

# ***Syllabus and Course Scheme***

***Academic year 2014-15***



## **B.Sc. – Computer Science**

**UNIVERSITY OF KOTA**

**MBS Marg, Swami Vivekanand Nagar,  
Kota - 324 005, Rajasthan, India**

**Website: [uok.ac.in](http://uok.ac.in)**

# UNIVERSITY OF KOTA, KOTA

## B.SC.COMPUTER SCIENCE Exam -2015

### 1. 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 4 hours per week for each practical under faculty guidance.

### 2. 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.
5. The student have to pass internal and external exam separately theory as well as practical papers.

#### 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.

#### Practical :

1. **Project:** 80% of the total Internal Assessment Marks for each practical paper during I & II year will be awarded on the basis of project, its presentation and project report submitted by the students. This activity can be held in the team of maximum two students. There should be a project co-ordinator (faculty member of computer science department).
2. **Internal examination:** 10 % of the total Internal Assessment marks for each practical paper during I & II year will be awarded on the basis of performance in practical examination conducted by the faculty, once during the session. In III year it will be 80%.
3. **Overall performance:** 10 % of the total internal assessment marks will be awarded during I & II year for each practical paper on the basis of performance and conduct of the student in the practical lab. In III year it will be 20%.

**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 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 i.e.  $< 60\%$  and  $\geq 45\%$ .
- (d) Passing criteria is as per university ordinance. 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 Examination- 2015

### Courses of Study and Examination :

| Paper                  | Paper Name                             | Lecture | Duration of exam. (hours) | Max. Marks       |                     | Total      |
|------------------------|--|---------|---------------------------|------------------|---------------------|------------|
|                        |  |         |                           | University Exam. | Internal Assessment |            |
| Paper-I (BCS-101)      | Introduction to Information Technology | 3       | 3                         | 75               | 25                  | 100        |
| Paper-II (BCS-102)     | Basic Mathematics                      | 3       | 3                         | 75               | 25                  | 100        |
| Paper-III (BCS-103)    | Problem Solving through C Programming  | 3       | 3                         | 75               | 25                  | 100        |
| Paper-IV (BCS-104)     | Database Management System             | 3       | 3                         | 75               | 25                  | 100        |
| Paper-V (BCS-105)      | Digital Electronics                    | 3       | 3                         | 75               | 25                  | 100        |
|                        | <b>Practical</b>                       |         |                           |                  |                     |            |
| Practical-I (BCS-106)  | DBMS Lab                               | 4(2+2)  | 3                         | 75               | 25                  | 100        |
| Practical-II (BCS-107) | Programming Lab in C                   | 4(2+2)  | 3                         | 75               | 25                  | 100        |
|                        | <b>TOTAL</b>                           |         |                           | <b>525</b>       | <b>175</b>          | <b>700</b> |

**\*for each practical paper students have to submit the project.**

## Pt-II Examination- 2015

### 1. Courses of Study and Examination

| Paper                  | Paper Name                           | Lecture | Duration of exam. (hours) | Max. Marks       |                     | Total      |
|------------------------|--------------------------------------|---------|---------------------------|------------------|---------------------|------------|
|                        |                                      |         |                           | University Exam. | Internal Assessment |            |
| Paper-I (BCS-201)      | Computer Oriented Statistical Method | 3       | 3                         | 75               | 25                  | 100        |
| Paper-II (BCS-202)     | Computer Organization                | 3       | 3                         | 75               | 25                  | 100        |
| Paper-III (BCS-203)    | Fundamentals of Operating Systems    | 3       | 3                         | 75               | 25                  | 100        |
| Paper-IV (BCS-204)     | Web Technology                       | 3       | 3                         | 75               | 25                  | 100        |
| Paper-V (BCS-205)      | Data Structure                       | 3       | 3                         | 75               | 25                  | 100        |
| Practical-I (BCS-206)  | Data Structure Lab                   | 4(2+2)  | 3                         | 75               | 25                  | 100        |
| Practical-II (BCS-207) | Web Technology Lab                   | 4(2+2)  | 3                         | 75               | 25                  | 100        |
|                        | <b>TOTAL</b>                         |         |                           | <b>525</b>       | <b>175</b>          | <b>700</b> |

**\*for each practical paper students have to submit the project**

## Pt-III Examination- 2015

### 1. Courses of Study and Examination

| Paper                  | Paper Name                        | Lecture | Duration of exam. (hours) | Max. Marks       |                     | Total |
|------------------------|-----------------------------------|---------|---------------------------|------------------|---------------------|-------|
|                        |                                   |         |                           | University Exam. | Internal Assessment |       |
| Paper-I (BCS-301)      | Systems Software                  | 3       | 3                         | 75               | 25                  | 100   |
| Paper-II (BCS-302)     | Visual Programming                | 3       | 3                         | 75               | 25                  | 100   |
| Paper-III (BCS-303)    | Unix Programming                  | 3       | 3                         | 75               | 25                  | 100   |
| Paper-IV (BCS-304)     | Data Communication and Networking | 3       | 3                         | 75               | 25                  | 100   |
| Paper-V (BCS-305)      | Software Engineering              | 3       | 3                         | 75               | 25                  | 100   |
| Practical-I (BCS-306)  | Visual Programming Lab            | 4(2+2)  | 3                         | 75               | 25                  | 100   |
| Practical-II (BCS-307) | Unix Lab                          | 4(2+2)  | 3                         | 75               | 25                  | 100   |
|                        | TOTAL                             |         |                           | 525              | 175                 | 700   |

**\*for each practical paper students have to submit the project**

# **B.Sc. Computer Science Pt-I Examination- 2015**

## **BCS - 101: 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, Software Its Qualities & Attributes, Programming Languages (Its types and differences)

**Operating Systems:** Definition, O.S. functions and O.S. types : brief introduction. A Brief History of Linux, MS-DOS, Windows Operating System.

### **UNIT - V**

**Computer Generation & Classifications:** First, Second, Third, Fourth and Fifth Generation, Classification of computers, Concept of Distributed and parallel computers.

**Internet:** Network, World Wide Web, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Introduction to Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services, Intranet and Extranet.

### **Text / Reference 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 - 102: Basic Mathematics

Time: 3 Hrs

Max.Marks: 75

## UNIT - I

Number Systems, LCD & GCD, Fibonacci numbers, Sequences and series : AP, GP and HP, Sum of n terms, arithmetic–geometric- harmonic means between two numbers (excluding arithmetic- geometric series). Logarithms : definition, Laws regarding product, quotient, exponent and change of base.

## UNIT – II

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

## UNIT - III

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

## UNIT – IV

**DIFFERENTIATION:** Derivative, derivatives of sum, differences, product & quotients, derivatives of composite functions, logarithmic differentiation, 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 & Leibnitz theorem.

## UNIT - V

**Basic concepts of Graph Theory :** Vertices, edges, degree, paths, circuits, cycles, complete graphs and trees. Multi-graphs, weighted graphs and directed graphs, Adjacency matrix of a graphs. Connected and disconnected graphs.

Permutations (Simple and under restrictions), combinations (selections with and without replacement).

### Text / Reference 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 -103: 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, example of simple algorithms. Program design, errors: syntax error and semantic error, debugging, program verification, testing, documentation and maintenance.

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, precedence and order of evaluation, standard input and output statements.

## UNIT- II

**Control Flow:** Statements and blocks, if-else, nested if, switch, looping statement: while, for, do-while, break and continue, go-to and labels.

**Arrays :** declarations, integer and character array, reading and writing an array, one and two dimensional array, operations on arrays.

## UNIT – III

**Functions and Program Structure:** Basics of function, function definition and declaration, external variables, scope rules, header files, static variables, register variables, block structure, initialization, recursion, the C preprocessor.

**Pointer :** Pointers and addresses, pointers and function arguments, address arithmetic. Character pointers, pointers to pointers, Pointers to functions.

## UNIT - IV

**Structures:** Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, type-def, unions.

## UNIT - V

**File Handling:** access methods , different file operations and functions, concept of text & Binary files, file I/O, command line argument, Formatted file input and output.

### Text / Reference 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.

# BCS 104: Database Management System

Time: 3 Hrs

Max.Marks: 75

## Unit –I

**Introduction :** Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation language, data base administrator, data base users, overall structure.

## Unit –II

**ER Model :** entities, mapping constrains, keys, E-R diagram, reduction E-R diagrams to tables, generation, aggregation, design of an E-R database scheme.

## Unit –III

**Relational Model :** The catalog, base tables and views. Relational Data Objects - Domains and Relations: Domains, relations, kinds of relations, relations and predicates, relational databases.

**Relational Data Integrity -** Candidate keys and related matters: Candidate keys. Primary and alternate keys. Foreign keys, foreign key rules, nulls. Candidate keys and nulls, foreign key and nulls.

## Unit –IV

**The SQL Language:** Data definition, retrieval and update operations. Table expressions, conditional expressions, embedded SQL, Joins.

**Views:** Introduction, what are views for, data definition, data manipulation, SQL support.

## Unit –V

**File and system structure :** overall system structure, file organisation, logical and physical file organization, sequential and random, hierarchical, inverted, multi list, indexing and hashing, B-tree index files.

### Text / Reference Books

1. Date C.J., Database Systems, Addison Wesley.
2. Korth, Database Systems Concepts, McGraw Hill.



# BCS -105 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.

### Text / Reference 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, Pvt Ltd. New Delhi.
3. Hayes J.P., Computer Organization and Architecture, Tata Mc-Graw Hill Publishing Company Ltd. New Delhi.
4. Mano M.M., Computer System Architecture, Prentice Hall of India Private Limited New Delhi.