

Detailed Program Scheme  
**Bachelor of Computer Applications**  
**(BCA)**

**Semester II- Examination**  
**(2016-2019)**

DOC201612020015



**RNB GLOBAL UNIVERSITY**

RNB Global City, Ganganagar Road,  
Bikaner, Rajasthan 334601

## **OVERVIEW**

RNB Global University follows Semester System along with Choice Based Credit System as per latest guidelines of University Grants Commission (UGC). Accordingly, each academic year is divided into two semesters, Odd (July-December) and Even (January-June). Also, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for BCA Program for Even (January-June) Semester, 2017 along with examination pattern is as follows:

### **Course Scheme**

#### **Semester - II**

<b>S. No</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Credits</b>
1.	13006100	Mathematics-II	4
2.	13004900	Digital Electronics	3
3.	11011100	Principles of Management	3
4.	13005100	Operating System	3
5.	99001900	Environmental Studies	4
6.	13004700	Data Structure using C	3
7.	13005000	Digital Electronics Lab	1
8.	13005200	Operating System Lab	1
9.	13004800	Data Structure using C Lab	1
10.	13002800	Ability & Skill Enhancement Module - II	3
11.	99002000	NSS/NCC*	-
12.	99002100	Club Activities*	-
<b>Total Credits</b>			<b>26</b>

### **EVALUATION SCHEME - THEORY**

The evaluation of the theory paper of BCA. program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

### **Internal Assessment**

The distribution of Internal Assessment Marks is as follows:

<b>Area of Assessment</b>	<b>Marking</b>	<b>Maximum Marks</b>
Sessional-I	As per marks obtained	10
Sessional-II	As per marks obtained	10
Marks obtained in various, assignments, presentations, quizzes etc	Average of marks obtained	15
Overall Conduct and Discipline	To be decided by concerned Faculty Member	5
Attendance	Student with 80% attendance will get 5 marks and 0.25 marks for every 1% attendance above 80 %	10
<b>Total</b>	<b>50</b>	

### **External Assessment**

<b>Type</b>	<b>Marks</b>
Theory	50

### **EVALUATION SCHEME - PRACTICAL**

The evaluation of the practical paper of BCA program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

### Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	35
Discipline	To be decided by concerned faculty	5
Attendance	80% - 5 marks and 0.25 percent for every one percent above 80 %	10
<b>TOTAL</b>	<b>50</b>	

### External Assessment

Type	Marks
Practical	50

### EVALUATION SCHEME - NSS/NCC AND CLUB ACTIVITIES

1. NSS/NCC /Similar activities prescribed by University will be completed from Semester I – Semester IV. It will be evaluated internally by the respective institute. The credit for this will be given after IV Semester.
2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester I – Semester IV and credits and marks would be given after IV Semester.

### CURRICULUM

**Course Name: Mathematics-II**

**Course Code: 13006100**

#### Course Outline

**Unit I : Sets** Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

**Unit II : Relations and Function** Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Introduction of Trigonometric, Logarithmic and Exponential Functions.

**Unit III : Partial Order Relations and lattices** Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebraic Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices.

**Unit-IV : 3D Coordinate Geometry** - 3D Coordinate Geometry: Coordinates in Space, Direction Cosines, Angle Between Two Lines, Projection of Join of Two Points on a Plane, Equations of Plane, Straight Lines, Conditions for a line to lie on a plane, Conditions for Two Lines to be Coplanar, Shortest Distance Between Two Lines, Equations of Sphere, Tangent plane at a point on the sphere.

**Unit V : Multiple Integration** Double Integral in Cartesian and Polar Coordinates to find Area, Change of Order of Integration, Triple Integral to Find Volume of Simple Shapes in Cartesian Coordinates.

**Suggested Readings:**

1. Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
2. S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000

**Course Name: Digital Electronics**

**Course Code: 13004900**

**Course Outline**

**Unit I : Number System:** Decimal numbers, binary numbers, binary arithmetic, 1's and 2's complements, octal, Numbers, hexadecimal numbers, inter-conversions of number systems, Digital codes: Binary coded decimal (BCD), Gray code, Excess-3 code, Format of ASCII code. Detection and correction codes, detecting and correcting an error.

**Unit II : Logic Gates:** Positive and negative logic, NOT gate, OR gate, AND gate, NAND gate, NOR gate, EX-OR and EX-NOR gates. Symbol, truth table, circuit diagram for basic gates using diodes and transistors, universal properties of NAND & NOR gates.

**Unit III: Boolean Algebra:** Boolean operations, logic expressions, rules and laws of Boolean algebra, DeMorgan's theorems, simplification of Boolean expressions using

Boolean algebra techniques. SOP and POS form of Boolean expressions for logic network, min-terms, max-terms, simplification of Boolean expressions using Karnaugh map techniques (up to 4 variables).

**Unit IV: Counters:** Design of asynchronous and synchronous, up-down and programmable counters, Mod Counters and Ripple Counters **Registers:** shift registers, Serial Registers and their applications.

**Suggested Readings:**

1. Modern Digital Electronics- R. P. Jain, Tata McGraw Hill Pub. Company
2. Digital Fundamentals-Thomas L. Floyd, Universal Publishing House
3. Digital Electronics: An Introduction to Theory and Practice-William H. Gothmann, Prentice Hall of India
4. Digital Principles and Applications, A.P. Malvino, McGraw Hill International Editions.

## **Course Name: Principles of Management**

**Course Code: 11011100**

### **Course Outline**

**Unit I: Management:** Meaning & concept, Management principles (Fayol & Taylor), Management process (in brief), Managerial levels, Roles & skills of a manager, Management Theories (Classical, Neo classical, Behavioral, Systems & Contingency)

**Unit II :** Planning: Meaning, Purpose & process, Decision making: Concept & process, Organizing: Process, Departmentation, Authority & Responsibility relationships, Decentralization. Staffing: Nature & Importance.

**Unit III :** Staffing: Concept, nature & importance of staffing. Directing: Motivation: concept & theories (Maslow's, Herzberg Two factor, McGregor's theory X & Y), Leadership: Concepts & styles. Controlling: Nature, Importance, significance & Process of control.

**Unit IV:** Managing People - Meaning, Need of understanding human behavior in organization, Models of OB, Major concepts in OB (elementary)- Personality, Learning, Perception & Attitude Building.

**Suggested Readings:**

1. Dr. C.B Gupta "Management concepts & practices" S.Chand & Sons, 2009.
2. Stoner, Freeman & Gilbert, "Management" 6th Edition, Pearson International.

## Course Name: Operating System

Course Code: 13005100

### Course Outline

**Unit I: Introduction to operating system**, its need and operating system services; operating system classification – single user, multi user, simple batch processing, Multiprogramming, Multitasking, parallel Systems, Distributed system, Real time system  
Process Management: Process concept, Process scheduling, threads, overview of Inter process communication, CPU scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms.

**Unit II: Memory management:** Logical versus Physical address space, Swapping, Partition, Paging and segmentation. **Virtual memory:** Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing.

**Unit III: File Management:** File concept, access methods, and Directory structure – single level, two lever, tree structures, acrylic graph and general graph directory, file protection. Allocation methods: Contiguous, linked and index allocation, free space management.

**Unit IV: Device Management:** Disk Structure, Disk Scheduling, FCFS Scheduling, SSTF Scheduling, SCAN Scheduling, C-SCAN Scheduling, Disk Scheduling algorithm , **Dead Lock:** Deadlock characteristic, Prevention , Avoidance, Detection and Recovery, Critical Section, Synchronization, Hardware, Semaphore, Combined Approach to dead lock Handling

### **Suggested Readings:**

1. Operating System Concepts by Peterson, J.L. & Silberschatz, A. Addison Wesley, New Delhi.
2. Operating System Principles by Brinch, Hansen, PHI, New Delhi.
3. Operating System by Tanenbaum, A.S., PHI, New Delhi.
4. Operating System by Stalling Willams, PHI, Delhi.

## Course Name: Data Structure Using C

Course Code: 13004700

### Course Outline

**Unit I: Introduction to Data Structures** Basic Terminology, Elementary Data Organizations, Classification of data structures and its operations. **Arrays:** Representation

of single and multidimensional arrays (up to three dimensions) ; sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices; addition and subtraction of two sparse arrays. (Multidimensional, and, sparse arrays, to be given elementary treatment.)

**Stacks and Queues:** Introduction and primitive operations on stack; Stack application: Polish Notations; Evaluation of postfix expression; Conversion from infix to postfix; Introduction and primitive operations on queues; D-queues and priority queues.

**Unit II : Lists** Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, Two way lists and Use of headers **Trees:** Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion and deletion;

**Unit III :** Introduction to and creation of AVL trees and m-way search trees - (elementary treatment to be given); Multilevel indexing and B-Trees: Introduction; Indexing with binary search trees; Multilevel indexing, a better approach to tree indexes; Example for creating a B-tree.

**Unit IV : Sorting Techniques:** Insertion sort, selection sort and merge sort. **Searching Techniques:** linear search, binary search and hashing. (Complexities NOT to be discussed for sorting and searching)

**Suggested Readings:**

1. Ashok N. Kamthane, "Introduction to Data Structures in C", Pearson Edu.
2. Y. Langsam, Tananbaum, et. al., "Data Structures using C and C++", PHI, 1999.
3. Schaum's outline series, "Data Structure", TMH, 2002
4. Yashwant Kanetkar, "Data Structures Through C",BPB Publications, 2008
5. A.K. Sharma, " Data Structure Using C", Pearson
6. P. S. Deshpande and O.G. Kakde, "C & Data Structure", Wiley Dreamtech, 1st Edition, 2003.
7. Richard F. Gilberg & Behrouz A. Forouzan, " Data Structures – A Pseudocode

## **Course Name: Environmental Studies**

### **Course Code: 99001900**

**Course Outline:**

**Unit I** Introduction to environmental studies: Multidisciplinary nature of environmental studies; Scope and importance; Need for public awareness. Ecosystems: What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**Unit II** Natural Resources : Renewable and Non-renewable Resources, Land resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal



populations. Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

**Unit III:** Biodiversity and Conservation: Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots India as a mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

**Unit IV :** Environmental Pollution: Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution Nuclear hazards and human health risks, Solid waste management: Control measures of urban and industrial waste. Pollution case studies.

Environmental Policies & Practices: Sustainability and sustainable development. Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

**Unit V:** Human Communities and the Environment: Human population growth: Impacts on environment, human health and welfare. Resettlement and rehabilitation of project affected persons; case studies. Disaster management: floods, earthquake, cyclones and landslides. Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

**Field work;** Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds and basic principles of identification. Study of simple ecosystems-pond, river, Delhi Ridge, etc.

### **Suggested Readings**

1. Environmental Geography, H.M. Saxena, Rawat Pub.
2. A Textbook Of Environment, K.M. Agrawal; P.K. Sikdar; S.C. Deb, McMillanPub.
3. A Textbook of Environmental Studies, D K Asthana & Meera Asthana, S. Chand Pub.
4. Environmental Studies, V. K. Ahluwalia, The Energy and Resources Institute, Pub, (2012).
5. Environmental Chemistry, A.K. Dey, New Age Pub.
6. Environmental Biology, K.C. Agarwal, Nidi Pub. Ltd. Bikaner

## **Course Name: Digital Electronic Lab**

**Course Code: 13005000**

### **Course Outline**

#### **List of Experiments (Not limiting to)**

1. Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates; Realization of OR, AND, NOT and XOR functions using universal gates.
2. Half Adder / Full Adder: Realization using basic and XOR gates.
3. Half Subtractor / Full Subtractor: Realization using NAND gates.
4. 4-Bit Binary-to-Gray & Gray-to-Binary Code Converter: Realization using XOR gates.
5. 4-Bit and 8-Bit Comparator: Implementation using IC7485 magnitude comparator chips
6. Multiplexer: Truth-table verification and realization of Half adder and Full adder using IC74153 chip.
7. Demultiplexer: Truth-table verification and realization of Half subtractor and Full subtractor using IC74139 chip.
8. Flip Flops: Truth-table verification of JK Master Slave FF, T-type and D-type FF using IC7476 chip.
9. Asynchronous Counter: Realization of 4-bit up counter and Mod-N counter using IC7490 & IC7493 chip.
10. Synchronous Counter: Realization of 4-bit up/down counter and Mod-N counter using IC74192 & IC74193 chip.
11. Shift Register: Study of shift right, SIPO, SISO, PIPO, PISO & Shift left operations using IC7495 chip.
12. DAC Operation: Study of 8-bit DAC (IC 08/0800 chip), obtain staircase waveform using IC7493 chip.
13. ADC Operations: Study of 8-bit ADC.

## **Course Name: Operating System Lab**

**Course Code: 13005200**

1. Linux and Unix operating Systems program
2. Write a program to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information)
3. Write a program to report behaviour of Linux kernel including information on configured memory, amount of free and used memory. (memory information)

## **Course Name: Data Structure using C Lab**

### **Course Code: 13004800**

1. Revision of programs of Data Structures from pervious semester: Insertion Sort, Bubble Sort, Selection Sort, Linear Search, Binary Search
2. Write a Program to Implement a Linked List
3. Write a Program to Implement a Doubly Linked List
4. Write a Program to Implement a Stack Dynamically
5. Write a Program to Implement a Queue dynamically
6. Write a Program to Implement a Circular Linked List
7. Write a Program to Implement Binary Search Tree
8. Write a Program to Implement In order
9. Write a Program to implement Post order
10. Write a Program to implement Pre order
11. Write a Program to implement Heapsort
12. Write a program to implement Breadth First search
13. Write a program to implement Depth First search
14. Write a Program to implement Dijkstra's Algorithm
15. Write a Program to Implement Bubble Sort using Recursion
16. Write a Program to Implement Insertion Sort using Recursion
17. Write a Program to Implement Selection Sort using Recursion
18. Write a Program to Implement Linear Search using Recursion
19. Write a Program to Implement Linear Search using Recursion

**Note:** The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing

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