

Detailed Program Scheme
Bachelor of Computer Applications
(BCA)

Semester-IV
(2017-2020)

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RNB
GLOBAL UNIVERSITY
Educating stars for tomorrow

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 (January-June) Even Semester, 2019 along with examination pattern is as follows:

Course Scheme

Semester -IV

S. No.	Course Code	Course Name	L	T	P	Credits
1.	13010200	Java Programming Language	3	0	0	3
2.	13010300	Java Programming Language Lab	0	0	2	1
3.	13010600	Computer Networks	3	1	0	4
4.	13010700	Computer Networks Lab	0	0	2	1
5.	13010400	Computer Graphics	3	0	0	3
6.	13010500	Computer Graphics Lab	0	0	2	1
7.	13011000	Optimization Technique	3	1	0	4
8.	13011100	Software Engineering	3	1	0	4
9.	13010800	Web Technology	3	1	0	3
10.	13010900	Web Technology Lab	0	0	2	1
11.	13003000	Ability & Skill Enhancement - IV	2	0	0	2
12.	99002700	Human Values & Social Service/NCC/NSS	-	-	-	1
13.	99002800	Workshops & Seminars	-	-	-	1
Total			20	4	8	29

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 & NCC/NSS

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of each 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 to Semester-IV and credits and marks would be given after the end of each Semester.

CURRICULUM

Course Name: Java Programming Language

Course Code: 13010200

Objectives

- To make students well versed with programming in java.
- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be aware of the important topics and principles of software development.
- Have the ability to write a computer program to solve specified problems.
- Be able to use the Java SDK environment to create, debug and run simple Java programs.

Course Outline

Unit I: Introduction

Object oriented programming, characteristics of object orientated languages, classes, **Java Programming**: Introduction, Data types, access specifiers, operators, control statements, arrays. Classes: Fundamentals, objects, methods, constructors. **Inheritance**: Super class,

sub class, this and super operator, method overriding, use of final, packages, abstract class, interface. **Polymorphism:** Method overloading, constructor overloading.

Unit II: Exception Handling

Exception Class, built in checked and unchecked exceptions, user defined exceptions, use of try, catch, throw, throws, finally. **Multi threaded programming:** Overview, comparison with multiprocessing ,Thread class and runnable interface, life cycle, creation of single and multiple threads, thread priorities, overview of Synchronization. **Java Library:** String handling (only main functions), String Buffer class. Elementary concepts of Input/output :byte and character streams, System. in and System. out, print and println, reading from a file and writing in a file.

Unit III: Software Development using Java

Applets: Introduction, Life cycle, creation and implementation, AWT controls: Button, Label, Text Field, Text Area, Choice lists, list, scrollbars, check boxes, Layout managers, Elementary concepts of Event Handling :Delegation Event Model, Event classes and listeners, Adapter classes, Inner classes. **Swings:** Introduction and comparison with AWT controls.

Unit IV: Networking Basics

Socket (datagram and TCP/IP based client and server socket), factory methods, InetAddress **JDBC:** JDBC Architecture, JDBC Drivers, Connecting to the Database **Introduction to Java Servlets:** Life cycle, Interfaces and classes in javax. servlet package(only description) Creating a simple servlet.

Suggested Readings:

1. Patrick Naughton and Herbert Schildt, "Java-2 The Complete Reference", TMH.
2. Y. Daniel Liang, "Introduction to Java Programming, Comprehensive Version, 7/e" Pearson.
3. Krishnamoorthy R, PrabhuS, "Internet and Java Programming", New Age Intl.
4. David Flanagan, Jim Farley, William Crawford and Kris Magnusson, "Java Enterprise in aNutshell", O'Reilly.

Course Name: Java Programming Language Lab

Course Code: 13010300

Course Outline

1. Write a program to display "Hello World" in 'JAVA' language.
2. Implementation of input and output statements
3. Implementation of control statements.
4. Implementation of functions.
5. Implementation of single dimension, two dimension and three dimension array

6. Write a JAVA program that uses a recursive function for solving Towers of Hanoi problem.
7. Write a JAVA program to implement the matrix ADT using a class. The operations supported by this ADT are:
 - a) Reading a matrix.
 - b) Addition of matrices.
 - c) Printing a matrix.
 - d) Subtraction of matrices.
 - e) Multiplication of matrices.
8. Write a JAVA program that overloads the + operator and relational operators (suitable) to perform the following operations:
 - a) Concatenation of two strings.
 - b) Comparison of two strings.
9. Write JAVA programs that illustrate how the following forms of inheritance are supported:
 - a) Single inheritance
 - b) Multiple inheritance
 - c) Multi inheritance
 - d) Hierarchical inheritance
10. Write JAVA programs that illustrate how the following forms of inheritance are supported:
 - a) Single inheritance
 - b) Multiple inheritance
 - c) Multi inheritance
 - d) Hierarchical inheritance
11. Write a JAVA program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class

Course Name: Computer Networks

Course Code: 13010600

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.
- The students will be exposed different types of media, multiplexing, switched networks, the Internet, TCP/IP suite, fibre-optic communications and the state-of-art networking applications.
- Various transmission media, their comparative study, fibre optics and wireless media
- Categories and topologies of networks (LAN and WAN) and TCP/IP) and protocol suites
- Channel error detection and correction, MAC protocols, Ethernet and WLAN
- Details of IP operations in the Internet and associated routing principles

Course Outline

Unit I: Introduction

Motivation, OSI model, Signals and media, Bits over signals, Synchronous communication, Modulation and modems, Bandwidth, Throughput, and noise, Time division and Frequency division multiplexing, Standards.

Unit II: Packet Transmission

Multiplexing, Frames, Error correction techniques, LAN/WAN topologies, Shared media and media access, Bus topology, CSMA/CD, Wireless and CSMA/CA, Ethernet addressing and Wiring, hubs.

Unit III: Other LAN technologies

Ring topology, Token passing rings, FDDI, Star topologies, Asynchronous transfer mode, IEEE 802.3, 802.5.

Routing Algorithms: Distance-Vector, Link-State, Shortest path computation, Dijkstra's algorithm, WAN technologies including frame relay, X.25, and ATM.

Unit IV: Internet working

Motivation, Concept, Goals, IP addressing, Address binding with ARP, IP Datagram, Encapsulation IP fragmentation and reassembly, ICMP, TCP, UDP concept and datagrams, **Network Services:** Electronic mail, File transfer, Remote login-introduction to protocol specification, Validation and testing.

Suggested Readings:

1. Forouzan, B.A., Data communication and Networking, McGraw Hill (2006) 4th ed.
2. Tanenbaum, A.S., Computer Networks, Prentice Hall (2003) 4th ed.
3. Comer, D.E., Internetworking with TCP/IP Vol. 1 Principles, Portals and Architecture, Prentice Hall of India (2005) 5th ed.
4. Stallings, W., Computer Networking with Internet Protocols and Tech., Prentice Hall of India (2007).

Course Name: Computer Networks Lab

Course Code: 13010700

Course Outline

List of Experiments

1. Study of different Network cables and practically implement the cross-wired cable and straight through wire using clamping tool.

2. Study Network tools and basic devices.
3. Study of Network IP addressing.
4. To study about different physical equipment's used for networking.
5. To study different internetworking devices in a computer network.
6. Aim: To study the working of Basic Networking Commands.
7. To assign IP address to the PC connected to the internet.
8. To connect the computers in Local Area Network.

Course Name: Computer Graphics

Course Code: 13010400

Objectives

- To understand the graphics applications and its use.
- After completing this course, students will be able to:
- Identify and explain the core concepts of computer graphics.
- Apply graphics programming techniques to design, and create computer graphics scenes.
- Create effective OpenGL programs to solve graphics programming issues, including 3D transformation, objects modeling, colour modeling, lighting, textures, and ray tracing.

Course Outline

Unit I: Introduction

The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Application Development of Hardware and software for computer Graphics, Conceptual Framework for Interactive Graphics, Overview, Scan: Converting Lines, Scan Converting Circles, Scan Converting Ellipses.

Unit II: Hardcopy

Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners, Working exposure on graphics tools like Dream Weaver, 3D Effects etc, **Clipping** Southland- Cohen Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision Algorithm.

Unit III: Geometrical Transformation

2D Transformation, Homogeneous Coordinates and Matrix Representation of 2D Transformations, composition of 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix.

Unit IV

Introductory Concepts: Multimedia Definition, CD-ROM and the multimedia highway, Computer Animation (Design, types of animation, using different functions), Uses of Multimedia, Introduction to making multimedia – The stage of Project, hardware & software requirements to make good multimedia skills and Training opportunities in Multimedia Motivation for Multimedia usage.

Suggested Readings:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
2. D.J. Gibbs & D.C. Tschritz: Multimedia programming Object Environment& Frame work , 2000
3. Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
4. D.Harn& Baker. Computer Graphics Prentice Hall of India,1986

Course Name: Computer Graphics Lab

Course Code: 13010500

Course Outline

1. Students are required to understand the graphics library available in Compiler and other graphical software
2. Preliminary study of Open GL, Open CV
3. To make small program of graphics using C, JAVA

Course Name: Optimization Technique

Course Code: 13011000

Objectives

- Optimization theory and methods have been applied in many fields to handle various practical problems. In light of advances in computing systems, optimization techniques have become increasingly important and popular in different engineering applications.

Course Outline

Unit I: Linear programming

Central Problem of linear Programming various definitions included Statements of basic theorem and also their properties, simplex methods, primal and dual simplex method, transport problem, tic-tac problem, and its solution. Assignment problem and its solution. Graphical Method Formulation, Linear Programming Problem.

Unit II: Queuing Theory

Characteristics of queuing system, Classification of Queuing Model Single Channel Queuing Theory, Generalization of steady state M/M/1 queuing models (Model-I, Model-II).

Unit III: Inventory Theory

Cost involved in inventory problem- single item deterministic model economics long size model without shortage and with shorter having production rate infinite and finite.

Unit IV: Job Sequencing

Introduction, solution of sequencing problem Johnson s algorithm for n jobs through 2 machines.

Suggested Readings :

1. Gillet B.E. "Introduction to Operation Research"
2. Taha,H.A. "Operation Research - an introduction"
3. Kanti Swarup "Operation Research"

Course Name: Web Technology

Course Code: 13010800

Objectives

- Students should be able to design and implement a basic website.
- Students should be able to implement different navigation strategies.
- Students should be able to use client-side technologies (XHTML, CSS, forms, JavaScript).
- Students should be able to develop simple back-end database to support a website.
- Students should be able to recognize and evaluate website organizational structure and design elements.
- This course is intended to teach the basics involved in publishing content on the World Wide Web.
- This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a

specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.

- This will also expose students to the basic tools and applications used in Web publishing. To provide an overview of the various business process, analyze operations, production planning.

Course Outline

Unit I

History of the Internet and World Wide Web, Search Engines, News-group, E-mail and its Protocols, Web Portal, Browsers and their versions, Its functions, URLs, web sites, Domain names, Portals. Static Web Development: HTML - Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and Sound, lists types of lists, tables, frames and floating frames, Developing Forms, Image maps.

Unit II

Introduction to Java Script: Data Types, Control Statements, operators, Built in and User Defined Functions, Objects in Java Script, Handling Events. Cascading Style Sheet: Types of Style Sheets – Internal, inline and External style sheets, creating styles, link tag.

Unit III

DHTML: Introduction to DHTML, Java Script & DHTML, Document Object Model, Filters, and Transitions, DHTML Events, Dynamically change style to HTML Documents.

Unit IV

Introduction to WYSIWYG Design tools, Introduction to Dreamweaver, Website Creation and maintenance, Web Hosting and Publishing Concepts, XML: Introduction to XML-Mark up languages, Features of Mark up languages, XML Naming rules, Building block of XML Document, Difference between HTML & XML Components of XML, XML Parser, DTD's Using XML with HTML and CSS.

Suggested Readings:

1. The complete reference HTML, by Thomas A Powell, TMH publication.
2. Mastering HTML 4.0 by Deborah S. Ray and Erich J. Ray. BPB Publication.
3. Internet and World Wide Web Deitel HM, Deitel, Goldberg, Third Edition
4. HTML Black Book, Stephen Holzner, Wiley Dreamtech.
5. Rajkamal, "Web Technology", Tata McGraw-Hill, 2001.
6. Jeffrey C. Jackson, "Web Technologies : A Computer Science Perspective", Pearson.

Course Name: Web Technology Lab

Course Code: 13010900

Course Outline

1. Students are to develop individual web pages, which should include, picture, audio, running text
2. Students are also supposed to work and learn about various CMS available, hands on practice in front page/Web Publishing of MS Office

Course Name: Software Engineering

Course Code: 13011100

Objectives

- To gain knowledge of various software models.
- To gain knowledge of various software design activities.
- To learn cost estimation, software testing, Maintenance and debugging.
- To provide the knowledge regarding the software requirement process, designing process, testing and coding process so that students should get to know that how we are developing a complete software.

Course Outline

Unit I: Introduction

Introduction to Software Engineering, importance of Software, The Software Evolution, Software Characteristics, Software Applications, Software Crisis: Problem and Causes
Software Development Life Cycle: Waterfall model, Incremental and Evolutionary process models, Personal Software process (PSP) and Team Software process (TSP), Overview of agile process and aspect oriented programming

Unit II: Software Requirement Specification

Problem Analysis, Requirement elicitation and Validation, Requirements modeling: Scenarios, Information and analysis classes, flow and behavioral modeling, documenting Software Requirement Specification (SRS).

System Design: Design Concepts, design models for architecture, component, data and user interfaces; Problem Partitioning, Abstraction, Cohesiveness, Coupling, Top Down and Bottom Up design approaches; Functional Versus Object Oriented Approach, Design Specification, 4GL.

Unit III: Coding

TOP-DOWN and BOTTOM-UP structure programming, Information Hiding, Programming Style, and Internal Documentation, Verification. **Software Testing:** Levels of Testing, Functional Testing, Structural Testing, Test Plan, Test Case Specification, Software Testing Strategies, Verification & Validation, Unit, Integration Testing, Top Down and Bottom Up Integration Testing, Alpha & Beta Testing, White box and black box testing techniques, System Testing and Debugging.

Software Quality Assurance: Software Configuration Management, Overview of Software Quality Control and Quality Assurance, ISO 9000 Certification for Software Industry, SEI Capability Maturity Model (CMM) and Comparison between ISO & SEI CMM.

Unit IV: Technical Metrics for Software

A Framework for Technical Software Metrics, Metrics for the Analysis Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

CASE (Computer Aided Software Engineering): CASE and its Scope, CASE support in Software Life Cycle, Documentation Support, Architecture of CASE Environment. Exposure to CASE tools like Rational Software suit, Turbo Analyst, Silk Suite.

Suggested Readings:

1. Roger S. Pressman, Software Engineering, A Practitioner's Approach, McGraw Hill International Edition (2009) 7th edition.
2. Ian Sommerville, Software Engineering, Addison-Wesley Publishing Company, (2006) 8th ed.
3. Watts Humphery, A discipline for Software Engineering, Addison Wesley, Massachusetts (1995).
4. James F. Peter, Software Engineering - An Engineering Approach, John Wiley (2004).
5. Pankaj Jalote, An integrated Approach to Software Engineering, Narosa (2005).

Course Name: Ability & Skill Enhancement IV

Course Code: 13003000

Objectives

- The objectives of the module are to make students self-confident individuals by developing leadership and organising skills; to guide students in making appropriate and responsible decisions; to give each student a realistic perspective of work related skills and to help students prepare effective interview questions to conduct effective interviews.

Course Outline - Final Assessment – Mock Interviews & PI Kit Submission

Unit I - Tele – Etiquettes

Receiving Calls, Placing a call, Ending Calls, Transferring calls, Taking Message/ Voice Mails, Placing call on hold, Handling Complaints.

Unit II : Confidence Building & Brain Storming

How to build confidence by positive thinking, identifying negative thoughts, how to control negative thoughts entering our mind, identifying personal talents, and its ways to improve, how to develop good habits and having principles and follow them at all times.

Need to learn new things, ideas and skills, what is brain storming, why do we need it, what are the different ways of brain storming through logics and reasoning, Brain Storming Session.

Unit III: PI Kit

What is resume, Format of Resume, Formatting, Resume Preparation, Covering Letter, PI Kit.

Unit IV: Interview Skills

Mastering the art of giving interviews in - selection or placement interviews, web /video conferencing, Mock Interview, HR Expert Mock Interview, Telephonic Interviews.

Unit V: Internship Preparation: Company Specific Research and Presentation

Identifying domain specific industries, researching the industry, Industry analysis, Presentation on specific industry/company.

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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