

## SEMESTER IV

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

CodeNo	Course Title	L	T	P	M
<b>THEORY</b>					
1	Probability and Statistics	4	0	0	100
2	Programming in Java	4	0	0	100
3	Principles of communication Engineering	4	0	0	100
4	Computer Architecture	4	0	0	100
5	System Software	4	0	0	100
6	Microprocessors and Microcontrollers	4	0	0	100
<b>PRACTICALS</b>					
1	Java programming Lab	0	0	3	100
2	Microprocessors and Microcontrollers Lab	0	0	3	100

**B.E. Second Year ( 4<sup>th</sup> Semester )**  
**INFORMATION TECHNOLOGY**  
**(TO PRESENT IN THE FORTH COMING BOARD OF STUDIES)**

**PROBABILITY AND STATISTICS**

- 1. PROBABILITY AND RANDOM VARIABLE** **9**  
Axioms of probability – Conditional probability – Total probability – Bayes theorem – Random variable – Probability mass function – Probability density functions – Properties – Moments – Moment generating functions and their properties
- 2. STANDARD DISTRIBUTIONS**  
Binomial, Poisson, Geometric, Negative Binomial, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties – Functions of a random variable.
- 3. TWO DIMENSIONAL RANDOM VARIABLES**  
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Regression – Transformation of random variables – Central limit theorem.
- 4. TESTING OF HYPOTHESIS**  
Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using Normal, t, Chi-square and F distributions – Tests for independence of attributes and Goodness of fit.
- 5. DESIGN OF EXPERIMENTS**  
Analysis of variance – One way classification – CRD – Two – way classification – RBD – Latin square.

**TUTORIALS**

Note: Use of approved statistical table permitted in the examination.

Total: 60

**TEXT BOOKS;**

1. Ross. S., “A first Course in Probability”, Fifth Edition, Pearson education, Delhi 2002. (Chapters 2 to 8).
2. Johnson. R.A., “Miller & Freund’s Probability and Statistics for Engineers”, Sixth Edition, Pearson education, Delhi, 2000. (Chapters 7,8,9,12)

## **REFERENCES**

1. Walpole, R.E., Myers, R.H. Myers R.S.L. and Ye K, "Probability and Statistics for Engineers and Scientists", Seventh Edition, Parsons Education, Delhi, 2002.
2. Lipschutz. S and Schiller.J, "schaum's outlines – Introduction to probability and statistics", McGraw Hill, New Delhi, 1998.
3. Gupta, S.c. and Kapur, J.N., "Fundamentals of Mathematical Statistics", Sultan Chand, Ninth Edition, New Delhi, 1996.



1. Hartsmann and Cornell, "Core JAVA fundamentals", Vol.I, PTR (sun series), Addison Wesley, 2000.
2. E.Balagurusamy, "Programming in Java", III Edition.

**SEMESTER IV-IT**  
**PRINCIPLES OF COMMUNICATION ENGINEERING**  
**( COMMON TO IV SEM IT & IV SEM BME 2006-2007 BATCH)**

1. **INTRODUCTION OF COMMUNICATIONS SYSTEMS:** **9**  
Communications systems, Modulation, Bandwidth requirements, Noise- External Noise, Internal Noise, Noise calculations, Noise figure, Noise temperature.
  
2. **AMPLITUDE MODULATION:** **9**  
Amplitude modulation theory, Generation of AM, Single- sideband techniques- Evolution and description of SSB, Suppression of carrier, Suppression of Unwanted sidebands, Extension of SSB, Radio receivers - AM receivers, Single and independent Sideband receivers.
  
3. **ANGLE MODULATION:** **9**  
Frequency Modulation - Theory of Frequency Modulation and Phase Modulation, Noise, Generation of Frequency Modulation, Radio receivers- FM receivers.
  
4. **PULSE COMMUNICATIONS:** **9**  
Information theory, Pulse modulation types -PWM, PPM and PCM, Pulse systems.
  
5. **DIGITAL & BROADBAND COMMUNICATIONS SYSTEMS:** **9**  
Digital technology, Fundamentals of data communications systems, Data sets and Interconnection requirements, Network and control considerations, Broadband - Multiplexing, Short and Medium haul systems, Long haul systems, Elements of Long distance telephony.

***TEXT BOOKS:***

1. George Kennedy and Bernard Davis, "Electronic communication systems", Tata McGraw – Hill Publication, 1999.

**REFERENCES:**

1. B.P.Lathi, "Analog and Digital Communication systems", PHI, 1992.
2. Proakis, "Digital Communications", Tata McGraw – Hill Publication, 1999.
3. A.B.Carlson, "Communication Systems", Tata McGraw – Hill Publication, 1992.

## ***SEMESTER IV***

### ***COMPUTER ARCHITECTURE***

#### **AIM**

To discuss the basic structure of a digital computer and to study in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.

#### **OBJECTIVES**

- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study in detail the different types of control and the concept of pipelining.
- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

#### **UNIT I BASIC STRUCTURE OF COMPUTERS 9**

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

#### **UNIT II ARITHMETIC UNIT 9**

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

#### **UNIT III BASIC PROCESSING UNIT 9**

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

#### **UNIT IV MEMORY SYSTEM 9**

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

#### **UNIT V I/O ORGANIZATION 9**

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

### **TEXT BOOKS**

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5<sup>th</sup> Edition “Computer Organization”, McGraw-Hill, 2002.

### **REFERENCES**

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6<sup>th</sup> Edition, Pearson Education, 2003.
2. David A.Patterson and John L.Hennessy, “Computer Organization and Design: The hardware / software interface”, 2<sup>nd</sup> Edition, Morgan Kaufmann, 2002.
3. John P.Hayes, “Computer Architecture and Organization”, 3<sup>rd</sup> Edition, McGraw-Hill, 1998.

## ***SEMESTER IV***

### **SYSTEM SOFTWARE**

(COMMON TO III SEM CSE & IV SEM IT)

#### **AIM**

To have an understanding of foundations of design of assemblers, loaders, linkers, and macro processors.

#### **OBJECTIVES**

- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers
- To know the design and implementation of linkers and loaders.
- To have an understanding of macroprocessors.
- To have an understanding of system software tools.

#### **UNIT I INTRODUCTION 9**

System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

#### **UNIT II ASSEMBLERS 9**

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

#### **UNIT III LOADERS AND LINKERS 9**

Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.

#### **UNIT IV MACRO PROCESSORS 9**

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

**TEXT BOOK**

1. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3<sup>rd</sup> Edition, Pearson Education Asia, 2000.

**REFERENCES BOOKS**

1. D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan “Systems Programming”, Tata McGraw-Hill Edition, 1972.

## ***SEMESTER IV***

### **MICROPROCESSORS AND MICROCONTROLLERS**

**(COMMON TO IV SEM IT, V SEM CSE & VI SEM EEE)- 2006-2007 BATCH**

<b>UNIT I</b>	<b>THE 8085 MICROPROCESSOR</b>	<b>9</b>
Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085		
<b>UNIT II</b>	<b>8086 SOFTWARE ASPECTS</b>	<b>9</b>
Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.		
<b>UNIT III</b>	<b>8086 SYSTEM DESIGN</b>	<b>9</b>
8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O – Multiprocessor configurations – System design using 8086		
<b>UNIT IV</b>	<b>I/O INTERFACING</b>	<b>9</b>
Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications		
<b>UNIT V</b>	<b>MICROCONTROLLERS</b>	<b>9</b>
Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set – Applications.		
<b>TUTORIAL</b>		<b>15</b>
		<b>TOTAL : 60</b>

#### **TEXT BOOKS**

1. Ramesh S.Gaonkar, “Microprocessor - Architecture, Programming and Applications with the 8085”, Penram International publishing private limited, fifth edition.  
(UNIT-1: – Chapters 3,5,6 and programming examples from chapters 7-10)
2. A.K. Ray & K.M.Bhurchandi, “Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing”, TMH, 2002 reprint. (UNITS 2 to 5: – Chapters 1-6, 7.1-7.3, 8, 16)

#### **REFERENCES**

1. Douglas V.Hall, “Microprocessors and Interfacing: Programming and Hardware”, TMH, Third edition
2. Yu-cheng Liu, Glenn A.Gibson, “Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design”, PHI 2003
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, “The 8051 microcontroller and embedded systems”, Pearson education, 2004.

## ***SEMESTER IV***

### **JAVA PROGRAMMING LAB**

1. Write a JAVA program to search the largest element from the given array.
2. Write a JAVA program to sort the strings in an alphabetical order.
3. Write a JAVA program to extract a portion of a character string and to print the extracted portion and the remaining portion of the string. Assume that m characters are extracted, starting with the nth character
4. Write a JAVA program for illustrating overloading and overriding methods in JAVA.
5. Define a class Baby with the following attributes:
  - a. Name
  - b. Date of birth
  - c. Date on which BCG injection has to be given. (60 days from date of birth)
  - d. Date on which Polio drops is to be given. (45 days from date of birth)

Write a constructor to construct the Baby object. The constructor must find out BCG and polio

drops dates from the date of birth. In the main program define a baby and display its details.

6. Define a class called Employee with name and date of appointment. Create 5 employee objects as an array and sort them as per their date of appointment. That is, print them as per their seniority.
7. Assume that a bank maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest for an amount that remains in the a/c for more than 45 days and withdrawal facilities but no cheque book facility. The current account provides simple interest for an amount that remains in the a/c for more than one month & also it provides cheque book facility. Current account holders should also maintain a minimum balance and if the balance fails below this level, a service charge is imposed.
8. Create a class Account that stores customer name, account number and type of account. From this derive the classes Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:
  - Accept deposit from a customer and update the balance.
  - Display the balance.
  - Compute and deposit interest.
  - Permit withdrawal and update the balance.
  - Check for the minimum balance, impose penalty, if necessary, and update the balance.

Do not use any constructors. Use methods to initialize the class members.

9. Write a JAVA program which illustrates the implementation of multiple inheritance using interfaces in JAVA.
10. Write a JAVA program to create your package for basic mathematical operations such as add, subtract, multiply. Demonstrate the use of this package in another class.
11. Write a JAVA program that counts the number of digits in a given number. If an alphabet is entered instead of a number, the program should not terminate. Instead it should display appropriate error message.

12. Write a JAVA program that moves the text “School of Computer Sciences welcomes you” diagonally using Applet.
13. Write a JAVA program to create an Applet with a label “Do you know car driving?” and two buttons Yes, NO. When the user clicks “Yes” button, the message “Congrats” must be displayed. When the user clicks “NO “button, “Regrets” must be displayed.
14. Write a JAVA program to animate the face image using Applet.
15. Write a JAVA program to create four Text fields for the name, street, city and pin code with suitable Labels. Also add a button called “My Details”. When you click the button, your name, street, city, and pin code must appear in the Text fields.
16. Write a JAVA program to simulate a simple calculator.

#### ***SEMESTER IV***

#### **MICROPROCESSORS AND MICROCONTROLLERS LAB (COMMON TO IV SEM IT & V SEM CSE) – 2006-2007 BATCH**

1. Programming 8085
2. programming 8086
3. Programming 8051
4. PC based control systems
5. Stepper Motor Control
6. PC interfacing
7. AC and DC Motor Speed Control