



Dr. B. R. AMBEDKAR UNIVERSITY-SRIKAKULAM
B.Sc. (ELECTRONICS) SYLLABUS
STRUCTURE UNDER CHOICE BASED CREDITS SYSTEM
REVIEWED SYLLABUS w.e.f. 2016-17

Sixth Semester

Paper VII: Elective (One)

Paper VIII: Cluster Electives (Three)

Practical 7 (Lab 7)

Practical 8.1 (Lab 8.1)

Practical 8.2 (Lab 8.2)

Practical 8.3 (project)

Proposed Electives in Semester - VI

Paper – VII (one elective is to be chosen from the following)

Paper VII-(A): ELECTRONIC INSTRUMENTATION

Paper VII-(B): MICROCONTROLLER AND INTERFACE

Paper VII-(C): MODERN COMMUNICATION SYSTEM

Paper – VIII (one cluster of electives (A-1,2,3 or B-1,2,3 or C-1,2,3) to be chosen *preferably* relating to the elective chosen under paper – VII (A or B or C))

Cluster 1.

PAPER VIII-A-1. BASIC VLSI DESIGN

PAPER VIII-A-2. BIO MEDICAL INSTRUMENTATION

PAPER VIII-A-3. POWER ELECTRONICS

Cluster 2

PAPER VIII-B-1. EMBEDDED SYSTEMS & C LANGUAGE

PAPER VIII-B-2. ELECTRONICS CIRCUITS AND PCB DESIGN

PAPER VIII-B-3. COMPUTER NETWORKS

Cluster 3

Paper VIII-C-1. DIGITAL SIGNAL PROCESSING

Paper VIII-C-2. TRANSMISSION LINES, ANTENNA AND WAVE PROPAGATION

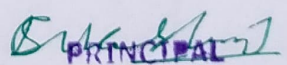
Paper VIII-C-3. MOBILE APPLICATION PROGRAMMING

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Or Cluster 2 (For Elective VII B)						
Paper VIII B 1	EMBEDDED SYSTEMS & C LANGUAGE	4	4	25	75	100
Practical VIII B 1	EMBEDDED SYSTEMS & C LANGUAGE LABORATORY	2	2	0	50	50
Paper VIII B 2	ELECTRONIC CIRCUITS AND PCB DESIGNING	4	4	25	75	100
Practical VIII B 2	ELECTRONIC CIRCUITS AND PCB DESIGNING LABORATORY	2	2	0	50	50
Paper VIII B 3	COMPUTER NETWORKS	4	4	25	75	100
Practical VIII B 3	PROJECT	2	2	0	50	50

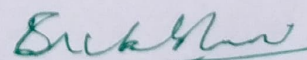
Or Cluster 3 (For Elective VII C)						
Paper VIII C 1	DIGITAL SIGNAL PROCESSING	4	4	25	75	100
Practical VIII C 1	DIGITAL SIGNAL PROCESSING LABORATORY	2	2	0	50	50
Paper VIII C 2	TRANSMISSION LINES, ANTENNA AND WAVE PROPAGATION	4	4	25	75	100
Practical VIII C 2	TRANSMISSION LINES, ANTENNA AND WAVE PROPAGATION LABORATORY	2	2	0	50	50
Paper VIII C 3	MOBILE APPLICATION PROGRAMMING	4	4	25	75	100
Practical VIII C 3	PROJECT	2	2	0	50	50


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ELECTRONICS SYLLBUS (CBCS) SEMESTER WISE
B.Sc ELECTRONICS COURSE STRUCTURE

SEMESTER VI	ELECTRONIC INSTRUMENTATION – 7A (ELECTIVE) – 1	4	4	25	75	100
	ELECTRONICS LAB – 7A	2	2	0	50	50
	MICROCONTROLLER AND INTERFACE – 7B (ELECTIVE) – 2	4	4	25	75	100
	ELECTRONICS LAB – 7B	2	2	0	50	50
	MODERN COMMUNICATION SYSTEMS – 7C (ELECTIVE) – 3	4	4	25	75	100
	ELECTRONICS LAB – 7C	2	2	0	50	50

Cluster 1 (For Elective VII A)						
Paper VIII A 1	BASIC VLSI DESIGN	4	4	25	75	100
Practical VIII A 1	BASIC VLSI DESIGN LABORATORY	2	2	0	50	50
Paper VIII A 2	BIO MEDICAL INSTRUMENTATION	4	4	25	75	100
Practical VIII A 2	BIO MEDICAL INSTRUMENTATION LABORATORY	2	2	0	50	50
Paper VIII A 3	POWER ELECTRONICS	4	4	25	75	100
Practical VIII A 3	PROJECT	2	2	0	50	50



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III B.Sc. SEMESTER-VI

Elective Paper VII (B)— MICROCONTROLLER AND INTERFACING (Elective)

Work load: 60 hrs per semester

4 hrs/week

Unit-1 (12 hours)

Microcontroller Architecture:

Introduction, comparison of Microprocessor and micro controller, Overview and block diagram of 8051, Architecture of 8051(program counter and memory organization, PSW register, Register banks and stack etc), pin diagram of 8051, Port organization, Interrupts, and timers.

Unit-2 (12 hours)

Addressing modes, instruction set

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.

Unit -3 (12 hours)

Assembly language programming of 8051

Data types and directives, Assemble language programming Examples: Addition, Multiplication, Subtraction, division, find the largest/smallest number in a given array of numbers. Time delay generation and calculation, Timer/Counter Programming.

Unit-4 (12 hours)

Interfacing of peripherals to Microcontroller

Interfacing of - PPI 8255, DAC 0808 , ADC 0804. Serial communication- modes and protocols

Unit-5 (12 hours)

Applications

Temperature measurement, displaying information on a LCD, Control of a Stepper Motor, Interfacing a keyboard and generation different types of waveforms.

Text Books:

1. The 8051 Microcontrollers and Embedded Systems – By Muhammad Ali Mazidi and Janice Gillispie Mazidi- Pearson Education Asia, 4th Reprint, 2002
2. Microcontrollers – Theory and applications by Ajay V. Deshmukh-Tata McGraw-Hill
3. The 8051 Microcontroller - architecture, programming & applications By Kenneth J. Ayala- Penram International Publishing, 1995.



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III B.Sc. SEMESTER-VI
Paper VIII B 1 – EMBEDDED SYSTEMS & C LANGUAGE (Cluster 2)

Work load:60 hrs per semester

4 hrs/week

Unit-1 (10 hours)

Introduction to Embedded Systems: Overview of Embedded Systems, Features, Requirements and Applications, Recent Trends in the Embedded System Design, Common architectures for the Embedded System Design, Simple embedded model.

Unit-2 (10 hours)

Introduction to microcontrollers

Introduction to microcontrollers, Overview of Harvard architecture and Von Neumann architecture, RISC and CISC microcontrollers

Unit-3 (12 hours)


AVR RISC Microcontrollers: Introduction to AVR RISC Microcontrollers, Architecture overview, status register, general purpose register file, memories, Instruction set, Data Transfer Instructions, Arithmetic and Logic Instructions, Branch Instructions, Bit and Bit-test Instructions, MCU Control Instructions.

Unit-4 (14 hours)

1. **Fundamentals of C language:** C character set-Identifiers and Keywords-Constants -Variables-Data types-Declarations of variables-Declaration of storage class-Defining symbolic constants- Assignment statement.
2. **Operators:** Arithmetic operators-Relational operators-Logic operators-Assignment operators-Increment and decrement operators-Conditional operators.
3. **Expressions and I/O Statements:** Arithmetic expressions-Precedence of arithmetic operators-Type converters in expressions-Mathematical (Library) functions - Data input and output-The getchar and putchar functions-Scanf-Printf simple programs.

Unit-5 (14 hours)

4. **Control statements:**If -Else statements -Switch statements - The operators - GO TO - While, Do - While, FOR statements - BREAK and CONTINUE statements.
5. **Arrays:** One dimensional and two dimensional arrays - Initialization - Type declaration - Inputting and outputting of data for arrays - Programs of matrices addition, subtraction and multiplication
6. **User defined functions:** The form of C functions - Return values and their types - Calling a function - Category of functions. Nesting of functions.Recursion.ANSI C functions- Function declaration, Scope and life time of variables in functions.


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Suggested Books:

1. AVR Microcontroller and Embedded Systems: Using Assembly and C by Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi, PHI
2. Embedded system Design - Frank Vahid and Tony Givargis, John Wiley, 2002
3. Programming and Customizing the AVR Microcontroller by D V Gadre, McGraw-Hill
4. Atmel AVR Microcontroller Primer: Programming and Interfacing by Steven F. Barrett, Daniel J. Pack, Morgan & Claypool Publishers
5. An Embedded Software Primer by David E Simon, Addison Wesley
6. AVR Microcontroller Datasheet, Atmel Corporation, www.atmel.com
7. Programming in ANSI C (TMH) : Balaguruswamy.
8. Programming with 'C' – Byron Gottfried, Tata Mc Graw Hill.

Embedded Systems Laboratory (Experiments to be performed on AVR trainer kit (Any Six):

1. Flash LED at an observable rate.
2. Hello LED - Flash LED at a rate such that the LED appears always on. Estimate the onset of the rate when the LED appears to stay on
3. Controlling ON/OFF of an LED using switch.
4. Use LFSR based random number generator to generate a random number and display it.
5. Toggle the LED every second using Timer interrupt.
6. Use the potentiometer to change the red LED intensity from 0 to maximum in 256 steps.
7. Use the switch to select the LED (from RGB led) and then the potentiometer to set the intensity of that LED and thus create your own color from amongst 16million colors.
8. Read the ADC value of the voltage divider involving the LDR. Print the value on the serial monitor.
9. Use the LDR and estimate a threshold for the LDR value and use that to turn the RGB LED on, to simulate an 'automatic porch light'.
10. Use the thermistor to estimate the temperature and print the raw value on the serial monitor.
11. Connect the LCD I/O Board and print 'Hello World' on the LCD. Scroll display from left to right.
12. Use the on-board EEPROM to store the temperature min and max values together with a time stamp.
13. Speed control of d.c. motor.
14. Speed control of stepper motor.



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III B.Sc. SEMESTER-VI

Paper VIII B 2 -- Electronic Circuits and PCB Designing (Cluster 2)

Work load:60 hrs per semester

4 hrs/week

Unit-1 (12 hours)

Network

theorems (DC analysis only): Review of Ohms law, Kirchhoff's laws, voltage divider and current divider theorems, open and short circuits. Thevenin's theorem, Norton's theorem and interconversion, superposition theorem, maximum power transfer theorem.

Unit-2 (12 hours)

Semiconductor

Diode and its applications: PN junction diode and characteristics, ideal diode and diode approximations. Block diagram of a Regulated Power Supply, Rectifiers: HWR, FWR- center tapped and bridge FWRs. Circuit diagrams, working and waveforms, ripple factor & efficiency (no derivations). Filters: circuit diagram and explanation of shunt capacitor filter with waveforms. Zener diode regulator: circuit diagram and explanation for load and line regulation, disadvantages of Zener diode regulator.

Unit-3 (12 hours)

BJT and

Small Signal amplifier: Bipolar Junction Transistor: Construction, principle & working of NPN transistor, terminology. Configuration: CE, CB, CC. Definition of α , β and γ and their interrelations, leakage currents. Study of CE Characteristics, Hybrid parameters. Transistor biasing: need for biasing, DC load line, operating point, thermal runaway, stability and stability factor. Voltage divider bias: circuit diagrams and their working, Q point expressions for voltage divider biasing. Small signal CE amplifier: circuit, working, frequency response, re model for CE configuration, derivation for A_v , Z_{in} and Z_{out} .

Unit-4 (12 hours)

Types of PCB:

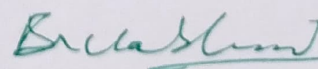
Single sided board, double sided, Multilayer boards, Plated through holes technology, Benefits of Surface Mount Technology (SMT), Limitation of SMT, Surface mount components: Resistors, Capacitor, Inductor, Diode and IC's.

Layout and Artwork: Layout Planning: General rules of Layout, Resistance, Capacitance and Inductance, Conductor Spacing, Supply and Ground Conductors, Component Placing and mounting, Cooling requirement and package density, Layout check. Basic artwork approaches, Artwork taping guidelines, General artwork rules: Artwork check and Inspection.

Unit-5 (12hours)

Laminates and

Photo printing: Properties of laminates, Types of Laminates, Manual cleaning process, Basic printing process for double sided PCB's, Photo resists, wet film resists, Coating process for wet film resists, Exposure and further process for wet film resists, Dry film resists Etching and Soldering: Introduction, Etching machine, Etchant system. Principles of Solder connection, Solder joints, Solder alloys, Soldering fluxes. Soldering, Desoldering tools and Techniques.



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Suggested Books:

1. Electronic Devices and circuit theory, Robert Boylestad and Louis Nashelsky, 9th Edition, 2013, PHI
2. Electronics text lab manual, Paul B. Zbar.
3. Electric circuits, Joseph Edminister, Schaum series.
4. Basic Electronics and Linear circuits, N.N. Bhargava, D.C. Kulshrestha and D.C Gupta -TMH.
5. Electronic devices, David A Bell, Reston Publishing Company/DB Tarapurwala Publ.
6. Walter C.Bosshart "PCB DESIGN AND TECHNOLOGY" Tata McGraw Hill Publications, Delhi. 1983
7. Clyde F.Coombs "Printed circuits Handbook" III Edition, McGraw Hill.

Electronic Circuits and PCB Designing Laboratory (Any Six):

(Hardware and Circuit Simulation Software)

1. Verification of Thevenin's theorem.
2. Verification of Super position theorem.
3. Verification of Maximum power transfer theorem.
4. Half wave Rectifier - without and with shunt capacitance filter.
5. Centre tapped full wave rectifier - without and with shunt capacitance filter.
6. Zener diode as voltage regulator - load regulation.
7. Transistor characteristics in CE mode - determination of r_i , r_o and β .
8. Design and study of voltage divider biasing.
9. Designing of an CE based amplifier of given gain
10. Designing of PCB using artwork, its fabrication and testing.
11. Design, fabrication and testing of a 9 V power supply with zener regulator.

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Paper VIII B 3 – COMPUTER NETWORKS (Cluster 2)

Work load:60 hrs per semester

4 hrs/week

Unit-1 (12 hours)

Introduction to OSI,TCP/IP and other Network models, Examples of Networks, Novel Networks, Arpanet, Internet, Network topologies, WAN, LAN, MAN.

Physical Layer: Transmitted media copper, twisted pair, wireless, switching and Encoding asynchronous communications, Narrowband, Broadband, ISDN& ATM.

Unit-2 (12 hours)

Data Link Layer: Design issues, framing, error detection & correction, CRC, elementary protocol-Stop and wait, Sliding window, slip, data link layer in HDLC, Internet, ATM

Unit-3 (12 hours)

Medium Access Sub Layer: ALOHA, MAC, Address, Carrier sense multiple access, IEEE 802.X standard Ethernet, Wireless LAN, Bridges.

Unit-4 (12 hours)

Network Layer: Virtual circuits and data gram sub nets-routing algorithm, shortest path routing, flooding, Hierarchical routing, broadcast, multicast, distance vector routing

Unit-5 (12 hours)

Transport Layer: Transport services, Connection management, TCP & UDP protocols, ATM AAL layers protocol

Application Layer - Network security, domain name system, SNMP, Electronic mail, The world web, multimedia.

Text Books:

Computer Networks

Data communications & Networking

- Andrew S. Tanenbaum, 4th Edition, Pearson education

-Behrouz A.Forouzan.3rdEditionTMH

References:

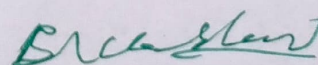
An engineering approach to Computer Networks - S. Kesav 2ndEdition, Pearson education

PROJECT WORK:-

Project work as directed in practical course is equal to 8 experiments

NOTE:-

STUDENTS MUST DO MINI PROJECT WORK DURING SIX SEMESTER



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