

SRI KRISHNADEVARAYA UNIVERSITY
DEPARTMENT OF ELECTRONICS
M.Phil/Ph.D Written Examination Syllabus

Paper - I : RESEARCH METHODOLOGY (GENERAL)

UNIT I: RESEARCH METHODOLOGY ON SCIENTIFIC STUDIES

Importance of R & D activity in science and technology, A bird's view of research and development activity in the field of electronics

Methodology involved in selecting the research topic. Collection of literature from primary, secondary and tertiary sources. Important research journals in the area of electronics and their emphasis. Preparation of the review of the earlier literature on research topic selected and planning of the research work.

UNIT II: ANALOG DEVICES AND DIGITAL DESIGN

Operational Amplifiers – Operational amplifier. DC and AC characteristics. inverting and non-inverting amplifiers, Instrumentation Amplifier. First Order Filters, Second Order Filters, Higher Order Filters, Switched Capacitor Filters

Digital Design and Applications I : Combinational circuits, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers. Sequential circuits, latches, flip-flops. Random Access Memory (RAM), Read Only Memory (ROM),

UNIT III: PROGRAMMING IN 'C' AND DATA STRUCTURES

Data types. input and output statements, Declaration of variables, Arithmetic, Relational and logical operators. Increment and decrement operators. Control operator. Bit-wise operator. Expressions. IF and SWITCH statements. WHILE. DO-WHILE and FOR statements. arrays, One-dimensional & two-dimensional arrays, pointers, strings and structures

UNIT IV: Microprocessors- Architecture. Programming and interfacing

Architecture of 8086/8088 microprocessor: Architecture of intel 8086/8088- Block diagram. Functional units and description. Instruction set of 8086/8088 Microprocessor:. Address modes. assembly language programming. **Interfacing:** Memory and I/O with Microprocessor Interfacing 8 bit D/A converter. Interfacing 8 bit A/D converters. Interfacing buffers latches.

BOOKS FOR STUDY :

1. JONATHAN, ANDERSON, ROBERT.A.day
2. Linear IC applications- S.V.Subrahmanyam , Hi-Tech Publishers, Hyderabad
3. M. Morris Mano."Digital Design", 3rd Edition, Pearson Education.
4. Programming in ANSI C" by E. Balaguruswamy
5. Microprocessor and interfacing programming and hardware-Douglas V Hall



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Paper –II (Optional A) : Embedded Systems and Applications

UNIT – I

Introduction to Embedded systems: Introduction, Application Areas, Categories of embedded systems, Overview of embedded systems architecture, Specialties of embedded systems, Recent Trends, hardware architecture, Software architecture, Application software, Communication Software, core platform development, boot sequence, development/testing tools.

UNIT – II

Introduction to Microcontrollers – Microprocessors and Microcontrollers - Introduction to Intel 8051/8751/8031 Microcontrollers – Architecture, Internal diagram, Data memory, Interrupt Structure, I/O ports, Timer / counters, Serial ports and Registers, Addressing modes.

Interfacing of Peripherals with 8051 Microcontroller - Interfacing of EPROM's, RAM's, PPI 8255, Programmable Interval Timer -8253/54, Display/Key Board Controller - 8279, Interfacing of 8 bit A/D and D/A converters.

UNIT – III

PIC Micro controllers – Introduction to PIC 16C6x/7x family microcontrollers, Architecture, Registers, Register File Structure, Addressing Modes, Instruction set. Interrupt Structure, Timers, Counters, I/O Port Concepts, Peripheral Interfacing and Applications.

UNIT – IV

Applications of 8051 Microcontroller - Interfacing of serial memories using I²C and SPI protocol, Interfacing of LCD Modules, Matrix type keypads, Stepper Motors. Multiple Interrupt Invoking, Measurement of Frequency, Pulse Width and Temperature.

BOOKS FOR STUDY:

1. Embedded/Real Time Systems – Dr.K.V.K.K.Prasad, dreamtech Press.
2. The 8051 Microcontroller Architecture. Programming & Applications, Kenneth J. Ayala, Penram International.
3. Microcontroller and embedded Systems – Muhammad Ali Mazidi, Pearson Education, LPE.
4. Design with PIC Microcontrollers – John B.Peatman, Pearson Education Asia

BOOKS FOR REFERENCE:

Intel Embedded Microcontrollers and Processors Vol. I



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Paper –II (Optional B) : Digital Signal Processing and Applications

UNIT – I

Architecture of DSP processor: TMS320C5Xfamily, overview, architecture functional block diagram, internal memory organization, addressing modes, detailed instruction set, program memory, data memory, interrupts, difference between TMS320c5x family and TMS320C6X family

UNIT – II

Finite Impulse Response Digital Filter Design : Introduction. Characteristics of FIR digital filters. Properties of FIR filters. Window Functions. Kaiser Window. General FIR filter design. Digital Networks for Linear phase FIR digital filters. Elementary ideas on Computer Aided Design of FIR digital filters.

UNIT – III

Infinite Impulse Response Digital Filter Design : Introduction. Digital Filter Design. Frequency Band Transformation. Bilinear Transformation. Digital Filter Design Equations. Generalised IIR Digital Filter. Transfer function Forms. IIR Digital Filter Design Procedure.

UNIT – IV

Signal Processing Applications : Introduction. Voice Processing, Applications to RADAR, Applications to Image Processing, Telecommunication, Echo Control and Sonar

Wavelet Transforms : Introduction to Wavelets, Time Frequency representation, Continuous Time Wavelet, Continuous Wavelet Transforms, Inverse Continuous Wavelet Transforms, Properties of Continuous Wavelet Transforms, Discrete Wavelet Transform, Comparison of Fourier Transform and Wavelet Transform, Applications.

Books For Study:

1. DSP Architecture – VenkataRamani
2. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya, TMH

Books for Reference:

1. Digital Signal Processing Using MATLAB – Sanjit K Mitra, TMH
2. Digital Signal Processing – John Proakis,
3. Digital Signal Processing – Ramesh Babu



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Paper –II (Optional C) : VLSI Design and Technology

UNIT – I

Digital Circuits: binary adder- subtractor, comparator, decoders, encoders, multiplexers, registers, counters

Digital integrated circuits: Introduction, special characteristics, bipolar-transistor characteristics, RTL and DTL circuits, Transistor- Transistor Logic (TTL), Emitter Coupled Logic(ECL), metal-oxide semiconductor (MOS), complementary MOS (CMOS).

UNIT – II

Introduction to VLSI Technology : Metal-Oxide semiconductor (MOS) and related VLSI technology. Basic MOS Transistors. Enhancement and Depletion Mode Transistor actions. CMOS fabrication. BICMOS technology.

Semi Custom Integrated Circuit Design : ASICs – Types, Introduction about Full Custom and Semi Custom ASICs, General Description with respect to their Structures of Gate arrays, Standard Cells, The ASIC Design process.

UNIT – III

Complex Programmable Logic Devices (CPLD) – Generic CPLD architecture and Generic Logic block, Xilinx XC9500 CPLD family – Function – Block Architecture, Input/Output – Block Architecture, Switch Matrix.

Field Programmable Gate Arrays (FPGA) - General structure, Interconnect, Switch technology Xilinx XC 4000 FPGA Family – Configurable Logic Block, Input Block, Programmable Interconnect.

UNIT – IV

VLSI Design Flow and Applications– Introduction, Simulation cycle, Simulation Organization, Simulation versus Synthesis, Design Rules ,Example Verilog program like Up/Down counter, ring counter, appliance timer, stepper motor, Binary to seven segment conversion, arithmetic logic unit.

BOOKS FOR STUDY :

1. M. Morris Mano."Digital Design", 3rd Edition, Pearson Education.
2. Basic VLSI Design -D.A. Pucknell, K. Eshraghian, PHI Pvt. Ltd.
3. Principles of CMOS VLSI Design. A System Perspective - N.Weste, K.Weste, K. Eshraghian- Addison-Wesley Publishing Co.



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Paper –II (Optional D) : Data Communications

UNIT – I

The OSI Model and the TCP/IP Protocol suite: The OSI model, layers in the OSI model, TCP/IP protocol suite, addressing-physical logic and port addressing.

IP Addresses: Introduction, classful addressing-recognizing classes, classes and blocks, network addresses, subnetting and super netting.

UNIT – II

ARP: ARP-Packet format, Encapsulation, operation, ARP over ATM, ARP package

Internet Protocol: Datagram, Fragmentation, Checksum, IP package, Message Protocol: Types of messages, message format, error reporting, Query, Debugging tools, ICMP package.

UNIT – III

User Data gram protocol(UDP): Process to process communication, user datagram, checksum, UDP operation, use of UDP, UDP package, Transmission control protocol: TCP services, TCP features, segment, TCP connection, state transmission diagram, flow control ,error control, congestion control, TCP timers, TCP package

UNIT –IV

Routing protocols: intra and inter domain routing, distance vector routing, RIP protocol, link state routing, open shortest path first areas, types of links, ospf packets, path vector routing, multicast and, broadcast routing1.

File transfer protocol (FTP): Connections, communication processing, file transfer, Trivial file transfer protocol (TFTP): Message, connection, data transfer, udp ports, and TFTP example, World Wide Web: Architecture, web documents, HTTP.

BOOKS FOR STUDY:

- 1.TCP/IP PROTOCOL SUITE By Behrouz A.Forouzan.Third edition
- Data Communications and computer networking - By Behrouz A. Forouzan , 3rd Ed., TMH, 2003

REFERENCE BOOKS :

1. Data and Computer Communications – By William Stalling., 7th Ed., PHI / PE
2. Data Communications and Networks - By Achyut S. Godbole, TMH, 2002
3. Computer Networks – By Andrew S. Tanenbaum., 4th Ed., PHI, 2002