Detailed Program

Bachelor of Technology (B.Tech.) (Computer Science Engineering)

Semester-IV

(2020-21)

DOC202002260012

RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road,
Bikaner, Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System. Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June).** Besides this, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for B. Tech (CSE) Program along with examination pattern is as follows:

Course Scheme

Semester – IV

S. No.	Course Code	Course Title	L	T	P	Credits
1.	19005300	Optimization Techniques	3	0	0	3
2.	19006100	Advanced Numerical Techniques Computation Lab (ANTC)	0	0	4	2
3.	19003700	Computer Architecture	3	0	0	3
4.	19006000	Software Engineering	3	0	0	3
5.	19005600	Computer Networks	3	0	0	3
6.	19005700	Computer Networks Lab	0	0	2	1
7.	19005800	Principles of Programming Languages	3	0	0	3
8.	19005900	Principles of Programming Languages Lab	0	0	2	1
9.	19005400	Web Technologies	3	0	0	3
10.	19005500	Web Technologies Lab	0	0	2	1
11.	11017100	Organizational Behavior	2	0	0	2
12.	19006200	Ability and Skill Enhancement-IV	2	0	0	2
13.	99002800	Workshops & Seminars	-	-	-	1
14.	99002700	Human Values & Social Service/NCC/NSS	-	-	-	1
		Total	**22**	**0**	**10**	**29**

EVALUATION SCHEME- THEORY

The evaluation of the theory paper of B.Tech 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 B.Tech 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: Optimization Techniques

Course Code: 19005300

Objectives

- The main objective of the course is to formulate mathematical models and to understand solution methods for real life optimal decision problems. The emphasis will be on basic study of linear programming problem, Integer programming problem, Transportation problem, two-person zero sum games with economic applications and project management techniques using PERT and CPM.

Course Outline

Unit I: Scope of Operations Research
Introduction to linear and non-linear programming formulation of different models; **Linear Programming:** Geometry of linear programming, Graphical method, Linear programming (LP) in standard form, Solution of LP by simplex and revised simplex methods, Exceptional cases in LP, Duality theory, Dual Simple method, Sensitivity analysis.

Unit II: Network Analysis
Transportation problem (with transshipment), Assignment problem, Traveling-salesman problem, shortest route problem, Minimal spanning tree, Maximum flow problem; **Integer Programming:** Branch and bound algorithm, Traveling salesman problem.

Unit III: Dynamic programming
Forward recursions, General problem, Reliability problem, Capital budgeting problem, Cargo-loading problem; **CPM and PERT:** Drawing of networks, Removal of redundancy, Network computations, Free slack, Total slack, Crashing, Resource allocation.

Unit IV: Non-Linear Programming
Characteristics, Concepts of convexity, maxima and minima of functions of n-variables using Lagrange multipliers and Kuhn-Tuker conditions, One dimensional search methods, Fibonacci, golden section method and gradient methods for unconstrained problems.
Software: Introduction to software for optimization techniques (TORA).

Suggested Readings:

1. Taha, H.A., Operations Research: An Introduction, Prentice Hall of India (2007) 8th ed.
2. Kasana, H.S., Introductory Operation Research: Theory and Applications, Springer Verlag (2005).
3. Rardin, Ronald L., Optimization in Operations research, Pearson Education (2005).
4. Ravindran A, Phllips D.T. and Solberg J.J. Operation Research: Principles and Practice, John Wiley (2007).

Course Name: Advanced Numerical Techniques Computation Lab (ANTC)

Course Code:19006100

Course Outline

Laboratory Work

Programming exercises on numerical and Statistical methods using C or C++ languages.

1. To detect the interval(s) which contain(s) root of equation f(x)=0 and implement bisection Method to find root of f(x)=0 in the detected interval.
2. To find the root of f(x)=0 using Newton-Raphson and fixed point iteration methods.
3. To evaluate the Newton's Forward Lagrange and divided difference interpolating polynomials of degree ≤ n, Based on (n+1) points.
4. To solve linear system of equations using Gauss elimination (without pivoting) method.
5. To solve linear system of equations using Gauss- seidel method.
6. To find the dominant eigen-value and associated eigen-vector by Rayleigh power method.
7. To integrate a function numerically using trapezoidal and Simpson's rule.
8. To solve the initial value problem using modified Euler's and Runge-kutta methods.
9. Generation of random numbers for Binomial and Poisson distributions using Linear Congruential Genrator Algorithm.
10. Regression analysis using least square principle.

11. Correlation analysis for bivariate distribution.

Suggested Readings:

1. Conte, S.D and Carl D. Boor, Elementary Numerical Analysis: An Algorithmic approach, Tata McGraw Hill, New York (2005).
2. Johnson, R., Miller, I. and Freunds, J., Miller and Freund's Probability and Statistics for Engineers, Pearson Education(2005) 7th ed.
3. Gerald C.F and Wheatley P.O., Applied Numerical Analysis, Pearson Education (2008) 7th ed.
4. Mathew, J.H., Numerical Methods for Mathematics, Science and Engineering, Prentice Hall Inc.J (2002).
5. Meyer, P.L.. Introductory Probability and Statistical Applications, Oxford (1970) 2nd ed.
6. Jain M.K., Iyengar, S.R.K., and Jain, R.K. Numerical Methods for Scientific and Engineering Computation, New Age International (2008) 5th ed.
7. Walpole, Ronald E., Myers, Raymond H., Myers, Sharon L. and, Keying Ye, Probability and Statistics for Engineers and Scientists, Pearson Education (2007) 8th ed.

Course Name: Computer Architecture

Course Code: 19003700

Objectives

- To equip the students with the internal architecture, organization and design of computer systems.
- To understand the basic structure and operation of digital computer
- To study the design of arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations
- To study the two types of control unit techniques and the concept of pipelining
- To study the hierarchical memory system including cache memories and virtual memory To study the different ways of communicating with I/O devices and standard I/O interfaces

Course Outline:

Unit I: Basics of Digital Electronics
Codes, Logic gates, Flip flops, Registers, Counters, Multiplexer, Demultiplexer, Decoder, Encoder. **Register Transfer and Micro operations:** Register transfer Language, Register transfer, Bus & memory transfer, Logic micro operations, Shift micro operation. **Basic Computer Organization:** Instruction codes, Computer instructions, Timing & control, Instruction Cycles, Memory reference instruction, Input/Output & Interrupts, Complete computer description & design of basic computer.

Unit II: Control Unit
Hardwired vs. Micro programmed control unit. **Central Processing Unit**: General register organization, Stack organization, Instruction format, Data transfer & manipulation, Program control, RISC, CISC.
Computer Arithmetic: Addition & subtraction, Multiplication Algorithms, Division algorithms.

Unit III: Input-Output Organization
Peripheral devices, I/O interface, Data transfer schemes, Program control, Interrupt, DMA transfer, I/O processor.

Memory Unit: Memory hierarchy, Processor vs. memory speed, High-speed memories, Cache memory, Associative memory, Interleave, Virtual memory, Memory management.

Unit IV: Introduction To Parallel Processing
Pipelining, Characteristics of multiprocessors, Interconnection structures, Interprocessor arbitration, Interprocessor communication & synchronization.

Suggested Readings:
1. Mano, Morris M., Computer System Architecture, Prentice Hall (1992) 3rd ed.
2. Hayes, J.P., Computer Architecture and Organization, McGraw Hill (1998) 3rd ed.
3. Hennessy, J.L., Patterson, D.A, and Goldberg, D., Computer Architecture A Quantitative Approach, Pearson Education Asia (2006) 4th ed.
4. Leigh, W.E. and Ali, D.L., System Architecture: software and hardware concepts, South Wester Publishing Co. (2000).

Course Name: Software Engineering

Course Code: 19006000

Objectives:

- Planning and Estimation of Software projects
- Software Requirements Specification, Software Design Concepts
- Implementation issues ,Validation and Verification Procedures
- Maintenance of Software and methodologies
- To apply principles of software development and evolution. To specify, abstract, verify, validate, plan, develop and manage large software and learn emerging trends in software engineering.

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, SilkSuite.

Suggested Readings:

1. Roger S. Pressman, Software Engineering, A Practitioner's Approach, McGrawHill 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: Computer Networks

Course Code: 19005600

Objectives

- To develop an understanding of modern network architectures from a design and performance perspective.
- To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
- To provide an opportunity to do network programming
- To provide a WLAN measurement idea.
- The subject will introduce the basics of computer networks to students through a study of layered models of computer networks and applications

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: 19005700

Course Outline

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: Principles of Programming Languages

Course Code: 19005800

Objectives

- Concepts of High level languages and its grammar
- Study of Imperative languages (Pascal and C)
- Study of Object oriented Programming (C++ and JAVA)
- Study of Functional Programming (Haskell / Lisp)
- Study of Logic Programming (Prolog and SQL)

Course Outline:

Unit I : Introduction
Study of principles and major concepts in various programming paradigms like imperative, Functional, Object-oriented and logic programming; Introduction to various phases of compilers, Formal translation models: BNF Grammars and Macroprocessors.

Imperative programming: Location, reference and expressions, Assignment and control, Data types, Blocks, Procedures and Modules.

Unit II : Object Oriented Programming
Concept of classes and objects, Introduction to abstraction and encapsulation, Inheritance and Polymorphism; **Functional Programming:** Functions as first class objects, Higher order functions, Polymorphic data types, Type checking and Type inferencing.

Unit III: Logic Programming
Introduction to logic, Unification, Backtracking; **Introduction to storage management:** Introduction to storage management from programmer's view, Static storage management, Heap storage management.

Unit IV: Concurrent Programming
Concept of concurrent programming, Processes, and Synchronization primitives; Case study/ Seminar on State-of-the-art topics in Programming Languages: Markup Languages, Wireless Markup Languages, Mobile agent paradigm, Cloud Computing etc. Illustration of the above concepts using representative languages: C, C++, Java, LISP and Prolog etc.

Course Name: Principles of Programming Languages Lab

Course Code:19005900

Course Outline

Laboratory work

1. Implementation of object-oriented concepts like inheritance, Polymorphism.
2. Programming in PHP, PERL, Markup Languages.
3. Implementation of concurrent programming, logic programming and use of open source tools (eg. LAMP).
4. Approximately four projects will be assigned on different languages/platforms.

Suggested Readings

1. Pratt, T.W. and Zelkowitz, M.V., Programming Languages - Design and Implementation, Prentice Hall (2006) 4th ed.
2. Sebesta, R.W., Concepts of Programming Languages, Addison Wesley (2008) 8th ed.
3. Sethi, Ravi, Programming Languages-Concepts and Constructs, Addison-Wesley (1996).
4. Tucker, A.B. and Noonan, R., Programming Languages-Principles and Paradigms, McGraw Hill (2007) 2nd ed.

Course Name: Web Technologies

Course Code:19005400

Objectives:

- Basic web concept and Internet protocols.
- CGI Concepts & CGI Programming
- SCRIPTING LANGUAGES
- Study of DHTML, XML
- Study of On-Line web application & Internet Concepts

Course Outline:

Unit I: Basics of Internet
Concepts, Architecture: Internet, Intranet and Extranet, Design Goals, Issues and related aspects, addressing schemes, protocols, applications - e-mail, ftp, telnet, WWW, IRC.

Unit II: Intranet Connectivity
Connection concepts, FDDI, ISDN, ADSL, PPP and ATM, Web servers and browser's , web server, proxy server, web browser.

Unit III: Network Security
Network Security attacks and vulnerabilities of Network system, Data Security Encryption, key protocols, Document signatures, firewalls;

Client Side Scripting: Introduction to Javascript and DHTML.

Unit IV: Web Programming
Introduction to Web Pages, HTML, HTTP, SHTTP and XML, Front Page Forms and Form Handlers, Site design and Navigation, Java Programming - class design, inheritance, overloading, polymorphism, exception handling, file streams and their manipulation, servlets, JSP, JDBC,.NET technologies.

Course Name: Web Technologies Lab

Course Code: 19005500

Course Outline

Laboratory Work:

- Exploring various web browsers and web servers ,
- Designing web pages in HTML and XML.

- Using Front Page express.
- Programming for web in Java and JSP.

Suggested Readings:

1. Raj Kamal, Internet and Web Technologies , TMH,200
2. Bayross, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI , BPB Publications, 2000.
3. C Xavier , World Wide Web Design,   TMH, 2001
4. Monica D'Souza , Web publishing TMH, 2001
5. HeithMorneau , Active Server Pages, Vikas Publishing House,2000
6. Ravi Kalkota, Frontiers of electronic commerce, Addison Wesley, 2000

Course Name: Organizational Behavior

Course Code: 11017100

Objectives

- Subject OB prepares students about basic psychology of job. It makes pupil understand about various behavioral aspects when working in an organization at any level.
- To understand the implications of individual and group behaviour in organizational Context. The students will conceptualize the components of individual and group behaviour, understand the practicability of communication and understand the various work, situations and apply behavioural techniques

Course Outline:

Unit I: Introduction to Organizational Behaviour
Today's Organizations, Challenges, Foundations of Organizational Behaviour, Individual Behaviour: Perception, Values, Attitudes Motivation theories. Employees Motivations in Organization, Management by Objectives Learning Processes, Reward and Punishment;

Unit II: Foundations of Group Behaviour
Interpersonal Communication, Leadership, Emotional Intelligence. Power & Polities, Conflict Process, Negotiations, Stress and Coping, Inter-Group Relations, Team Working.

Unit III: A Macro Perspective of Organizational Behaviour
Organization Structure – Key Elements, Types and Basic Models, Work Design, Organizational Change, and Learning Organizations;

Unit IV: Organizational Behaviour
Future Challenges Gender Diversity at the place of work, changing world Scenario, Role of External Environment.

Achieving Competitive: Advantage Management of change, International issues in Organizational Behaviour;

Suggested Readings

1. Robbins, S.P., Organizational Behaviour, PHI (2007) 8th ed.
2. Lufthans F., Organizational Behaviour, Irwin Mc-Graw Hill. (2007) 11th ed.
3. Hellriegal, D., and Slocum, J.W., Organizational Behaviour, Southwestern Educational Publishing (2008).

Course Name: Ability & Skill Enhancement - IV

Course Code: 19006200

Objectives:

- The objectives of the module are to make students self-confident individuals by developing leadership and organizing 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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