

# UNIVERSITY OF KOTA, KOTA

## B.Sc COMPUTER SCIENCE -2013

### 1. Courses of Study and Examination

#### I Year

Paper	Paper Name	Lecture	Duration of exam. (hours)	Max. Marks		Total
				University Exam.	Internal Assessment	
Paper-I (BCS-01)	Introduction to Information Technology	3	3	75	25	100
Paper-II (BCS-02)	Basic Mathematics	3	3	75	25	100
Paper-III (BCS-03)	Problem Solving through C Programming	3	3	75	25	100
Paper-IV (BCS-04)	Digital Electronics	3	3	75	25	100
Paper-V (BCS-05)	Computer Organization	3	3	75	25	100
	<b>Practical</b>					
Practical-I (BCS-07)	H/W Lab	3	6	100	-	100
Practical-II (BCS-08)	Programming Lab	3	6	100	-	100
	<b>TOTAL</b>			<b>575</b>	<b>125</b>	<b>700</b>

H/W Lab: It Will Cover experiments of Basic Logic Gates

### 2. Scheme of Instruction:

Each year shall be of ten months (150 working days) duration. Details of lecture hours per week shall be as follows:

**Theory:** Three hours/week for each Paper

**Practical:** Students are required to work in the Laboratory for 10 hours/week for each practical under four hours/week faculty guidance for each practical paper.

### 3. Examination Scheme:

1. University shall conduct examinations only after completion of 150 working days of instruction in a year.
2. Each theory paper shall be of 100 marks (75 marks for written examination of 3 hrs duration and 25 marks for internal assessment).
3. Each practical paper shall be of 100 marks.
4. The internal marks will be awarded by committee consisting of Head of the Department & the faculty concerned.

#### Theory:

1. **Assignments:** 40% of the internal assessment marks for each theory paper will be awarded on the basis of performance in the assignments regularly given to the students, and its records.
2. **Internal Examination:** 40% of the total Internal Assessment marks for each theory paper will be awarded on the basis of performance in written examination conducted by the faculty, one at the end of fourth month and another at the end of eighth month.
3. **Seminar/Oral examination:** 10% of the total internal assessment marks for each paper will be awarded on the basis of performance either in a seminar or internal viva-voce.
4. **Overall performance:** 10% of the total internal assessment marks will be awarded for each paper on the basis of performance and conduct in the classroom.

**Note:** Detailed breakup of Internal Marks awarded as per above guidelines must be submitted to the university in a tabular format for each paper. Department/College must preserve answer books of internal examination for a period one year from the date of examination and must be presented to the university as and when required.

- (a) **I division with distinction:** 75% or more marks in the aggregate and provided the candidate has passed all the papers and examinations in the first attempt.
- (b) **I division :** 60% or more marks but fails to satisfy the criteria for being classified as first division with distinction laid in (a).
- (c) **II division :** All other than those included in (a) and (b) above. A candidate must pass the examinations within five years of the initial admission to the first year of the course.

# **B.Sc (Computer Science) Pt-I 2013**

## **BCS - 01: Introduction to Information Technology**

Time: 3 Hrs

Max.Marks: 75

### **UNIT - I**

**Computer Basics:** Algorithms, A Simple Model of a Computer, Characteristics of Computers, Problem-solving Using Computers.

**Data Representation:** Representation of Characters in computers, Representation of Integers, Representation of Fractions, Hexadecimal Representation of Numbers, Decimal to Binary Conversion, Error-detecting codes.

**Input & Output Devices:** Description of Computer Input Units, Other Input Methods, Computer Output Units.

### **UNIT - II**

**Computer Memory:** Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to Construct Memories, Magnetic Hard Disk, floppy Disk Drives, Compact Disk Read Only Memory, Magnetic Tape Drives.

**Processor:** Structure of Instructions, Description of a Processor, A Machine Language Program, An Algorithm to Simulate the Hypothetical computer.

### **UNIT - III**

**Binary Arithmetic:** Binary Addition, Binary Subtraction, Signed Numbers, Two's Complement Representation of Numbers, Addition/Subtraction of Numbers in 2's Complement Notation, Binary Multiplication, Binary Division, Floating Point Representation of Numbers, Arithmetic Operations with Normalized Floating Point Numbers.

**Computer Architecture:** Interconnection of Units, Processor to Memory communication, I/O to Processor Communication, Interrupt Structures, Multiprogramming, Processor Features, Reduced Instruction Set Computers (RISC), Virtual Memory.

### **UNIT-IV**

**Software Concepts:** Types of Software, Programming Languages, Software (Its Nature & Qualities), Programming Languages.

**Operating Systems:** History & Evolution, A Brief History of Linux, A Brief History of MS-DOS, A Brief History of Windows System.

### **UNIT - V**

**Computer Generation & Classifications:** First Generation of Computers, The Second Generation, The Third Generation, The Fourth Generation, The Fifth Generation, Moore's Law, Classification of computers, Distributed Computer System, parallel computers.

**Internet:** Network, Client and Servers, Host & Terminals, TCP/IP, World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services, Case Study, Intranet.

#### **Text book:**

#### **Suggested Books**

1. P.K.Sinha " Introduction to Information Technology",
2. V. Rajaraman, Fundamentals Of Computers, 3<sup>rd</sup> Edition , PHI Publications
3. Nasib S. Gill, Essentials of Computer & Network Technology, Khanna Publications.
4. Deepak Bharihoke, Fundamentals of Information Technology, Excel Books.

# BCS - 02: Basic Mathematics

Time: 3 Hrs

Max.Marks: 75

## UNIT - I

**SETS:** Sets, subsets, equal sets, null set, universal set, finite & infinite sets, open & closed sets etc., operations on sets, partition of sets, Cartesian product.

**RELATIONS AND FUNCTIONS:** relation, properties of relations, equivalence relation, equivalence relation with partition, partial order relation, maximal and minimal points, glb, lub, chains and antichains, pigeonhole principle. Function, domain & range, onto, into and one-to-one functions, composite functions, inverse functions, introduction of algebraic, trigonometrically, logarithmic, exponential, hyperbolic functions, zeroes of functions.

## UNIT - II

**DIFFERENTIATION:** Derivative, derivatives of sum, differences, product & quotients, chain rule, derivatives of composite functions, logarithmic differentiation, Rolle's theorem, mean value theorem, expansion of functions (Maclaurin's & Taylor's.), indeterminate forms, L'Hospitals rule, maxima & minima, concavity, asymptote, singular points, curve tracing, successive differentiation & liebnitz theorem.

## UNIT - III

**INTEGRATION:** [TF – (4.1-)], [SNI – ()] Integral as limit of a sum, Riemann sum, fundamental theorem of calculus, indefinite & definite integrals, methods of integration substitution, by parts, partial fractions, integration of algebraic and transcendent functions, , reduction formulae for trigonometric functions, Gamma and Beta functions.

## UNIT - IV

**PLANE CURVES & POLAR COORDINATES:** Polar coordinates, curve tracing in polar coordinates, area in polar coordinates, Arc length, area & volume of surface of revolution in Cartesian and polar coordinates.

## UNIT - V

**FUNCTIONS OF SEVERAL VARIABLES :** Limits & continuity, partial differentiation, chain rule , Euler's theorem, Maxima & Minima, Lagranges method of undetermined multipliers, Taylor's formula for functions of two variables.

### Suggested Books

1. C. L. Liu.: Elements of Discrete Mathematics , Tata Mac-Graw Hill.
2. Thomas, G.B. and R. L. Finney: Calculus & Analytical Geometry, Addison-Wesley , 9<sup>th</sup> edition.
3. Chandrika Prasad : Mathematics for Engineers, Prasad Mudranalaya, Allahabad, 19<sup>th</sup> edition
4. Shanti Narayan: Differential Calculus, S.Chand & Co.
5. Shanti Narayan: Integral Calculus, S.Chand & Co.

# BCS -03: Problem Solving through C Programming

Time: 3 Hrs

Max.Marks: 75

## UNIT- I

**Algorithm and algorithm development:** Definition and properties of algorithm, flow chart symbols, conversion of flow chart to language, example of simple algorithms. Program design, errors : syntax error, runtime error, logic error, debugging, program verification, testing, documentation and maintenance.

**Introduction to C:** Variables and arithmetic expressions, the for statement, symbolic constants, character input and output, arrays, functions, arguments- call by value, character arrays, external variables and scope. Types, Operators and Expressions: Variable names, data type and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions, precedence and order of evaluation.

## UNIT- II

**Control Flow:** Statements and blocks, if-else, else-if, switch, loops- while and for, loops- do-while, break and continue, goto and labels.

**Functions and Program Structure:** Basics of function, functions returning non-integers, external variables, scope rules, header files, static variables, register variables, block structure, initialization, recursion, the C preprocessor.

## UNIT - III

**Pointer and Arrays:** Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic. Character pointers and functions, pointer arrays: pointers to pointers, multi-dimensional arrays, pointers vs. multi-dimensional arrays. Pointers to functions. Complicated declarations.

## UNIT - IV

**Structures:** Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, table lookup, typedef, unions, bit-fields.

## UNIT - V

**Input and Output:** Standard input and output. Formatted output- print, variable length argument lists. Formatted input- scanf, file access, error handling- stderr and exit, line input and output, miscellaneous functions.

### Suggested Books

1. Deendayalu R., Computer science Volume I and II, Second Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Rajaraman V., Fundamentals of computers, Second Edition, Prentice Hall of India Private Limited, New Delhi.
3. Kernighan B.W. and Ritchie D.M., The C Programming Language, Prentice Hall of India Private Limited New Delhi.
4. Drogmey R., How to solve it by computers. Prentice Hall of India Private Limited , New Delhi.

# BCS -04 Digital Electronics

Time: 3 Hrs

Max.Marks: 75

## UNIT- I

Number Systems: Binary, octal, decimal, hexadecimal and BCD number systems. Representation of positive, negative integers and real numbers. Characters digital codes: ASCII and EBCDIC coding, binary arithmetic in 1's and 2's complement.

## UNIT-II

Boolean Algebra: Logic gates, truth table, logic expression, rules and laws of boolean algebra. Demorgan's theorems, simplification of boolean expression using Karnaugh map (upto 4 variables).

## UNIT- III

Combinational Circuits: Adder, subtractor, comparator, decoder, encoder, multiplexer, de-multiplexer. (Block diagram level only)

## UNIT- IV

Flip Flops: Latches, edge-triggered flip flops, pulse triggered flip flop, R-S flip, JK master-slave flip flop, D flip flop, T flip flop. Shift register, shift left, shift right, Bidirectional

## UNIT- V

Memory Organization: Basic memory cell, 1- 2-D memory, row and column address, accessing memory, different RAM and ROM types, Magnetic bubble memory, charged couple device.

### Suggested Books

1. Thomas L. Floyd, Digital Fundamentals, United Book Stall New Delhi.
2. Mano M.M., Digital Logic and Computer Design, Prentice Hall of India Private Limited New Delhi.
3. Hayes J.P., Computer Organization and Architecture, Tata Mc-Graw Hill Publishing Company Limited New Delhi.
4. Mano M.M., Computer System Architecture, Prentice Hall of India Private Limited New Delhi.

# BCS- 05 Computer Organization

Time: 3 Hrs

Max.Marks: 75

## UNIT- I

Basic Computer Organization: Instruction codes, direct and indirect address, timing and control signal generation, instruction cycle, memory reference instructions, input output instructions.

Register Transfer and Micro Operations: Bus and memory transfers, three state bus buffers, binary adder, binary incrementer, arithmetic circuit, logic and shift micro operations, ALU.

## UNIT- II

Central Processing Unit: General register organization, memory stack, one address, two address instructions, data transfer, arithmetic, logical and shift instructions, software and hardware interrupts (only brief introduction), arithmetic and instruction pipelines.

## UNIT- III

Computer Arithmetic: Addition and subtraction with signed magnitude data, multiplication algorithms, hardware algorithm and booth algorithm, division algorithm.

## UNIT - IV

Input Output Organization: Asynchronous data transfer- handshaking, asynchronous serial transfer, interrupt initiated I/O, DMA transfer, interfacing, peripherals with CPU (introduction), keyboard, mouse, printer, scanner, network card.

## UNIT- V

Memory Organization: ROM, RAM, hard disk, CD-ROM, Cache memory- direct mapping scheme, virtual memory concept.

### Suggested Book

1. Mano M., Computer System Architecture, Pearson Education.