Rayat Shikshan Sanstha's

SADGURU GADAGE MAHARAJ COLLEGE, KARAD.

(An Autonomous)

Accredited By NAAC with 'A^{+} (3.63 CGPA)' Grade

ISO- 9001-2015 Certified

Affiliated to Shivaji University, Kolhapur

B.Sc Computer Science(Optional) Part-III

DEPARTMENT OF COMPUTER SCIENCE

Under the Faculty of Science and Technology

Choice Based Credit System (CBCS)

Regulations in accordance with **National Education Policy**
to be implemented from Academic Year 2023-24

Syllabus For

B.Sc. Part – III

SEMESTER V & VI

(Syllabus to be implemented from June 2023 Onward)

B.Sc. Computer Science (Optional) Part III
Semester-V&VI
CBCS Syllabus to be implemented from June 2023 Onwards

1. **TITLE:** Computer Science
2. **YEAR OF IMPLEMENTATION**: Revised Syllabus will be implemented from June2023onwards.
3. **DURATION:** B.Sc. in Computer Science Part- III The duration of course shall be one year and two semesters.
4. **PATTERN:** Pattern of examination will be semester.
5. **STRUCTURE OF COURSE:**

STRUCTURE OF COURSE

Sr. No.	Paper	Name of Paper	Marks
Computer Science (Semester V)			
1	MJBCST23-501	Core Java	40 (Theory)
2	MJBCST23-502	Internet Technology-I	40 (Theory)
3	MJBCST23-503	C# Programming	40 (Theory)
4	MJBCST23-504	Linux Part-I	40 (Theory)
5	MJEBCST23-505	Software Engineering	50 (Theory)
6	MNBCST23-506	Data Communication	50 (Theory)
7	MJBCSP23-507	Practical Based on MJBCST23-501, MJBCST23-502, MJBCST23-503 &MJBCST23-504	200
8.	FPBCS23-508	Field Project	50
Computer Science (Semester VI)			
7	MJBCST23-601	Advanced Java	40 (Theory)
8	MJBCST23-602	Internet Technology-II	40 (Theory)
9	MJBCST23-603	ASP .NET	40 (Theory)
10	MJBCST23-604	Linux Part-II	40 (Theory)
11	MJEBCST23-605	Software Project Management	50 (Theory)
12	MNBCST23-606	Computer Networks	50 (Theory)
13	MJBCSP23-607	Practical Based on MJBCST23-601, MJBCST23-602, MJBCST23-603 &MJBCST23-604	200
14.	OJTBCS23-608	On Job Training	50

B.Sc. Part –III Computer Science Optional (Semester– V)
Course Code: MJBCST23-501
Computer Paper IX
Course Title: Core Java
Total Contact Hours: 36 Hrs.
Teaching Scheme: Theory – 02 Lect. / Week

Course Outcome: After completion of this course student will be able to

1. Implement Object oriented concepts using java
2. Develop Object oriented software application
3. Develop multithreading applications
4. Handle exceptions while executing programs

Unit	Content	Hours Allotted
I	**Introduction to Java Programming Language** History of Java , Features of Java, Comparison of Java and C++ , Java Environment, Java Tools – jdb, javap, javadoc, Java IDEs Structure of java program, First java program, Types of Comments, Data types, Variables, Operators, Keywords, Naming Convention, Declaring 1D, 2D array, Decision Making (if, switch),Looping(for, while), Type Casting, Accepting input using Command line argument, Accepting input from console.	**12**
II	**Object Oriented Concepts in Java** Defining Your Own Classes, Access Specifiers (public, protected, private, default), Array of Objects, Constructor, Overloading Constructors and use of 'this' Keyword, static block, static Fields and methods,Object class methods, String Class, Inner class, Packages, Wrapper Classes , Garbage Collection, Memory allocation for objects, Constructor, Implementation of Inheritance, use of super keyword, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes, Use of final keyword related to method and class, abstract class and abstract methods,Defining and Implementing Interfaces, Object Cloning.	**12**
III	**Exception Handling, GUI components using AWT** Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions, Assertions, Basics of AWT and Swing, their Difference, Layout Manager	**12**

Reference Books:

1. Core Java2 Volume I-Fundamentals by Cay S. Horstmann, Gary Cornell
2. Effective Java Programming Language Guide by Joshua Bloch
3. Java, The Complete Reference by Herbert Schildt
4. Java 2 programming black books by Steven Horlzner
5. Programming with Java , A primer by E. Balagurusamy

Practical Program List :

1. Program on type casting.
2. Program on branching and looping statements.
3. Program on class, objects, field and method.
4. Program on method overloading.
5. Program on Constructor and constructor overloading.
6. Program on Array.
7. Program on Inheritance.
8. Program on Packages.
9. Program on abstract class.
10. Program on interface.
11. Program on Exception Handling and user defined exception.

B.Sc. Part –III Computer Science Optional (Semester– V)
Course Code: MJBCST23-502
Computer Paper X
Course Title: Internet Technology-I
Total Contact Hours: 36 Hrs
Teaching Scheme: Theory – 02Lect. / Week

Credits: 02 **Total Marks: 40**

Objectives:

1. The internet technology helps us with facts and figures, information and knowledge for personal, social and economic development

Course Outcomes:

2. The student will be able to impart ability in the field of Computer Networks.
3. To provide entrepreneurship opportunities in the field of E-Commerce using web technology and networking architecture

Unit	Contents	Hours Allotted
I	**Introduction to Internet** Internet, History of Internet, working of internet, internet application, advantage and disadvantage of internet, difference between Intranet and internet, Services on Internet (Definition and Functions) :- E-mail, WWW, Telnet, FTP, IRC and Search Engine, Current Trends on Internet:- Languages, Internet Phone, Internet Video, collaborative computing, e-commerce.	12
II	**Internet Networking** Network definition, Common terminology: LAN ,MAN,PAN,WAN ,Types of networks, Network address translation, Subnet Masking, What is routing, Types of routing, Dynamic and Static Routing, Domain Name Server , networking tools – ipconfig, ping, netstat, traceroute.	9
III	**Internet Protocol and Technology** Internet protocols: TCP, IP, FTP, HTTP,HTTPS,SMTP,IMAP,POP3, VoIP, ISO/OSI Model , Network Topologies: Bus, Star, Ring Web server: introduction, working, hosting and mapping a web server Proxy server: introduction, working, types of proxies	**12**

Reference Books:

1. Andrew S. Tanenbaum - Computer Networks
2. Textbooks: TCP/IP Protocol Suite Edition 4 by Behrouz Forouzan (McGraw Hill)
3. Internet and Web Technologies ,Raj Kamal McGraw Hill Open

Practical Based on MJBCST23-502

Practical Program List:-

1. Demonstrate the use of networking tools like ping, ipconfig, netstat and traceroute.
2. Configure a web-server on a personal system.
3. Demonstrate the network monitoring of the internet traffic through any predefined tool
4. Track unwanted data bleaching over the internet
5. Work in e-commerce websites

B.Sc. Part –III Computer Science Optional (Semester– V)
Course Code MJBCST23-503
Computer Paper XI
Course Title: C# Programming
Total Contact Hours: 36 Hrs
Teaching Scheme: Theory – 02 Lect. / Week

Credits: 02 **Total Marks: 40**

Course outcome: After completion of this course student will be able to 1.Understand working of .Net Framework
2. Demonstrate concept of object oriented programming using C#
3. Demonstrate concept of object oriented programming using C#
4. Study importance and applications of exception handling
5. Understand working of file handling in C#

Unit	Content	Hours Allotted
I	**Introduction to .Net** • .NET Framework Architecture • An Overview • Components of .NET: CLR ,CLS • Microsoft Intermediate Language ("MSIL" or "IL"), • The Common Type System (CTS), Namespaces, • .NET Framework Base Classes, DLL and Exe. • An Overview of C# • History and Features of C#. • Data Types, Value and Reference Types, Boxing and • Unboxing • Properties : Set and Get • C# - Flow Control: Branching, Switching and Looping • Structure	**12**
II	**Object oriented Concepts** • C# Program compilation and execution • Command Line Arguments • Programming Examples using Console application , • Classes and Objects • Inheritance • Polymorphism • Abstract Classes • Sealed Classes • Partial Classes • Exception Handling	**12**
III	**Introduction to Windows Form Application Using C#** • IDE – (Integrated Development Environment) • Form Controls: Label, Button, Textbox, Checkbox, Radio Button, Timer, calendar, List Box, Image and overview of remaining all common controls its properties and events	**12**

References:

1. C# 4.0 The Complete Reference Schildt Mc Graw Hill
2. Inside C# - By Tom Archer, Andrew Whitechapel (Microsoft Pub)
3. Programming in C#- E Balagurusamy

Practical Based on MJBCST23-503

1. Write a C# program that print hello word using command line argument.
2. Write a console application program to demonstrate switching, looping, branching statement.
3. Write a console application for swapping of 2 numbers using Pass by value.
4. Write a console application for swapping of 2 numbers using Pass by Reference.
5. Write a C# program that uses explicit keyword.
6. Write a C# program that uses implicit keyword.
7. Write a C# program to implement out parameter.
8. Write C# program to display factorial of number.
9. Write C# program to display prime factors of entered number.
10. Write C# program check entered number is even or odd.
11. Write C# program to demonstrate array.
12. Create DLL and implement in another console application.
13. Write C# program to demonstrate static and non-static methods.
14. Write C# program to demonstrate Inheritance.
15. Write C# program to demonstrate Interface.
16. Write C# program to demonstrate abstract class.

B.Sc. Part –III Computer Science Optional (Semester– V)
Course Code: MJBCST23-504
Computer Paper XII
Course Title: LINUX - I
Total Contact Hours: 36 Hrs.
Teaching Scheme: Theory – 02Lect. / Week

Credits: 02 **Total Marks: 40**

Course Outcomes

1. Upon completion of this course, students should have a good working knowledge of Linux.
2. Allowing them to easily use any Linux distribution.
3. This course shall help student to learn advanced subjects in computer science practically.

Unit	Contents	Hours Allotted
I	**Introduction to Linux** • History of Linux • Architecture of Linux • Operating System Services • Shell • Types of Shell • Kernel • Login, Logout • General Purpose Utilities (banner, cal, date, calendar, who, tty, uname, password, lock, echo, tput, bc, clear, script, wc, head, tail, echo, test, expr)	**9**
II	**File System, System Calls and Process** • Basic file system management • Files Types, Boot block, Super block, Inode table • Storage and Accessibility of files • Finding Information of commands • File and Directory Commands • File and Directory Manipulation commands • File ownership and permission • Open, Read, Write, Close • Mounting and Un-mounting File System • Process States and Transitions • Process Creation • Signal • Process Termination • Awaiting Process Termination • Invoking Other Programs • Process Management(ps, kill, background processing, no hang up, SPOOL, job scheduling using at command)	**18**
III	**Editors and Shell Scripting** • Types of editors • Modes of Operation	**9**

	• Editing Text Files • Block Commands • Set Commands • Command Line Options • Choosing a Shell • Invoking the Shell Variables • Getting input from keyboard • Special Variables • Control Statement- Conditional • Iterative Statements • Regular expression	

Reference Books

1. Linux Commands- Instant Reference by Bryan PF affenberge
2. The Design of the Unix Operating System- Bach
3. Unix Shell Programming- Yashwant Kanetkar
4. Unix Concepts and Application – Sumitabhadas
5. Linux : The Complete Reference- Richard Peterson

Practical Based on NBCST22-503

1. Demonstration of General Purpose Utilities.
2. Write a shell script using if statements to check file exists or not.
3. Write a shell script to copy a file.
4. Write a shell script to check the given number is odd or even.
5. Write a shell script to check file permission.
6. Write a shell script to calculate the grade of student.
7. Write a shell script to find out given word contains vowel and also the entered vowel is small case or capital.
8. Write a shell script to display given year is leap year or not.
9. Write a shell script to greet message according to time.
10. Write a shell script to print the Fibonacci series.
11. Write a shell script to print the numbers between 1 to10.
12. Write a shell script to read name, sex and marital status and display the same.

B.Sc. Part –III Computer Science Optional (Semester– V)
Course Code: MJEBCST23-505

Computer Paper XIII
Course Title: Software Engineering
Total Contact Hours: 36 Hrs. (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 04 Lect. / Week

Credits: 02 **Total Marks: 40**

Course Objectives

1. To get knowledge and understanding of software engineering discipline.
2. To learn analysis and design principles for software project development.
3. Implement Agile Development Methodologies in real life Software Projects.

Course Outcomes On completion of the course, student will be able to-

- Identify data requirements, analyses and prepare data models.
- Understand basic software engineering concepts and Process models.
- Compare and chose a process model for a software project development.
- Design different UML Diagrams.

Unit	Contents	Hours Allotted
I	**Introduction to Software Engineering** 1.1 Definition of Software 1.2 Nature of Software Engineering 1.3 Changing nature of software 1.4 Mc Call's Quality factors 1.5 Software Process 1.6 The Process Framework 1.7 Umbrella Activities	**7**
II	**Software Development Life Cycle** 2.1 Introduction, Activities of SDLC 2.2 Preliminary Investigation and its activities. 2.3 Requirements engineering tasks (Inception, Elicitation, Elaboration,Negotiation, Specification, Validation, Requirements Management) 2.4 Fact finding techniques (Interview, Questionnaire, Record Review, Observation) 2.5 Determination of system requirements 2.6 Design of a system 2.7 Development of software 2.8 System testing (Unit Testing, Integration Testing, System Testing, Acceptance Testing) 2.9 System Implementation and Evaluation 2.10 System maintenance	**12**

III	**Process Models** 3.1 Generic Process Model 3.2 Prescriptive Process Models 3.2.1. The Waterfall Model 3.2.2 V-model 3.3 Incremental and Iterative Process Models 3.4 Evolutionary Process Models- Prototyping, Spiral Model 3.5 Introduction to UML **3.6 Structural Modeling** 3.6.1 Class Model 3.6.2 Object Model 3.6.3 Deployment Model 3.6.4 Component Model **3.7 Behavioral Modeling** 3.7.1 Use case model 3.7.2 Activity model 3.7.3 State Chart Model 3.7.4 Sequence model **3.8 Interaction Model-** 3.8.1 Sequence Model 3.8.2 Collaboration Model	**17**

Reference Books:

1. Roger S Pressman, Bruce R Maxim, "Software Engineering: A Practitioner's Approach", Kindle Edition, 2014.
2. Ian Sommerville," Software engineering", Addison Wesley Longman, 2014.
3. James Rumbaugh. MichealBlaha "Object oriented Modeling and Design with UML", 2004.
4. Ali Behforooz, Hudson, "Software Engineering Fundamentals", Oxford, 2009.
Charles Ritcher, " Designing Flexible Object Oriented systems with UML", TechMedia , 2008

B.Sc. Part –III Computer Science Optional (Semester– V)
Course Code: MNBCST2-506
Computer Paper XIV
Course Title: Data Communication
Total Contact Hours: 36 Hrs. (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 04 Lect. / Week

Credits: 02 **Total Marks: 40**

Course outcome: After completion of this course student will be able to

1. Identify key considerations in selecting various transmission media in networks.
2. Familiar with switching and routing techniques in networking.
3. Understand different data communication modes.
4. Understand OSI model and networking protocols.

Unit	Content	Allotted Hours
1	**Data and signals** • Data and Signals: Introduction, Objectives, • Analog and Digital signals, Periodic Analog Signals, Digital Signals, • Transmission Impairment Attenuation, Distortion, Noise, Data Rate Limits, • Noiseless channel: Nyquist bit rate, Noisy channel: Shannon capacity, Performance, Bandwidth, Throughput, Latency, Bandwidth-delay product, • Shannon capacity Performance – types of Error – Error Detection – Error corrections.	**12**
2	**Introduction to Data Communication** • Introduction to Data Communication: Definition, components, characteristics, • Uses of computer networks for companies, • Protocol: Protocol standards, Transmission media: Introduction, Guided media: twisted pair cable, co-axial cable, fiber-optic, unguided media (wireless) - radio waves, microwaves, infrared. • Switching: Introduction, Objectives, Circuit switched networks, Datagram networks, • Virtual circuit networks, • Router and Routing – Factors affecting routing algorithms - Routing algorithm -Approaches to routing	**12**
3	**Introduction to Data communication modes** • Data communication modes: Serial and Parallel, Simplex, Half duplex and full duplex, • Synchronous and asynchronous transmission, • Multiplexing - Types of Multiplexing - FDM versus TDM, • Integrated services digital networking (ISDN): Introduction – Background of ISDN - ISDN architecture – ISDN interfaces - Functional grouping • Introduction – Protocols in computer communications • The OSI model - OSI layer functions.	**12**

Reference books

1) Behrouz and forouzan - Introduction to Data Communication and Networking – 2 nd Edition – TMH- 2001. 2. Jean Walrand – Communication Networks (A first Course) – Second Edition – WCB/McGraw Hill – 1998.
2) Computer Network by Tanenbaum
3) Computer network – black
4) Data Communications and Networks, ACHYUT. S. GODBOLE, Tata McGraw-Hill Publishing Company, 2007.
5) Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson
6) Computer networks, A system Approach, 5th ed, Larry L Peterson and Bruce S Davie, Elsevier

B.Sc. Part –III Computer Science Optional (Semester– VI)
Course Code: MJBCST23-601
Computer Paper XV
Course Title: Advance Java
Total Contact Hours: 36 Hrs. (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 04 Lect. / Week

Credits: 02 **Total Marks: 40**

Objectives:

Explore advanced topic of Java programming for solving problems.

Course Outcomes:

1) The student will be able to develop distributed business applications, develop web pages Using advanced server-side programming through servlets and Java server pages.
2) Demonstrate approaches for performance and effective coding
3) To learn database programming using Java
4) To study web development concept using Servlet and JSP

Unit	Content	Hours Allotted
I	**Swing and JDBC** • Concept of swing • MVC architecture • Component of swing: JFrame,JComponent,JLable, JTextfields, JCheckbox, JPanel, JRadiobuttons, JTabbed Pane,JButton, JTree, JTable, JMenu • Introduction Java Data Base Connectivity (JDBC) • JDBC Connection Statements, ResultSet. • simple program • Executing commands and SQL queries • Updatable ResultSet • Forward Only ResultSet • Scrollable ResultSet • PreparedStatement • Connection Modes, SavePoint.	**12**
II	**Servlet** • Introduction to Servlet • Hierarchy of Servlet • Life cycle of servlet • ServletConfig • ServletContext • Servlet API • packages- javax.servlet and javax.servlet.http • Servlet Communication • Handing get and post request (HTTP)	**12**

III	**Java Server Page (JSP)** • Concept of JSP • Life cycle of JSP • JSP v/s Servlet • Components of JSP: Directives, Tags • Scripting elements – Declarations, Expressions, Scriplets, Comments • Implicit objects of JSP • Connecting to database • Simple application using JSP	**12**

Reference Books

1. Programming with JAVA, A Primer by E Balaguruswamy
2. Herbert Schildt, Java2: The Complete Reference, Tata McGraw-Hill
3. Java Programming- Rajendra Salokhe (Aruta Pub)
4. Java 2 Black Book –(DreamTech)
5. *The Java Tutorials: http://docs.oracle.com/javase/tutorial/)*
6. The Java Tutorials of Sun Microsystems Inc

Practical Based on NBCST22-501

Practical Program List

1. Program on Swing
2. Simple program using servlet
3. Simple program using JSP
4. Program on Database Connection.
5. Develop a java application to store image in a database as well as retrieve image from database
6. Create EMP table in Database and perform insert ,update ,and delete operation on EMP table using JSP.

B.Sc. Part –III Computer Science Optional (Semester– VI)
Course Code: MJBCST23-602
Computer Paper XVI
Course Title: Internet Technology II
Total Contact Hours: 36 Hrs.
Teaching Scheme: Theory – 04 Lect. / Week
Credits: 02 **Total Marks: 40**

Course Objectives:

1.Understand the Advance JavaScript Programming Concepts.

2.Understand the Node.js tool.

3.Create Node.js Modules and express code modularity in an application.

Unit	Contents	Hours Allotted
1	Basic of JavaScript : Introduction to Javascript, Client side and server-side nature of javascipt, Operators in Javascript , Arrays, Types of Functions. Advance Javascript: Introduction to advance javascript, JavaScript Asynchronous Programming Callbacks Promises (then, catch, finally) Async/Await	9
2	NodeJS : Introduction to Nodejs, Architecture of Nodejs Application, Advantages of NodeJS, Synchronous and Asynchronous Programming, NodeJS Event Loop,Call back function in Nodejs, Promise in Nodejs, Design the schema in Nodejs	10
3	NodeJS Modules: Functions, Buffer, Module, Module Types, Core Modules, Local Module export, NPM, installing package locally, adding dependency in package.json, installing packages globally, updating packages, Fs.readFile, writing of file, asynchronously, Opening a file , Deleting a file	16

Refernce Books:

1. Advanced Javascript by Zachary Shute
2. Node.js web development by David Herron
3. Begining Node.js –Basarat Ali Syed

Practical Based on MJBCST23-602

Practical Program List

1. Write a program to calculate the **sum, difference, product, and quotient** of two numbers entered by the user
2. Display “Adult” or “Minor” based on age using the ternary operator.
3. Determine if a student has **passed or failed** based on marks.
4. Create a program to perform **addition of two numbers** using a callback function.
5. Write a Program on Node.js Event Loop.
6. Create a promise that either resolves with a success message or rejects with an error message after a delay.
7. Write an async function that waits for **2 seconds** and then displays a message.
8. Write a Node.js program that uses a **callback function** to read a file and display its contents.
9. Write a Promise-based function to check whether a number is **positive or negative**.
10. Design a **User Schema** with fields: name, email, password, age, and createdAt.
11. Create a **Student Schema** with validation rules for marks and email.
12. Write a Node.js program that defines a **function in a module** and uses it in another file.
13. Create a **local module** that exports multiple functions.
14. Write a Node.js program to **read a file asynchronously** using `fs.readFile()`.

B.Sc. Part –III Computer Science Optional (Semester– VI)
Course Code: MJBCST23-603
Computer Paper XVII
Course Title: ASP.NET
Total Contact Hours: 36 Hrs
Teaching Scheme: Theory – 04 Lect. / Week

Credits: 02 **Total Marks:40**

Course Outcomes:

This course will cover the practical aspects of multi-tier web based application development using the .NET framework. The goal of this course is to introduce the students to the basics of distributed Web application development.

Unit	Content	Hours Allotted
I	**Introduction to ASP.Net**: • Web browser, web server • HTTP request response structure • HTML form elements • GET/POST method • Client side and Server side programming. • Web form life cycle, page events, • Visual studio IDE. • **Server Controls:** Textbox, Listcontrols, FileUpload, Linkbutton, Imagemap, Image, Imagebutton, Calender, Literal control, Radiobutton, Checkbox, • Validation Controls • Navigation controls • Master Page.	**14**
II	**Asp.Net State Management** • Cross page postback property of button, • Response.Redirect, • Server.transfer, Response.Write, • Hiddenfield control, • View State, Cookies, Session, Application • Global.asax, Caching	**10**

III	**Database and ADO.Net** • Sql Server Database. • Data controls o Gridview o Listview o FormView o DetailsView, o Repeater • Introduction to ADO.Net o ADO.NET Architecture- Connection, command, data reader, data adapter, data set o Understanding connected layer of ADO.NET and disconnected l Basics of Crystal reports	**12**

Reference Books:

- Beginning ASP.NET 4.5 in C# and VB, Wrox, 2012, ISBN-10: 1118311809
- Beginning ASP.NET 4.5 in C#, Apress, 2012, ISBN-10: 1430242515
- Pro C# with .NET 3.0, Andrew Troelsen, Apress, 2007, ISBN 978-1-59059-823-8

Practical Experiments based on NBCST22-602:

1. Write an Asp.Net Program to print a Message on web form.
2. Write an Asp.Net Program to Create Simple Web Application using two or more web form.
3. Write an Asp.Net Program to set a link for new Page.
4. Write an Asp.Net Program to demonstrate different common Control.
5. Write a program using while or for loop to print sum of first 100 ODD and Even numbers.
6. Write a Program to add the value of Text Box in to Dropdown List and List box Controls.
7. Write an Asp.Net Program to Delete Items from Dropdown list and List box.
8. Write a Program to set Image on Image Control according to selection of image name from dropdown list.
9. Write an Asp.Net Program to demonstrate use of Master Page.
10. Program to demonstrate ADO.Net connected architecture.
11. Program to demonstrate ADO.Net disconnected architecture
12. Program to demonstrate client side state management.
13. Program to demonstrate serverside state management.
14. Write an Asp.Net Program to perform Insert and update operation in Database.
15. Write an Asp.Net program to perform Search and Delete operation in Database.
16. Write an Asp.net program to display the records from database using Data Reader Object.

B.Sc. Part –III

Computer Science Optional (Semester– VI) Course
Code: MJBCST23-604

Computer Paper XVIII
Course Title: Linux Part II
Total Contact Hours: 36 Hrs.
Teaching Scheme: Theory – 02 Lect. / Week

Credits:02 **Total Marks:40**

Course Outcome:

1. This course covers design principles of Linux Operating System Memory management.
2. Structure of File system and virtual file system is also elaborated.
3. This course contains details of shell programming and introduces System administration

Unit	Content	Hours Allotted
I	**Memory Management and Advanced vi** • Swapping • Demand Paging • ex Mode- handling Multiple Files • Named Buffer • Numbered Buffers • Entering control characters • Searching for a characters	**9**
II	**Filters and Advanced Shell Programming** • sed and sed options • grep and grep options • Line Addressing • Multiple Instruction(-E and -F) • Context Addressing • Writing Selected Lines to a File • Shell and subshell • Command Line Arguments • Exporting Shell Variables • Arrays • Shell Functions	**18**

III	**Networking Tools** • Introduction to TCP/IP • Network Management Tools- Firewall • The write command • The wall command • cron	**9**

Reference Books:

1. Linux Commands –Instant Reference by Bryan PF affenberge
2. The design of the Unix Operating System- Bach
3. Unix Shell Programming- Yashwant Kanetkar
4. Unix Concepts and Applications- Sumitabha das
5. Linux : The Complete Reference- Richard Peterson

Practical Based on NBCST22-603

1. Write a shell script using grep command to print prime numbers between 1 to 30.
2. Write a shell script to find whether the supplied user working on network or not. If he/she is working then display his/her login time.
3. Write a anawk program to display customer earning report with given format.
4. Write a shell script which accepts a file name as a input. Find out whether it is ordinary file or directory. If a file is available then display all file access permission on screen.
5. Write a shell script which copies files from one directory to another during copy command.
6. Write an awk program to display stock report with given format.
7. Create a data file which contains given format and perform the given operations on that data file using sed.
8. Write a shell script to copy a file using command line argument, source file must be exists and readable and target file must be non-existing file name.
9. Write a shell script, which works similar to wc command accept filename as command line argument.
10. Accept any word through command line argument and find out its length

B.Sc. Part –III Computer Science Optional (Semester– VI)

Course Code: MJBCST23-605
Computer Paper XI
Course Title: Software Project Management
Total Contact Hours: 36 Hrs.
Teaching Scheme: Theory – 02 Lect. / Week

Course Outcomes: After completion of this course student will be able to

1. Implement the basics of Project Management.
2. Choose correct Scheduling Techniques as per the software.
3. Develop Team Development skills and reduce conflicts.
4. Implement various Software Quality Standards.
5. Using CASE tools, Software Re-Engineering for creating efficient software's.

Unit	Contents	Hours Allotted
1	**Overview of Project Management** • Project Management – Definitions • Factors Influencing Project Management – Project Manager, Project Management Activities, Stakeholders; Project Communication; • Project Development Phases; • Project Charter; Statement of Work (SoW). • Project Planning: Tasks in Project Planning; • Work Breakdown Structures (WBS); • Development Life Cycle Models; A Generic Project Model.	**12**
2	**Scheduling Techniques and Conflict Management:** • Program Evaluation and Review Technique (PERT), Gantt Chart and critical Path Method (CPM), Automated Tools • Project Monitoring and Controlling: Project Status Reporting; • Project Metrics • Project Communication Plan & Techniques • **Team Development and Conflict Management:** Basic Concepts; Organization Types – Centralized-control team organization, Decentralized-control team organization, Mixed-control team organization.	**12**
3	**Software Configuration Management (SCM):** Baselines, Software Configuration Items (SCI); SCM Process; Version Control; Change Control; Configuration Audit; Status Reporting; Goals of SCM. **Software Quality Assurance:** Software Quality Assurance Activities; Software Qualities; Software Quality Standards – ISO Standards for Software Organization, Capability Maturity Model (CMM)	**12**

Reference Books:

1. Roger S Pressman, Bruce R Maxim, "Software Engineering: A Practitioner's Approach", Kindle Edition, 2014.
2. Ian Sommerville," Software engineering", Addison Wesley Longman, 2014.
3. Software Project Management by Edwin Bennatan.

B.Sc. Part –III Computer Science Optional (Semester–VI)

Course Code: MNBCST23-605
Computer Paper XV
Course Title: Computer Networks
Total Contact Hours: 36 Hrs
Teaching Scheme: Theory – 02 Lect. / Week

Course Outcomes: After completion of this course student will be able to

1. Familiar with network basics concepts like protocols, topology etc.
2. Familiar with OSI layered model services
3. Understand with switching and routing concepts in networking technologies.
4. Familiar with network security concepts 5.

Unit	Content	Allotted Hours
1	**Network Basics** • Network definition; network topologies; • network classifications; network protocol; • Layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite. • The telephone network fundamental of communication theory. • Asynchronous and synchronous transmission. • Transmission Media: Guided media - twisted-pair cable, coaxial cable, fiber-optic cable. Unguided media (wireless) - radio waves, microwaves, infrared. • Connection-oriented and connectionless Services, service primitives.	**12**
2	**Switching & routing concepts** • Switching and routing in network: Message switching, packet switching, packet routing. • Routing – characteristics, routing algorithms(strategies) – optimality principle, shortest path routing, flooding, distance vector routing, link-state routing, hierarchical routing, broadcast routing, multicast routing. Congestion control. And its prevention policies	**12**
3	**Protocols** • Goals of layered protocols, network design problems, OSI model and its all layer's services. Token passing – Token ring, Token bus, Token passing (priority systems). • ANSI Fiber Distributed Data Interface (FDDI), • TCP/IP : Introduction to TCP/IP and internetworking , operations related protocols and sockets, • IP address structure major features of IP. • IP data gram, major IP service, • TCP major features of TCP	**12**

Reference:

1. Black C “Computer networks protocols, standards and Interface”, prentice hall of India, 1996
2. stlling W, “Computer communication network” (4th Edition), prentice hall of India, 1993
3. Tanenbaum A.S. “Computer Network”, prentice hall of India, 1981
4. Forouzan, “TCP/IP Protocol Suite”, Tata McGraw Hill.
5. Walrand&Varaiya,“High Performance Communication Networks”, 2/e, Elsevier”, 2003
6. Youlu Zheng / Shakil Akhtar, “Networks for Computer Scientists and Engineers”, Oxford University Press
7. James F. Kurose, Keith W. Ross, “Computer Networking – A Top-Down Approach Featuring the Internet”, Fifth Edition, Pearson Education, 2009.
8. Nader. F. Mir, “Computer and Communication Networks”, Pearson Prentice Hall Publishers, 2010.
9. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, “Computer Networks: An Open Source Approach”,Mc Graw Hill Publisher, 2011.

Behrouz A. Forouzan, “Data communication and Networking”, Fourth Edition, Tata McGraw –

Project Work

Guidelines for Project:

Number of Copies: The student should submit two Hard-bound copies of the Project Report. (one copy for institute and one copy for student)

Acceptance/Rejection of Project Report:

The student must submit an outline of the project report to the college for approval. The college holds the right to accept the project or suggest modifications for resubmission.

Format of the Project Report:

The student must adhere strictly to the following format for the submission of the Project Report.

a. Paper:

The Report shall be typed on white paper, A4 size, for the final submission.

b. Typing:

The typing shall be of standard letter size, 1.5 spaced and on one side only. (Normal text should have Times New Roman Font size 12. Headings have bigger size i.e. up to size 14)

c. Margins:

- The typing must be done in the following margins:
- Left -----1.5 inch, Right--------1 inch
- Top -----1 inch, Bottom-------1 inch

Standard Project Report Documentation Format

a) Cover Page
b) Institute/College Recommendation
c) Guide Certificate
d) Declaration
e) Acknowledgement
f) Index
g) Chapter Scheme

1) Introduction to Project
   -Introduction
   -Existing System
   -Need and scope of Computer System
   -Organization Profile
2) Proposed System
   -Objectives
   -Requirement Engineering.
   • Requirement Gathering
   • SRS
3) System Analysis
   System Diagram
   • DFD
   • ERD
   • UML(if applicable)
4) System Design
   • Database Design
   • Input Design
   • Output Design
5) Implementation
   - System Requirements
   • Hardware
   • Software
   - User Guideline
   - Installation process
6) Outputs-
   Screens and Reports (with valid Data)
7) Conclusion and Suggestions
   • Conclusion
   • Limitations (future enhancement)
   • Suggestion
8) Bibliography:

Note : Minimum 4 to 6 reports are essential