic Devices and Circuits – An Introduction- Prentice Hall

Electronics Lab - 4

(Analog and digital ic-pplictions)

LAB LIST:

1. Op-Amp as inverting and non-inverting

2. Op-Amp as integrator and differentiator

3. Op-Amp as adder & subtractor

4. Op-Amp as voltage to current converter

5. Op-Amp as sine wave generator (Wien bridge oscillator)

6. Op-Amp as sine wave generator

7. Astable multivibrator determination of frequency (using IC-555)

8. Schmitt trigger using IC-555 timer

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

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ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM

B.Sc- ELECTRONICS-SYLLABUS
SEMESTER: V
PAPER V - MICROPROCESSORS (INTEL 8085) (60 OURS)

Work load:60 hrs per semester   **4 hrs/week**

UNIT- I (12 hrs)

ARCHITECTURE OF 8085 MICROPROCESSOR

Functional block diagram of Intel 8085-Register structure- multiplexing & Demultiplexing of address / data bus - Control Signal Generation and status signals - 8085 pin-out diagram & functions - Interrupts - Priority Concept

INSTRUCTION SET OF 8085 -Instruction set classification - addressing modes

UNIT - II (12 hrs)

MEMORY-Instruction cycle - machine cycle - T-state -Timing diagrams for Opcode Fetch Cycle Memory Read, Memory Write, I/O Read, I/O Write, - Functional explanation for RAM, ROM, EPROM

UNIT- III (12 hrs)

PROGRAMMING 8085- addition & subtraction(16-bit), multiplication, division, largest, smallest(all 8-bit data), Binary to BCD, BCD to Binary(all 8-bit data) - Stack & Subroutines Concept - Debugging program.

UNIT- IV (12 hrs)

INTERFACING MEMORY - 2K X 8 ROM, RAM to 8085, Interfacing an I/O port in Memory Mapped I/O and I/O Mapped I/O - Difference between I/O mapped and Memory Mapped I/O.

UNIT - V (12 hrs)

MICROPROCESSOR APPLICATIONS - Programmable peripheral device (8255)-Pin functions, Different Modes & Block Diagram - Keyboard and Display Interface 8279 (Architecture) - Simple temperature controller- stepper motor control interface.

TEXTBOOKS

 1.Ramesh S. Gaonakar, Microprocessor Architecture, Programming and Application with the8085-PenramLnternational Publishing, Mumbai.
 2. Ram, Fundamentals of microprocessors and microcomputers - Dhanpat Rai Publications, New Delhi

3. Microprocessors & Microcontrollers by N .Senthilkumar, M. Saravanan& S. Jeevananthan, 1st edition, Oxford press(Helpful for interfacing applications)

4. Microprocessors & Microcontrollers by B.P.Singh, Galgotia publications Pvt.Ltd.

REFERENCE BOOKS

1. Mathur A.P., Introduction to Microprocessors. (3rd edn., Tata McGraw, New Delhi,
2. Leventhal L.A., Microprocessor Organisation and Architecture, Prentice Hall India.
3. Microprocessor lab premier by K.A.Krishnamurthy

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ELECTRONICS LAB -5
(MICROPROCESSORS LAB)

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Work load: 30 hrs per semester   **2 hrs/week**

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(Any six experiments should be done)

</div>

Programs using Intel 8085

1. Addition & Subtraction (8-bit)
2. Addition & Subtraction (16-bit)
3. Multiplication & Division (8 - bit)
4. Largest & Smallest number in the given array.
5. Ascending & Descending order.
6. Binary to BCD and BCD to binary
7. Waveform generation using DAC interface.
8. Stepper motor interface.

LAB MANUAL

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.
3. Vijayendran V., Fundamentals ofmicroprocessor-8085, S.Viswanathan publishers Chennai.

SEMESTER: V

PAPER VI - CONSUMER ELECTRONICS (60 HOURS)

(w. e .f. 2015-16 ab)

Work load: 60 hrs per semester   **4 hrs/week**

UNIT-I (12 hrs)

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 (12 hrs)

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 (12 hrs)

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 (12 hrs)

HOME/OFFICE DIGITAL DEVICES - Facsimile machine - Xerographic copier - Calculators - Structure of a calculator - Internal Organization of a calculator - Digital clocks - Block diagram of a digital clock.

UNIT-V (12 hrs)

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.

TEXT BOOKS

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 -6(B)

CONSUMER ELECTRONICS LAB

Work load: 30 hrs per semester   **2 hrs/week**

(At least two Activities should be done)

I. 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& printer

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

Model paper

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
CBCS/Semester System (w.e.f. 2015-16 Admitted Batch)
B.Sc., (THREE YEAR EXAMINATIONS)
SEMESTER-V – **ELECTRONICS**
Paper-V: MICROPROCESSORS (INTEL 8085)

Time: 3 Hrs   Max. Marks: 75

PART – A

Answer any **FIVE** questions.   5 X 5 = 25 Marks

1. Explain about flags of 8085.
2. Write data transfer group instructions.
3. Explain instruction cycle of 8085.
4. Explain about debugging a program.
5. Write an assembly language program to add two 16-bit numbers.
6. What are the differences between I/O mapped and memory mapped I/O?
7. How 8085 controls temperature?
8. Briefly explain EPROM.

PART – B

Answer **ALL** questions.   5 X 10 = 50 Marks

9. Draw and explain the pin diagram of 8085.

                                        or

   Explain various addressing modes of 8085.
10. Explain the timing diagram for op-code fetch cycle of memory read and memory write.

                                        or

    Give the functional explanation of RAM and ROM.
11. Write a program to find the largest number among given numbers using 8085.

                                        or

    Write a program to convert binary numbers to BCD numbers using 8085.
12. Explain the interfacing of 2K X 8 ROM with 8085.

                                        or

    How an I/O port is interfaced in memory mapped I/O ?
13. Explain the block diagram and modes of PPI 8255?

                                        or

    How a stepper motor is interfaced with 8085 microprocessor?

Model paper
ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
CBCS/Semester System (w.e.f. 2015-16 Admitted Batch)
B.Sc., (THREE YEAR EXAMINATIONS)
SEMESTER-V – **ELECTRONICS**
Paper-VI – CONSUMER ELECTRONICS

Time: 3 Hrs   Max. Marks: 75

PART – A

Answer any **FIVE** questions.   5 X 5 = 25 Marks

1. Explain the properties and applications of micro waves.
2.   What are the wiring and safety instructions taken in microwave oven ?
3. What are the features of washing machines?
4. What are the components of air conditioning systems?
5. Explain the structure of a calculator.
6. Briefly explain facsimile machine.
7. Explain about set-top boxes.
8. Write about video on demand.

PART – B

Answer **ALL** questions.   5 X 10 = 50 Marks

9. Draw the block diagram of microwave oven and explain its working.

                                        or

    Explain the function of LCD timer with alarm in microwave oven.
10. Explain the block diagram of washing machine.

                                        or

    Explain Fuzzy logic washing machines.
11. Explain central air conditioning systems.

                                        or

    Explain the working of split air conditioner.
12. Explain the working of xerographic copier.

                                        or

    Draw the block diagram of a digital clock and explain its working.
13 Explain the working of a digital computer.

                                        Or

    Explain the working of automated teller machine (ATM) ?

Adikavi Nannaya University

B.Sc. Electronics CBCS SYLLABUS
w.e.from 2015-16 admitted batch

3rd YEAR

VI SEMESTER
PAPER-VII   **ELECTIVE (Choose A or B)**
                          A: MICRO CONTROLLER AND INTERFACING
                             Practical

                          B: PC MAINTAINANCE AND TROUBLE SHOOTING
                             Practical

Paper VIII   Cluster Elective A

        A1:   EMBEDDED SYSTEMS DESIGN
                  Practical/Project Work
        A2:   ANALOG AND DIGITAL COMMUNICATIONS
                  Practical
        A3:   POWER ELECTRONICS
                  Practical

        Cluster Elective (**B**)

        B1   COMPUTER NETWORKS
                  Practical
        B2   ELECTRONIC INSTRUMENTATION
                   Practical
        B3   OPTICAL FIBER COMMUNICATION AND IT'S
                  APPLICATION
                   Practical

ELECTIVE PAPER
VII (A): MICRO CONTROLLER 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:
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.

UNIT-III:(10Hrs)
Addressing modes, instruction set of 8051: Addressing modes and accessing memory using various addressing modes, instruction set: Arithmetic, Logical, Simple bit, jump, loop and call instructions and their usage. Timer/Counter Programming,

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 a 4*4 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 Gillispie 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

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

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 division of two 8-bit numbers.
5. How the information is displayed on LCD?

6. Write short note on microcontroller testing tools.
7. Explain about stack pointer.
8. Draw the pin diagram for DAC.

SECTION-B

Answer the following: 5x10=50M

9.a) Explain the difference between   microprocessor and microcontroller.

(or)

b) Draw the pin diagram of 8051 and explain each pin in detail.

10. a)Explain the architecture of 8051 and explain each pin in detail.

(or)

b) Explain about memory organization of 8051.

11. 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.

12. 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.

13. a)Briefly explain the architecture of 8255(PPI).

(or)

b)Explain about interfacing of stepper motor to 8051 microcontroller.

PAPER- VIII (A1)   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, Design Challenge, 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: Host and Target Machines, Linker / Locators for Embedded Software, Getting Embedded Software into the target system. Debugging Techniques: Testing on your Host Machine, and Instruction Set Simulators.

UNIT 4: (10Hrs)

RTWA for Embedded Systems:
Introduction, Pulse Width Modulators, LCD Controllers, Keypad Controllers, Stepper Motor Controllers, Analog – to – Digital Converters, and Real Time Clocks.

UNIT 5: (10Hrs)
Advanced Communication Principles:

Parallel Communication, Serial Communication, Wireless Communication, **Serial Protocols:** I^{2}C, CAN and USB. **Parallel Protocols:** PCI BUS and ARM BUS. **Wireless Protocols:** Bluetooth, and IEEE 802.11.

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 instruction set simulator.
4. Write about LCD controllers.
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 different debugging techniques

(or)

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

4. a) Explain about Real time clocks.

(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.

Cluster Elective- A

A2:   ANALOG AND DIGITAL COMMUNICATIONS

OBJECTIVES:

- This course provides a thorough introduction to the basic principles and techniques used in analog and digital communications.

- The course will introduce analog and digital modulation techniques.

- Communication receiver and transmitter design, baseband and band pass communication techniques, line coding techniques, noise analysis, and multiplexing techniques.

- The course also introduces analytical techniques to evaluate the performance of communication systems.

UNIT –I   (10Hrs)
 AMPLITUDE MODULATION:
   Need for modulation, amplitude modulation-frequency spectrum of AM wave, representation of AM, power relations in the AM wave. Generation of AM- Transistor modulators. Suppression of carrier, balanced modulator, suppression of one side band- phase shift method.

UNIT –II (10Hrs)
 FREQUENCY MODULATION:
   Theory of FM, frequency spectrum of FM wave, narrow band FM, wide band FM, power contents of the carrier and sidebands, Generation of FM signals – Reactance modulator.

UNIT –III   (10Hrs)
BASIC RECEIVER CIRCUITS:
   Noise – Thermal, Shot, Super heterodyne Receiver block diagram, FM receiver, discriminators- slope, balanced slope & Ratio detector

UNIT –IV (12Hrs)
 RADIO WAVE PROPAGATION:
   Communication bands, Electromagnetic waves-properties and applications. *PULSE MODULATION:* Introduction, Sampling theorem, PAM- Generation & Detection PWM- Generation & Detection, PPM- Generation & Detection

UNIT –V (18Hrs)
 DIGITAL COMMUNICATIONS:
   PCM – Quantization noise, S/N ratio of PCM system, relation between S/N ratio & BW, Companding.
   Advantages of digital over analog communications. Advantages of shift keying over digital communication, Types of shift keying, ASK – Generation & Detection, FSK – Generation & Detection.

TEXT BOOKS:
   1. Electronic Communications - George Kennedy
   2. Antennas and Wave Propagation – G.S.N.Raju – PHI
   3. Principles of communication system –Herbert Taub & D.L.Schilling
REFERENCES:
   1. Electronic Communications – Roody & Colen
   2. Communication Systems – Hayken   --- 4th Edition
   3. Advance Electronic communication system ---Tomasi wayne
   4. Modern digital and analog communication system –B.P.lathi

OUTCOMES:
 On successful completion of the course students will be able to:
   - The student can gain good knowledge on analog and digital communication
   - Understand basic elements of a communication system

- Conduct analysis of baseband signals in time domain and in frequency domain
- Demonstrate understanding of various analog and digital modulation and demodulation techniques techniques.
- Analyse the performance of modulation and demodulation techniques in various transmission environments

ELECTRONICS LAB-V

COMMUNICATION   LAB

LAB LIST:
(Any six experiments should be done)

1. AMPLITUDE MODULATION
2. AMPLITUDE DE-MODULATION
3. FREQUENCY MODULATION
4. FREQUENCY DE-MODULATION
5. PRE-EMPHASIS CIRCUIT
6. DE-EMPHASIS CIRCUIT
7. PULSE AMPLITUDE MODULATION
8. PULSE WIDTH MODULATION.

MODEL PAPER

SECTION-A

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

1. Explain about need for modulation.
2. Write short note on wide band FM.
3. Define the following terms.
    (i)Thermal (ii) shot noise
4.   What are the advantages of digital communication over analog communication?
5. Write a short note on amplitude shift keying .
6. State and prove Sampling theorem.
7. Explain the generation of FSK.
8. Explain the power relations in AM.

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

1. a) Define amplitude modulation and explain about frequency spectrum of AM wave.

                              (or)

   b) Explain about Suppression of one side band using phase shift method.

2. a)Explain about demodulation of FM

                           (or)

  b) Explain how FM signals are generated using reactance modulator.

3. a) Explain about the principle and working of super hetro dyne receiver-AM

(or)

b)Discuss about the construction and working of Ratio detector.

4. a)Explain the block diagram of PAM and briefly explain each block.

(or)

b)Describe the generation and detection of PWM .

5. a)Explain the block diagram of PCM in detail.

(or)

b)Discuss briefly about ASK Phase shift keying .

Cluster Elective : A

A3: 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, Introduction to family of thyristors.
Silicon Controlled Rectifier (SCR): structure, I-V characteristics, Turn-On and Turn-Off characteristics, Factors affecting the characteristics of SCR, Control circuits design and Protection circuits.

Unit- 2   **(14 Lectures)**
Diac and Triac: Basic structure, working and V-I characteristics of diac and triac.
Insulated Gate Bipolar Transistors (IGBT): Basic structure, I-V Characteristics, switching characteristics.
Power MOS FETs: operation modes, switching characteristics, power BJT, second break down, saturation and quasi-saturation state.

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), Morgan's chopper

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, Series Inverter, bridge invertors.

Unit- 5   **(14Lectures)**
Electromechanical Machines: DC Motors, Principle of operation, EMF equation, Back EMF, Factors controlling motor speed, Thyristor based speed control of DC motors, AC motor (Induction Motor only), Rotor and stator, torque & speed of induction motor.

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:

(Any six experiments should be done)

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 fullwave 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

Model paper
ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY
CBCS/Semester System (w.e.f. 2015-16 Admitted Batch)

SEMESTER-VI – **ELECTRONICS**

Paper-X (A3): POWER ELECTRONICS

Time: 3 Hrs   Max. Marks: 75
PART – A
Answer any **FIVE** questions.   5 X 5 = 25 Marks

1. Explain the turn-on and turn-off times of SCR.
2. Explain the working of DIAC.
3. What is meant by chopper? State its applications.
4. Explain about bridge inverter.
5. State and explain the factors affecting the speed control of AC motors.
6. Explain the switching characteristics of IGBT.
7. Explain the operating modes of power MOSFETs.
8. Briefly explain Morgan's chopper.

PART – B

Answer **ALL** questions.   5 X 10 = 50 Marks

9. Explain the working and characteristics of SCR.

or

Explain the mechanism of protecting power devices.
10. Explain the constructional details of TRIAC with a diagram and its characteristics.

or

Explain the working and characteristics of IGBT.
11. Explain the working principle of chopper with circuit diagram and waveforms.

or

Explain the operation of a dc chopper circuit with A-type commutating circuit.
12. Analyse parallel capacitor commutated inverter with reactive feedback.

or

Explain the working of a simple series inverter with circuit diagram.
13. Explain the principle and theory of operation of DC motors.

or

How the speed of a DC motor is controlled by thyristor? Explain.

14

VI SEMESTER

Cluster Elective B
B1: PC MAINTAINANCE 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, Characteristics of Pentium MMX, Comparison of Pentium-2 with all other processors. Dual core, core 2 duo, quad, P4, P4HT, I3, I5, I7 processors.

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.
Add on cards: MDA, CGA, VGA, Sound card, NIC card, SCSI Controller and FDC and HDC.

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.
DVD:- Different types, working and components of DVD.
Reasons for failure of disk 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

MONITOR: Introduction about display units, Different display technologies, block diagram, Reasons for display failure.

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, Effect of magnetic fields on system performance, EMI effect, Virus protection, Tools and techniques of S/W trouble shooting.

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

<u>PC MAINTENANCE AND TROUBLE SHOOTING LAB</u>

<u>LAB LIST:</u>

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.

B2: COMPUTER NETWORKS

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

<u>Cluster Elective B</u>

B3: 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, standards &calibrations of an instrument.
Applications of instrument
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 principle of measurement of I, V, C. Accuracy and resolution of measurement. **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. Basic idea of PLL IC (565 or 4046). Lock-in-amplifier , Idea of techniques for sum and averaging of signals.
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
Standards and calibration, Fluid expansion and metal expansion type transducers, like bimetallic strip, Thermometer, RTD, Thermo couple and their characteristics.

UNIT-V : (10hrs)
Direct digital control (DDC), Distributed control system (DCS),
PLC'S: Block diagram, hardware, PLC operation, basic logic program (ladder logic),
      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

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.

B.Sc. Electronics CBCS SYLLABUS

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**

2. 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.

B. Sc ELECTRONICS SYLLABUS (2017-18)

3RD YEAR

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

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

MODEL PAPER

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.