

Rajiv Gandhi University of Knowledge Technologies**Basar, Nirmal – 504107****B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING****III YEAR II SEMISTER**

Code	Subject	L-T	P	C
EC3201	Digital communications	4	-	4
EC3202	Digital System design	4	-	4
EC3203	Microprocessors and Interfacing	4	-	4
CS3001	Object Oriented Programming	4	-	4
CS3204	Computer Networks	4	-	4
EC3801	Digital communications Lab	-	3	2
EC3802	Digital System design Lab	-	3	2
CS3601	Object Oriented Programming Lab	-	3	2
EC3000	Comprehensive Viva-I	1	-	1
EC3902	Seminar-III	1	-	1
	Total	22	9	28

EC3201**Digital Communications****Externals: 60Marks****(L-T)-P-C****Internals: 40Marks****4-0-4****Course Objectives:**

1. To learn various digital pulse modulation and digital carrier modulation techniques.
2. To learn the different source coding and channel coding schemes.
3. To learn the need for spreading a code and various spread spectrum techniques.

UNIT-I: Introduction

Introduction to digital signals and systems, spectra and bandwidth. A-D conversion and quantization. PCM, Log-PCM, DPCM, DM, ADPCM, and LPC for speech signals, time division multiplexing, digital hierarchy and standards, baseband transmission.

UNIT-II: Modulation Techniques

Digital modulation and demodulation: binary and M-ary ASK, FSK, GMSK, PSK, DPSK and their spectra, circuits and systems, carrier recovery, performance of digital modulation systems, data generators and clock recovery, inter-symbol interference, equalizers.

UNIT-III: Random Processes

Detection of binary signals in presence of Gaussian noise, Maximum likelihood receiver, Matched filter, Realization of matched filter, Error probability.

UNIT-IV: Information theory:

Elements of information theory, Source coding theorem, Discrete memory less channels, Channel capacity, Channel coding theorem, Information capacity theorem.

UNIT-V: Spread spectrum Techniques:

Pseudo noise sequences, A Notion of spread spectrum, DS-Spread Spectrum, Frequency hopping, synchronization, Jamming.

TEXT BOOKS:

1. A. Bruce Carlson, & Paul B. Crilly, —Communication Systems – An Introduction to Signals & Noise in Electrical Communication, McGraw-Hill International Edition, 5th Edition, 2010.
2. Sam Shanmugam, —Digital and Analog Communication Systems, John Wiley, 2005.

REFERENCES:

1. Bernard Sklar, —Digital Communications, Prentice-Hall PTR, 2nd edition, 2001.
2. Simon Haykin, —Communication Systems, Wiley-India edition, 3rd edition, 2010.
3. B.P. Lathi, & Zhi Ding, —Modern Digital & Analog Communication Systems, Oxford University Press, International 4th edition, 2010.
4. Herbert Taub & Donald L Schilling, —Principles of Communication Systems, Tata McGraw-Hill, 3rd Edition, 2009

EC3202**Digital System Design****Externals: 60Marks****(L-T)-P-C****Internals: 40Marks****4-0-4****UNIT-I:INTRODUCTION**

Introduction to VLSI design, Combinational circuit design, PLD, PAL, Review of Flip Flops, Timing Diagrams

UNIT-II:RTL CODING

Sequential circuit design, MSI implementation of sequential circuits, Design of sequential circuits using one hot controller, Verilog modeling of combinational circuits, Modeling of verilog sequential circuits, Modeling of verilog sequential circuits, RTL coding guidelines, Coding realization – complete realization, Coding realization – complete realization, Writing a test bench

UNIT-III:ASM CHARTS

System design using ASM Chart (BUS ARBITOR), Traffic Light Controller, Examples of System design using ASM Chart, DICE GAME, Micro programmer design

UNIT-IV:SIMULATION USING MODELSIM

Design flow of VLSI circuits, Simulation of combinational circuits, Simulation of combinational circuits, Analysis of waveforms using Modelsim, Analysis of waveforms using Modelsim, Modelsim simulation tool

UNIT-V:SYNTHESIS AND SYNPLIFY TOOLS

Synthesis tool, Synplify tool – schematic circuit diagram view, Technology view using Synplify tool, Synopsys tool and parallel cases, Xilinx place and route tool

REFERENCES

1. Jon F Wakerly, Digital Design: Principles and Practices, Prentice Hall.
2. Kevin Skahil, VHDL for programmable logic, Addison Wesley.
3. Zainalabedin Navabi, VHDL, analysis and modeling of digital systems, McGraw-Hill.
4. PLD, FPGA data sheets.

EC3203 Microprocessors & Interfacing

Externals: 60Marks

Internals: 40Marks

(L-T)-P-C

4-0-4

Course Objectives:

1. To examine the 8085 and 8086 microprocessors in terms of hardware/software and functions of signals generated/accepted.
2. To understand the 8085/8086 architecture and its programming.
3. Explore how to interface the memory and I/O devices to 8086 microprocessor.

UNIT I: 8085 and 8086 Architecture;

Introduction to 8085 Microprocessor, 8086 Architecture-Functional diagram. Register Organization, Memory Segmentation. Programming Mode!. Memory addresses. Physical memory organization. Architecture of 8086, signal descriptions of 8086- common function signals. Minimum and Maximum mode signals. Timing diagrams. Interrupts of 8086.

UNIT II: Instruction Set and Assembly Language Programming of 8086:

Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT III: I/O Interface:

8255 PPI various modes of operation and interfacing to 8086. Interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

UNIT IV: Interfacing with advanced devices:

Memory interfacing to 8086, Interrupt structure of 8086, Vector interrupt table, Interrupt service routine. Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259 DMA Controller 8257 to 8086.

UNIT V: Communication Interface:

Serial communication standards, Serial data transfer schemes. 8251 USART architecture and interfacing. RS- 232. IEEE-4-88, Prototyping and trouble shooting.

TEXT BOOKS:

1. D. U. Hall. Micro processors and Interfacing, TMGH. 2nd edition 2006.
2. Advanced Microprocessors and Peripherals - A. K. Ray and K.M. Bhurchandani, TMH, 2nd edition 2006.

REFERENCE BOOKS:

1. Micro Computer System 8086/8088 Family Architecture. Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.
2. The 8088 and 8086 Micro Processors – PHI, 4th Edition, 2003

CS3001 Object Oriented Programming though Java

Externals: 60Marks

(L-T)-P-C

Internals: 40Marks

4-0-4

Prerequisites

1. A course on “C - Programming & Data Structures”.

Objectives

1. Introduces object oriented programming concepts using the Java language.
2. Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes.
3. Introduces the implementation of packages and interfaces.
4. Introduces exception handling, event handling and multi threading.
5. Introduces the design of Graphical User Interface using applets and swings.

Outcomes

6. Develop applications for a range of problems using object-oriented programming techniques.
7. Design simple Graphical User Interface applications.

UNIT-I

OOP concepts - Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms.

Java programming - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

UNIT-II

Inheritance - Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

Polymorphism - dynamic binding, method overriding, abstract classes. **Interfaces** - Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interfaces. **Inner classes** - uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples. **Packages** - Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT-III

Exception handling - Dealing with errors, benefits of execution handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re throwing exceptions, exception specification, built in exceptions, creating own exception sub classes. **Multithreading** - Difference between multiple

processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, procedure consumer pattern.

UNIT-IV

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT-V

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. **GUI Programming with Java** - Introduction to Swing, limitations of AWT, Swing vs AWT, MVC architecture, Hierarchy for Swing components, Containers - JFrame, JApplet, JDialog, JPanel. Overview of some swing components JButton, JLabel, JTextField, JTextArea, simple swing applications.

TEXT BOOKS:

1. Java the complete reference, 7th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

CS3204**Computer Networks****Externals: 60Marks****(L-T)-P-C****Internals: 40Marks****4-0-4****Unit 1**

Introduction : Layered Network Architecture, Data Communication Fundamentals, Data Transmission Media & Transmission Impairments, Transmission of Digital Signal, Analog Data to Analog Signal, Digital Data to Analog Signal

Unit 2

Data Link layer: Error Detection and Correction, Flow Control and Error Control, HDLC & PPP, Switching Techniques: Circuit Switching and Packet Switching, Medium Access Control Techniques, IEEE CSMA/CD based LANs & IEEE Ring LANs, Synchronous Optical Network (SONET), X.25, Frame Relay, and ATM Networks

Unit 3

Network Layer: Logical Addressing, IPV4 in detail-classless and classfull addressing, subnetting, super netting, masking, IPV6 –introduction, Internet Protocol, structure of datagram, fragmentation, checksum, Address mapping-ARP, RARP, BOOTP, DHCP, Error Reporting ICMP, and Multicasting-IGMP, Direct Vs. indirect Delivery of packets, Packet forwarding techniques, Routing, Routing Algorithms: RIP, OSPF, BGP

Unit 4

Transport Layer: Process to process delivery, UDP, TCP, SCTP, Congestion Control and quality of service, open loop and closed loop congestion control, leaky bucket and token bucket algorithms, Congestion control in TCP-slow start, congestion avoidance and congestion detection

Unit 5

Application Layer: Domain Name System, Remote Logging, Electronic mail- Architecture, SMTP, POP, IMAP, File Transfer (FTP and Anonymous FTP), WWW and HTTP –static, Dynamic, Active documents, Proxy server, Persistent vs. non-persistent connection, Security in Internet-IPSec, SSL/TSL (secure socket layer/Transport layer security), PGP (Pretty Good Privacy), VPN (Virtual private Network), Firewall

Books:-

1. Andrew S. Tanenbaum, “Computer Networks”, 4th edition, Pearson Edition.
2. W. Richard Stevens, “Unix Network programming”, Pearson Edition.

EC3801

Digital Communications Lab

Externals: 60Marks

(L-T)-P-C

Internals: 40Marks

0-3-2

LIST OF EXPERIMENTS:

1. Pulse Code Modulation
2. Frequency Shift keying
3. Amplitude Shift Keying
4. Binary Phase Shift Keying
5. Multiplexer and Demultiplexer
6. Design of Base Band Communication system, Eye pattern display and BER measurement.
7. Carrier and Bit recovery from a BPSK signal
8. Design and implementation of line coder and testing

Note: A PNS generator be designed implemented and to be used as a data source.

EC3802

Digital System Design Lab

Externals: 60Marks

Internals: 40Marks

(L-T)-P-C

0-3-2

LIST OF EXPERIMENTS:

1. HDL familiarization
2. Design and synthesis of a CMOS amplifier
3. Familiarization with digital synthesis
4. Design and simulation of CMOS inverter using PSPICE
5. Familiarization of an FPGA kit and synthesis tools.
6. Design of a synchronous counter and implementation on an FPGA kit
7. Implementation of a multiplier using embedded DSP code on an FPGA kit.

CS3601 Object Oriented Programming Lab

Externals: 60Marks

Internals: 40Marks

(L-T)-P-C

0-3-2

EC3000

Comprehensive Viva-I

Externals: 60Marks

(L-T)-P-C

Internals: 40Marks

1-0-1

EC3902

Seminar - III

Externals: 60Marks

(L-T)-P-C

Internals: 40Marks

1-0-1