Detailed Course Scheme

Bachelor of Computer Applications

(BCA)

Semester-II

(2020-2021)

DOC202002260019

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 along with examination pattern is as follows:

Course Scheme

Semester –II

S. No.	Course Code	Course Name	L	T	P	Credits
1.	13006100	Mathematics-II	3	1	0	4
2.	13004900	Digital Electronics	3	0	0	3
3.	13005000	Digital Electronics Lab	0	0	2	1
4.	11011100	Principles of Management	3	0	0	3
5.	13005100	Operating System	3	0	0	3
6.	13005200	Operating System Lab	0	0	2	1
7.	13004700	Data Structure using C	3	0	0	3
8.	13004800	Data Structure using C Lab	0	0	2	1
9.	99001900	Environmental Studies	3	1	0	4
10.	13002800	Ability & Skill Enhancement - II	2	0	0	2
11.	99002800	Workshops & Seminars	-	-	-	1
12.	99002700	Human Values & Social Service /NCC/NSS	-	-	-	1
Total			**20**	**2**	**6**	**27**

EVALUATION SCHEME- THEORY

The evaluation of the theory paper of BCA 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:

Type	Details	Marks
Mid Term	Two Mid-term Sessional of 15 marks each (15+15)	30
Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc.	Average of marks obtained	15
Attendance	75%+: 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME -PRACTICAL

The evaluation of the practical paper of BCA 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	45
Attendance	75%+ : 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- WORKSHOPS & SEMINARS AND HUMAN VALUES & SOCIAL SERVICE/NCC/NSS

1. The evaluation of Workshops & Seminar and Human Values & Social Service/NCC/NSS will be completed from Semester I – Semester VI. It will be evaluated internally by the various Forums & Schools Concerned. The credit for this will be given at the end of each Semester.

2. The students have to join club/clubs/Forums with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of each Semester.

CURRICULUM

Course Name: Mathematics-II

Course Code: 13006100

Objectives

- This subject consists of the basic definition of set theory and it's real life applications. The main objective to learn this subject is to explore the new techniques used in the modern world using the theory of mathematics as well as computer applications.
- To get the Knowledge about sets, relations and functions.
- To study the basics of lattices and graphs.
- To get familiar with propositional logic.

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 Functions
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 Trignometric, 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 & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattics.

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

Objectives

- To learn about the design principles of different digital electronic circuits
- To study the applications of above circuits
- To provide an overview of the various digital logic gates and circuits. Implementation and verification of various logic circuits.

Course Outline

Unit I: Number System
Decimal numbers, binary numbers, binary arithmetic, 1'sand2's complements, octal, Numbers, hexa decimal numbers, inter conversions of number systems, Digital codes: Binary coded decimal (BCD),Gray code, Excess-3code, Format of ASE II 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:

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

Course Name: Digital Electronics 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. De multiplexer: 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: Principles of Management

Course Code: 11011100

Objectives

- This course aims to empower students with knowledge and capacities to understand and analyze general Management, from a corporate and consumer perspective. Lectures are a mix of theory and practical exercises to improve memorization, to increase students' involvement and work capacities and to make lectures more dynamic. The concepts will be discussed through case study discussions and presentations on practical aspects.
- To get the knowledge about the important management concepts & their application.
- To have an insight of various functional departments in an organization.

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, Behavioural, 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 behaviour 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

Objectives

- Operating System Also Known as the Resource Manager Means Operating System will Manages all the Resources those are Attached to the System means all the Resource like Memory and Processor and all the Input output Devices those are Attached to the System are Known as the Resources of the Computer System and the Operating system will Manage all the Resources of the System. The Operating System will identify at which Time the CPU will perform which Operation and in which Time the Memory is used by which Programs. And which Input Device will respond to which Request of the user means When the Input and Output Devices are used by the which Programs. So this will manage all the Resources those are attached to the Computer System.
- To Understand the services provided by an operating system.
1. To acquire the fundamental knowledge of the operating system architecture and its components
2. To know the various operations performed by the operating system.

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: Operating System Lab

Course Code: 13005200

Objectives

This lab introduces basic commands in LINUX and helps students in familiarizing the concepts of operating system through various commands related to operating system activities.

Course Outline

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

Course Code: 13004700

Objectives

- To provide the knowledge of fundamental concepts of data structures using the c programming language so that students should get to know that how we are managing various kinds of data in the computer system and how it is accessed in a proper way.
- Understand the use and working of the various data structures.
- Learn to be able to build own algorithms and pseudo codes for the various applications of the basic data structures.

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. YashwantKanetkar, "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: Data Structure using C Lab

Course Code: 13004800

Objectives
The course is designed to provide a practical exposure on data structure and its applications.

Course Outline

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 Inorder

9. Write a Program to implement Postorder
10. Write a Program to implement Pretorder
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

Course Name: Environmental Studies

Course Code: 99001900

Objectives:

- To gain knowledge about environment and its conservation along with sustainable development.
- To define and use correctly the common terms of environmental science.
- To explain what makes up the environment, how it functions, and how humans are part of it.
- To apply the concepts and principles of environmental science to propose solutions to specific environmental problems.
- To analysis environmental writings and predictions and their impact on subsequent developments in human relationship with the environment.
- To evaluate the adequacy of conclusions about environmental phenomena.

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. Bharucha, E. 2003, Textbook for Environmental Studies, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environmental Education and Research, Pune. 361.
2. Carson, Rachel. 1962. Silent Spring (Boston: Houghton Mifflin, 1962), Mariner Books, 2002

3. Economy, Elizabeth. 2010. The River Runs Black: The Environmental Challenge to China's Future.
4. Gadgil, M. & Ramachandra, G. 1993. This fissured land: an ecological history of India. Univ of California Press.
5. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
6. Grumbine, R. Edward, and Pandit, M.K. Threats from India's Himalaya dams. Science 339.6115 (2013): 36-37.
7. Heywood V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press.
8. McCully, P. 1996. Silenced rivers: the ecology and politics of large dams. Zed Books.
9. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
10. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders. 214
11. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic press, 2011.
12. Rao MN and Datta AK, 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
13. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
14. Ricklefs, R. E., & Miller, G.L. 2000. Ecology. W. H. Freeman, New York.
15. Robbins, P. 2012. Political ecology: A critical introduction. John Wiley & Sons.
16. Rosencranz, A., Divan, S. & Noble, M.L.. Environmental law and policy in India. 2001. Tripathi 1992.
17. Sengupta, R. 2003. Ecology and economics (OUP): An approach to sustainable development." OUP Catalogue.
18. Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. Ecology, Environment and Resource Ecology, Environment and Resource Conservation. Anamaya Publishers.
19. Sodhi, N.S., Gibson, L. & Raven, P.HG. (eds). 2013. Conservation biology: voices from the Tropics. John Wiley & Sons.
20. Van Leeuwen, C. J., & Vermeire, T. G. 2007. Risk assessment of chemicals.
21. World Commission on Environment and Development. 1987. Our Common Future. Oxford: Oxford University Press.

Course Name: Ability and Skill Enhancement II

Course Code: 13002800

Objectives

- To improve the communication skills of the students with respect to pronunciation. The classes are interactive, and activity based.
- ASE continuously looks for ways to develop the skills, abilities, and competencies to enhance the confidence in students. Through effective skill enhancement, students become more capable, competent, and confident in their performance, it's the better platform to reach the goals.

Course Outline - Final Assessment – Debate/Group Discussion

Unit I- Phonetics Phonetic symbols and the International Phonetic Alphabets (IPA), The Description and Classification of Vowels (Monophthongs & Diphthong) Consonants, Phonetic Transcription & Phonology, Syllable, Stress & Intonations, Reading aloud, recording audio clips.

Unit II – Vocabulary Building Idioms and Phrases, Words Often Confused, One word Substitution, Word Formation: Prefix & Suffix.

Unit – III Ethics & Etiquettes What are ethics, what are values, difference between ethics and morals, Business ethics, workplace ethics, what are virtues for e.g. civic virtues, etc. Human ethics and values- 5 core human values are: right conduct, living in peace, speaking the truth, loving and care, and helping others.

Etiquette awareness, Importance of First Impression, Personal Appearance & Professional presence, Personal Branding, Dressing Etiquette, Dining Etiquette.

Unit IV – Reading & Writing Skills Reading Comprehension, News Reading, Picture Description, Paragraph Writing, News Writing.

Unit V - Listening & Speaking Skills Public Speaking, Debate, Inspirational Movie Screening, Skit Performance.

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

------------------ End of document--------------------