Rayat Shikshan Sanstha's

SADGURU GADGE MAHARAJ COLLEGE, KARAD.

(An Empowered Autonomous)

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

ISO- 9001-2015 Certified

Affiliated to Shivaji University ,Kolhapur

B.Sc. Computer Science (Entire)

Under the Faculty of Science and Technology

B.Sc. Computer Science (Entire) Part-III (NEP2.0)

Regulations in accordance with **National Education Policy**
To be implemented from AcademicYear2023-24

Syllabus For

B.Sc. Computer Science (Entire) Part-III

SEMESTER V & VI

(Syllabus to be implemented from June 2025 onwards)

Sr. No.	Subject Title	TEACHINGSCHEME						EXAMINATIONSCHEME						
		THEORY			PRACTICAL			THEORY					PRACTICAL	
								University			Internal			
		No. of	Hours	Credits	No. of lecture	Hours	Credits	Hours	Max Marks	Min Mar	Max Marks	Min Marks	Hours	Max Mar / Min
1	MJ-BCSE23-501	4	3.2	**2**	5	4	2	2	40	16	10	4		
2	MJ-BCSE23-502	4	3.2	**2**	5	4	2	2	40	16	10	4	**PRACTICAL EXAMINATION**	
3	MJ-BCSE23-503	4	3.2	**2**	5	4	2	2	40	16	10	4		
4	MJ-BCSE23-504	4	3.2	**2**	5	4	2	2	40	16	10	4		
5	MJE-BCSE23-505	4	3.2	**2**	5	4	2	2	40	16	10	4		
6	MJ-BCSE23-506	4	3.2	**2**	5	4	2	2	40	16	10	4		
7	MJ-BCSE23-507	5	3.2	**8**	5	---	8	5	200	80	--	--		
8	MPBCSE23-508	–	--	**2**	----	--	2	5	50	20	--	--		
	TOTAL	**29**	**22.4**	**22**	**35**	**24**	**22**		**490**		**60**			
	SEMESTER–VI													
1	NBCSE22-601	4	3.2	**2**	5	4	2	2	40	16	10	4		
2	NBCSE22-602	4	3.2	**2**	5	4	2	2	40	16	10	4		
3	NBCSE22-603	4	3.2	**2**	5	4	2	2	40	16	10	4	**PRACTICAL EXAMINATION**	
4	MJ-BCSE23-604	4	3.2	**2**	5	4	2	2	40	16	10	4		
5	MJE-BCSE23-605	4	3.2	**2**	5	4	2	2	40	16	10	4		
6	MJ-BCSE23-606	4	3.2	**2**	5	4	2	2	40	16	10	4		
7	MJ-BCSE23-607	5	3.2	**8**	5	---	8	5	200	80	--	--		
8	MPBCSE23-608	–	--	**2**	----	--	2	5	50	20	--	--		
	TOTAL	**29**	**22.4**		**35**	**24**	**22**		**490**		**60**		**SEM - V+ SEM - VI**	
		58	**44.8**	**28**	**70**	**48**	**44**						**550+550=1100**	

- Studentcontacthoursperweek:32Hours(Min)

TheoryandPracticalLectures:48Min. Each

B.Sc. Computer Science Entire Part-III

Year of Implementation: Revised Syllabus will be implemented from June2025 **Duration :** Part-III shall be of one academic year consisting of two semesters.

Pattern : Semester Pattern.

B.Sc. Part–III Computer Science (Entire)

Code	Course Title
MJ-BCSE23-501	Operating System
MJ-BCSE23-502	Core Java
MJ-BCSE23-503	C# Programming
MJ-BCSE23-504	PHP Programming
MJE-BCSE23-505	Software Engineering OR E-Commerce
MN-BCSE23-506	Data Communication
MJ-BCSE23-507	Practical Based onMJ-BCSE23-501,MJ-BCSE23-502,MJ-BCSE23-503,MJ-BCSE23-504
MPBCSE23-508	Field Project
MJ-BCSE23-601	Linux Operating System
MJ-BCSE23-602	Advanced Java
MJ-BCSE23-603	ASP.NET

MJ-BCSE23-604	Advanced PHP Programming
MJE-BCSE23-605	Software Project Management OR Artificial Intelligence
MN-BCSE23-606	Computer Network
MJ-BCSE23-607	PracticalBasedonMJ-BCSE23-601,MJ-BCSE23-602,MJ-BCSE23-603,MJ-BCSE23-604
MPBCSE23-608	On Job Training

B.Sc. Computer Science Entire Part-III

Syllabus to be implemented from June 2025 onwards.

Course: BCS

1. **TITLE: BCS**
2. **YEAR OF IMPLEMENTATION:** Revised Syllabus will be implemented From June 2025 onwards.
3. **DURATION:** B.Sc. in Computer Science Entire Part-III The duration of course shall be One year and two semesters.
4. **PATTERN:** Pattern of examination will be semester.
5. **STRUCTUREOFCOURSE:**

Sr. No.	Code	Name of Paper	Marks
SEM-V			
1	MJ-BCSE23-501	Operating System	**50(40Univ+10 Internal)**
2	MJ-BCSE23-502	Core Java	**50(40Univ+10 Internal)**
3	MJ-BCSE23-503	C# Programming	**50(40Univ+10 Internal)**
4	MJ-BCSE23-504	PHP Programming	**50(40Univ+10 Internal)**
ElectiveCourseI:MJE-BCSE23-505ORMJE-BCSE23-505			
5	MJE-BCSE23-505	Software Engineering	**50(40Univ+10 Internal)**
	MJE-BCSE23-505	E-Commerce	**50(40**Univ**+10 Internal)**
6	MN-BCSE23-506	Data Communication	**50(40Univ+10 Internal)**
SEM-VI			
7	MJ-BCSE23-601	Linux Operating System	**50(40Univ+10 Internal)**
8	MJ-BCSE23-602	Advanced Java	**50(40Univ+10 Internal)**
9	MJ-BCSE23-603	ASP.NET	**50(40Univ+10 Internal)**

10	MJ-BCSE23-604	Advanced PHP Programming	**50(40Univ+10 Internal)**
ElectiveCourseII:MJE-BCSE23-605ORMJE-BCSE23-605			
11	MJE-BCSE23-605	Software Project Management	**50(40Univ+10 Internal)**
	MJE-BCSE23-605	Artificial Intelligence	**50(40Univ+10 Internal)**
12	MN-BCSE23-606	Computer Network	**50(40Univ+10 Internal)**

Practical Examination (Semester V and VI)

Code	Name of Paper	Marks
MJ-BCSE23-507	LabCourseBasedonMJ-BCSE23-501,MJ-BCSE23- 502, MJ-BCSE23-503, MJ-BCSE23-504	200
MP-BCSE23-508	Field Project	50
MJ-BCSE23-607	LabCourseBasedonMJ-BCSE23-601,MJ-BCSE23- 602, MJ-BCSE23-603, MJ-BCSE23-604	200
MP-BCSE23-608	On Job Training	50

Note- Four Lecture *theory course per week.*
Lab Course five periods (four hours)-per week per20 student's batch.

SCHEMEOFEXAMINATION:-

The Theory examination shall be conducted at the end of each semester.

- The Theory paper shall carry 40Marksandinternalevaluationcarry10marks.
- There shall be no theory exam on SEC–I&SEC–II.
- The practical examination shall be conducted attend of each year.
- ThePracticalpapershallcarry100marks.

STANDARDOFPASSING:

- Astudentwillhavetosecure**40%**ofmarksintheoryandpracticalexaminationseach..
- Nature of Practical Question Paper and scheme of marking (Semester)

Nature of theory question paper

- As per regular B.Sc. Program.

NatureofPracticalQuestionPaperForMJ-BCSE23-501,MJ-BCSE23-502,MJ-BCSE23-503,MJ-BCSE23-504

1. Thepracticalpapershallcarry200marks.

2. There shall be two Sections.

3. ForMJ-BCSE23-507,SectionIshallbebasedon(MJ-BCSE23-501,MJ-BCSE23-502,MJ-BCSE23-503, MJ-BCSE23-504) and Major Project-I(MP-BCSE23-508)

Section II based on

4. ForMJ-BCSE23-607,SectionIshallbebasedon(MJ-BCSE23-601,MJ-BCSE23-602,MJ-BCSE23-603, MJ-BCSE23-604) and Major Project-II(MP-BCSE23-608)

5. Each Section shall be of three questions out of which one question is compulsory from each section.

6. Student has to solve total three questions.

7. EachQuestioncarries**25**marks.

8. **10**marks for Certified Journal and**15**marksforViva.

9. The total time duration of the practical examinations hold is 4hours.

10. **PW** is project work of 50 marks.

SEMESTER-V
B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-501
Course Title: Operating System
Total Contact Hours: 48hrs (60lecturesof48min)
Credits: 02TeachingScheme: Theory: 04 Lectures/WeekTotalMarks:40

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

1) Total what is an operating system ,its objective sand functions
2) Toclassifytypesofoperatingsystemandexplainoperatingsystemservices.
3) Toexplainprotection,systemcalls,systemprogramsandapplicationprograms
4) To understand the concept of process management, memory management and file management and deadlocks.

Unit	Content	Allotted Hours
1	**Operating System overview**: • Introduction and definition of operating system • Objectives and function • Types of operating system • Operating system services • Protection : input output ,memory and CPU protection • System calls: types of system calls and system call implementation • System programs and application programs	**12**
2	**Process Management:** • Process concept ,Process states ,Process control block (PCB) • Context switching • Threads ,concept Of multi threads ,benefits of threads and types of threads • Process scheduling :scheduling objectives ,types of schedulers, scheduling criteria, • Schedule in algorithms –Preemptive and non-preemptive .FCFS, SJF, priority, round • Robin ,multiple queue, multilevel feedback queue • Process synchronization, critical section problem, semaphores.	**12**

3	**Memory Management:** • Logical and physical address map • Swapping • Memory allocation-contiguous memory allocation-fixed and variable partition, internal • And external fragmentation and compaction. • Paging and virtual memory, demand paging ,locality of reference, page fault, dirty page/ • Dirty bit , pager placement policies FIFO, optimal, LRU,MFU • Disk structure, Disk scheduling-FCFS,SSTF,SCAN,LOOK, CSCAN, CLOOK	**12**
4	**File management and Deadlocks:** • File concept, access methods-sequential and direct, file type sand operations • Directory structure-single level, two level, three structure, acyclic graph, general graph • Directory structure • Allocation method-contiguous ,linked and indexed • Definition of deadlock ,characteristics • Deadlock prevention ,detection and recovery	12

SEMESTER-V
B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-502:
Course Title: Core Java
Total Contact Hours: 48 hrs. (60lecturesof48min)
Credits: 02TeachingScheme: Theory: 04 Lectures/Week Total Marks: 40

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	Allotted Hours
1	**Java Language Basics** • History and features of Java • Java Virtual Machine(JVM) • JDK tool(Folder structure- for practical purpose only) • Structure of java program ,compilation and execution of java program • Java keywords, Data types • Java variables- declaration and assigning values to variables(using assignment statement and Scanner class object), scope of variables • Typecasting-Implicit and Explicit casting, Operators of java • Control structures of java– 1) Branching statements- If, if….else, if…else if and switch statement 2) Iterative statements-for loop, do…while, while loop, jumping statements-break and continue statement.	**12**
2	**Introducing classes and objects** • Introduction: Classes, Objects and methods • Defining a class, field declaration, method declaration • Accessing class members ,access specifies in java • Static variables and methods. • Method overloading • Constructor-types of constructor ,constructor overloading • Use of this keyword • Garbage collection-finalize(),wrapper classes • Array, types of array, array of object • Collection-Iterator interface, List interface, Array List class, Linked List class, Vector class and Stack class.	**12**
3	**Inheritance ,packages and interfaces** • Inheritance-definition, syntax, types of inheritance • Method overriding, use of super key word, difference between method overloading and overriding • Dynamic method dispatch • Abstract class and method, use of final keyword • Interface-defining and implementing interface, implementation of multiple inheritances using interface, difference between abstract class and interface. • Packages-Java API package, Defining and accessing user	**12**

	Defined package	
4	**Exception Handling and Multithreading** • Concept of exception, difference between error and exception • Types of exceptions-checked and unchecked • Exception handling using try and catch block • Multiple catch block ,finally block, throws keyword • User defined exception • Concept of multithreading in java, Difference between process and thread • Creating thread by extending Thread class and by implementing Runnable interface • Lifecycle of thread, Thread class methods- start(), run(), yield(),suspend(),resume(),sleep(),wait(),notify(),stop() • Thread synchronization	**12**

Reference books-

1. HerbertSchildt,Java2:TheCompleteReference,TataMcGraw-Hill
2. ObjectOrientedProgrammingwithJAVAEssentilasandApplications,McGraw Hill
3. Core and Advanced Java, Black Book- dreamtech
4. Programming with JAVA-E Balagurusamy

SEMESTER-V
B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-503
Course Title: C# Programming
Total Contact Hours: 48hrs (60lecturesof48min)
Credits: 02TeachingScheme: Theory: 04 Lectures/WeekTotalMarks: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. Study importance and applications of exception handling
4. Understand working of file handling in C#.

UNIT	Contents	Hours Allotted
1	**Dot Net Framework:** • Overview ,component Architecture of .Net framework, • Features of .NET, Evolution of .net framework • Meta data and assembly • CLR, Managed and unmanaged code • MSIL ,JIT Compiler ,CTS,CLS • Compilation and execution process, NET base classes, namespace.	**12**
2	**C# Basics:** • Introduction to C#, Entry point method, command line arguments • Control statements ,looping statements, Arrays, String • CSC. EXE, Different valid forms of main • Global stack and heap memory ,reference type and data type • Typecasting-Implicit and Explicit Boxing and unboxing • Pass by value and pass by reference and out parameters.	**12**

3	**C# Object Oriented Concepts:** • Class, static and non-static methods • Delegate-Syntax, importance, example • Inheritance, Polymorphism, Interface, Abstract Class • Partial Class, DLL, Difference between DLL and EXE.	**12**
4	**Exception Handling and File I/O:** • Introduction to exception ,Importance in C#, try, Catch, Finally blocks • Exception classes, Handling Exceptions • User defines exceptions and System defines exceptions. • Concept of File Handling, Importance • C#I/O Classes • File Stream Class, File operations using C#.	**12**

References:

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

SEMESTER-V
B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-504
Course Title: PHP Programming
Total Contact Hours: 48hrs (60lecturesof48min)
Credits: 02 Teaching Scheme: Theory: 04Lectures/Week Total Marks: 40

Course Outcomes:
1. Improving skill of basics PHP concepts.
2. Ability to understand branching and looping.
3. Ability to understand arrays.
4. Ability to understand and File Handling in PHP and Exception Handling

Unit	Contents	Hours Allotted
1	**PHP Introduction & Arrays in PHP:** • Introduction of PHP • Structure of PHP Program • Embed PHP in HTML/HTML in PHP, • Data Types • Variables • PHP Constants • Operators in PHP • Control Structures • Array &Types of Arrays: • Indexed Arrays • Associative array • Multidimensional arrays • Sorting Arrays • Displaying contents of an Arrays in HTML table.	**12**

2	**Functions in PHP:** • What is function? • Syntax • Creating a Function • Calling a Function • PHP Function Arguments • PHP Default Argument Value • PHP Functions-Returning Values • Passing Arguments by Reference	**12**
3	**Exception Handling in PHP:** • Error Handling • Definition of Exception • Difference between Exception and error • Exception Handling Mechanism • Exception Class • Catching Multiple Exceptions • Nesting try Blocks	**12**
4	**Web Development in PHP** • Static and dynamic web pages • Communication between HTML and PHP • Difference between get and post requests • HTML Special chars()function • Handling Multi-Valued form fields.	**12**

SEMESTER-V
B.Sc. Computer Science Entire Part-III
Course Code: MJE-BCSE23-505
Course Title: Software Engineering
Total Contact Hours: 48 hrs. (60lecturesof48min)
Credits: 02 Teaching Scheme: Theory: 04 Lectures/Week Total Marks: 40

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

1. Understand the problem domain to choose process models correctly.
2. Choose software projects using appropriate design notations.
3. Measure the product and process performance using various metrics.
4. Evaluate the system with various testing techniques and strategies
5. Able to analyze, design, verify, validate, implement, and maintains of systems.

Unit	Contents	Hours Allotted

1	**Software Engineering Fundamentals** • The importance of software, • Software myths ,software engineering paradigms, • Characteristics of good quality software • Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model • Evolutionary Software Process Models: Incremental Model ,Spiral Model , Component Assembly Model, • Analysis Concepts and Principles.	**12**
2	**Software Project Planning** • Software Project Planning • Size Estimation ,Cost Estimation • Models- COCOMO, The Putnam Resource Allocation Model • Risk Identification and Projection: RMMM, • Project scheduling and Tracking • Software Design Process, Design Principles • Design Concepts: Effective Modular Design, Design Heuristics, Design Documentation (SRS), • Design Methods: Data Design, Architectural Design, Interface Design, Procedural Design.	**12**
3	**Software Testing** • Software Testing Fundamentals • White Box Testing, Black Box Testing • Software testing strategies • Verification and Validation, • System Testing, Unit testing ,Integration testing and Debugging • Implementation types • Software Maintenance, Maintenance Tasks.	**12**
4	**Unified Modeling Language(UML)** • Object-oriented concepts and principles • Unified Modeling Language,UMLviews • Basic structures and modeling classes, common modeling techniques, relationships, common mechanism • Advanced structured modeling, advanced classes and relationships, Interfaces, types and roles • Static diagrams-class diagram, object diagram, Component diagrams • Dynamic diagrams- Use case diagrams , State diagrams, Interaction diagrams, Sequence diagrams.	**12**

Reference Books:

1. Roger Pressman, Bruce R Maxim," Software Engineering: A Practitioner's Approach", Kindle Edition, 2014.
2. Ian Summer Ville," Software engineering", Addison Wesley Longman, 2014.
3. James Rum Baugh. Michael Balham "Object oriented Modeling and Design with UML", 2004.
4. Ali Behforooz, Hudson, "Software Engineering Fundamentals", Oxford, 2009.
5. Charles Ritcher, "Designing Flexible Object Oriented systems with UML", Tech Media, 2008.

SEMESTER-V
B.Sc. Computer Science Entire Part-III
Course Code: MN-BCSE23-506
Course Title: Data Communication
Total Contact Hours: 48hrs (60lecturesof48min)
Credits: 02 Teaching Scheme: Theory: 04Lectures/Week Total Marks: 40

Course outcome:

After completion of this course student will be able to

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

Unit	Contents	Hours Allotted
1	**Data and signals Data and Signals:** Introduction, Objectives, Analog and Digital signals, Periodic Analog Signals, Digital Signals, Transmission Impairment Attenuation, Distortion, Noise,DataRateLimits,Noiselesschannel:Nyquistbitrate,Noisychannel: 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:** Definition, components, characteristics, Uses of computer networks for companies, Protocol: Protocol standards, Transmission media: Introduction, Guided media: twisted pair cable, coaxial cable, fiber optic, unguided media (wireless) - radio waves, microwaves, infrared. Switching: Introduction, Objectives,Circuitswitchednetworks,Datagramnetworks,Virtualcircuit 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, Parallel and serial Transmission – DTE/DCE/such as EIA-449, EIA-202 and X21 interface – Interface standards	12
4	**Introduction to Networking protocols and OSI model :** Introduction – Protocols in computer communications• The OSI model - OSI layer functions.• Integrated services digital networking (ISDN): Introduction –• Background of ISDN - ISDN architecture – ISDN interfaces - Functional grouping – Reference points ISDN protocol architecture - Broadband ISDN (B-ISDN) of ATM –• Packet size – Virtual circuits in ATM – ATM cells – Switching – ATM layers – Miscellaneous Topics.	12

Reference books

1) Behrouz and forouzan - Introduction to Data Communication and Networking – 2 nd Edition – TMH- 2001. 2. Jean Worland – 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) UnderstandingcommunicationsandNetworks,3rdEdition,W.A.Shay,Thomson
6) Computer networks, A system Approach, 5th ed, Larry L Peterson and Bruce S Davie, Elsevier

Major Practical: MJ-BCSE23-507

Practical based on MJ-BCSE23-501Operating System

1. Write a program to implement copy command of DOS.
2. Write a program to display date and time of system
3. Write a program to implement pwd command of linux.
4. Write a program to implement wc command of linux.
5. Write a program to implement string function without using library functions.
6. Write a program to count number of vowels and consonants.
7. Write a program to implement md,cd,rd command.
8. Write a program to implement type command.
9. Write a program to implement rename command.
10. Write a program to implement cat command

Practical based on MJ-BCSE23-502 Core Java

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 Collection.
8. Program on Inheritance.
9. Program on Packages.
10. Program on Abstract class.
11. Program on interface.
12. Program on Exception Handling and user defined exception.
13. Program on multithreading(e.g. create and run multiple threads using different thread life cycle methods)

Practical based onMJ-BCSE23-503 C# Programming

1. Program on parameter passing mechanism.
2. Program on command line argument.
3. Program on type casting.
4. Program on looping statements.
5. Program on control structure.

6. Program on DLL and EXE
7. Program on array.
8. Program on static and non-static methods.
9. Program on Inheritance.
10. Program on Interface.
11. Program on abstract class.
12. Program on partial class.
13. Program on exception handling- Arithmetic exception, Array exception, File Exception, Null Reference Exception.
14. Program on user define exception.
15. Program on File I/O functions

Practical based on MJ-BCSE23-504 PHP Programming-I

1. Program to use echo and print statement in PHP .
2. Program on global and local variables in PHP.
3. Program on different control structures.(if, if…else, nested if, switch)
4. Program on different looping structures.(for, while, do while, for each loop)
5. Program to create , initialize and display array elements .
6. Program on indexed array.
7. Program on associative array.
8. Program on multidimensional array.
9. Program on sorting array.
10. Program on user defined function.
11. Program on passing array to a function.
12. Program on recursive function
13. Program on exception handling.
14. Program to create static and dynamic web page using PHP.

Field Project Work-I–MPBCSE23-508

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
   - Input Design

SEMESTER – VI

B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-601:
Course Title: Linux Operating System
Total Contact Hours: 48 hrs. (60 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory: 04 Lectures / Week Total Marks: 40

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

1) Understand the basic concepts, history, and structure of the Linux operating system.
2) Operate and manage files, directories, and user sessions using Linux commands.
3) Edit and manage text files efficiently using the VI editor.
4) Develop and execute shell scripts to automate tasks in the Linux environment

Unit	Contents	Hours Allotted
1	**Introduction**: • Operating system • Types of operating system • Functions of operating system • History and development of Linux • Features of Linux • Concept of shell , kernel , Kernel-shell relationship	12
2	**Handling Linux Environment:** • Login , logout and remote login • Different GPU (cal , date, wc, who) • Concept of file, types, files system tree, file handling- ls, cat, cp, mv , rm . lp commands , listing file names using meta characters (* , ? ,[ ]).] Concept of directory , home directory , directory handling- cd , mkdir , rmdir • Basic file attributes , change file/directory access permissions –ls –l , chmod command. • Basic filters –head , tail , sort , grep, different options and expressions for grep	12
3	**VI editor:** • Editor, use of VI , features of VI • Vi basics , different modes and working with VI • Command mode -cursor movements(k,j,h,l), delete(character, line, word), Screen up , down use of repeat factor , joining lines (J) • Input mode- switching with (I,o,r,s,a,I,O,R,S,A) • ex mode – saving (w, x, q) , writing selecting lines to another file. searching for pattern (/ and ?), Search and replace	12
4	**Essential Shell programming:** • Shell Script , running a shell script • Statements – read , echo , test , if case , exit , expr • Loops- while , until , for • manipulating positional parameters – set and shift • Here document (<<) • Exit status of a command •	12

Reference books-

1. Unix concept and applications-------Sumitabha Das
2. Linux programming- Foreword By- Alan Cox
3. Red Halt Linux 718 Bill Ball , David Pitts
4. Unix shell programming- Yashwant Kanetkar

(Lab course based on paper- XVI- Linux Operating system

SEMESTER – VI

B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-602
Course Title: Advanced Java
Total Contact Hours: 48 hrs. (60 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory: 04 Lectures / Week Total Marks: 40

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

1. Develop GUI using Java

2. Handle Database connectivity using java
3. Develop dynamic web pages using servlet and JSP
4. Develop client-server application

Unit	Content	Allotted Hours
1	**Java Swing** • Introduction • Swing container classes - JFrame, JDialog • Swing component classes- JTextField, JTextArea, JButton, JComboBox, JLabel, JList, JMenuBar, JTabbedPane, JOptionPane, JPanel, JTree,JTable,JMenu • Layout Manager- FlowLayout, BorderLayout, GridLayout, GridBagLayout • Event Handling	**12**
2	**Java Database Connectivity** • Introduction • JDBC driver and its types • JDBC connection steps • JDBC API- DriverManager class, Connection interface, Statement interface, PreparedStatment interface and ResultSet interface • Connectivity with MySQL using JDBC • Simple JDBC program	**12**
3	**Java Servlet** • Introduction to servlet • Web terminology- static vs. dynamic website, HTTP,HTTP request, Get vs. Post, Container, Content Type • Life cycle of servlet • Servlet API- javax.servlet and javax.servlet.http • javax.servlet package interfaces(Servlet,ServletConfig, ServletContext), classes(GenericServlet) • javax.servlet.http- interfaces(HttpServletRequest,HttpServletResponse), classes(HttpServlet) • Introduction to Session , session tracking techniques • Cookies- types of cookies	**12**
4	**Java Server Pages** • Introduction to JSP • JSP vs. Servlet • Life cycle of JSP • JSP scripting elements- JSP scriptlet tag, JSP expression tag, JSP declaration tag • JSP implicit objects • JSP directive elements • JSP action elements- jsp:forward, jsp:include Simple JSP application	**12**

Reference books-

1. Herbert Schildt, Java2: The Complete Reference, Tata McGraw-Hill
2. Object Oriented Programming with JAVA Essentilas and Applications , Mc Graw Hill
3. Core and Advanced Java, Black Book- dreamtech
4. Murach's Java Servlets and JSP

SEMESTER - VI
B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-603
Course Title: ASP.NET
Total Contact Hours: 48 hrs. (60 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory: 04 Lectures / Week Total Marks: 40

Course outcome: After completion of this course student will be able to
1. Understand working of Asp.Net web application
2. Demonstrate Asp.Net server controls.
3. Study database operations using ADO.Net.
4. Understand importance and working of state management.

UNIT	Contents	Hours Allotted
1	**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.	12
2	**Server Controls:** • Textbox, List controls, Link button, • Image map, Image, Image button, File Upload • Calendar, Literal control, Radio button, Checkbox • Validation Controls • Navigation controls- Menu, Tree View, Sitemap Path • Master Page, Sitemap, Sitemap Data source	12
3	**Asp.Net State Management:** • Cross page postback property of button • Response.Redirect, Server.transfer, Response.Write • Client Side: Hiddenfield control, View State, Cookies • Server Side: Session, Application, Global.asax.	12
4	**Database and ADO.Net:** • Sql Server Database. • Data controls- Grid view, List view, Form View, Details View, Repeter, SqlDataSource • Introduction to ADO.Net, ADO.NET Architecture- Connection, command, data reader • Data adapter, data set • Understanding connected layer of ADO.NET and disconnected layer of ADO.NET	12

Reference:

1. ASP.NET Black Book- By Steven Holzner
2. Professional ASP.NET 2 –Wrox Series- Wallace B. McClure
3. Asp.Net using C#- Rajendra Salokhe
4. Asp.Net: The Complete Reference Schildt McGraw Hill

SEMESTER - VI
B.Sc. Computer Science Entire Part-III
Course Code: MJ-BCSE23-604
Course Title: Advanced PHP Programming
Total Contact Hours: 48 hrs. (60 lectures of 48 min)
Credits: 02 Teachinng Scheme: Theory: 04 Lectures / Week Total Marks: 40

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

1) Develop dynamic web applications using PHP and MySQL, including form handling and user input processing.

2) Implement file upload functionalities with validation, size restrictions, and format filtering in PHP.

3) Manage user sessions and cookies for stateful web interactions and personalized user experiences.

4) Design and build mini-projects like login, registration, or stock management systems using sessions and cookies.

UNIT	Contents	Hours Allotted
1	**Developing Applications in PHP using MySQL** • Developing applications in PHP • Arithmetic operators through GUI • Web calculator etc. • Introduction to Databases • Connection with MySQL, Create MySQL database • Creating database, Creating tables • Inserting values in table, Displaying, changing, searching, deleting records from the table	**12**
2	**Form Handling php :** • Designing a Form • Form Validation • Handling Multi-Valued Form Fields • Uploading a File in PHP • Accessing Information of Uploaded File • Uploading Multiple Files • Specifying Allowed File Formats • Restricting File Upload Sizes and File Extension	**12**
3	**PHP OOPS** • Introduction, Declaring class, objects, • Constructor, Destructor, • Inheritance, Polymorphism • Abstract method and class, Interface.	**12**

4	**Mini Project:** • Website application • Login application • Registration application • Stock information etc • Use cookie and Session**.**	**12**

Reference:

1) PHP and MySQL Web Development – Luke Welling & Laura Thomson, Pearson Education
2) Learning PHP, MySQL & JavaScript – Robin Nixon, O'Reilly Media
3) Head First PHP & MySQL – Lynn Beighley & Michael Morrison, O'Reilly Media
4) Programming PHP – Kevin Tatroe, Peter MacIntyre & Rasmus Lerdorf, O'Reilly Media

SEMESTER - VI
B.Sc. Computer Science Entire Part-III
Course Code: MJE-BCSE23-605
Course Title: Software Project Management
Total Contact Hours: 48 hrs. (60 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory: 04 Lectures / Week Total Marks: 40

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); • Planning Methods; • 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 • Steps for Process Improvement. • 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), Comparison between ISO 9001 & CMM.	**12**
4	**Computer Aided Software Engineering (CASE) Tools** • CASE Concepts • Classification of CASE Tools • Steps for CASE Tool Implementation • Integrated CASE Environments • Architecture of CASE Environment. • Software Re-Engineering: Software Maintenance Problems; Redevelopment vs. Reengineering; Business Process Reengineering; Software Reengineering Process Model; Technical Problems of Reengineering.	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.
4. Software Project Management by S.A. Kalmar

SEMESTER - VI
B.Sc. Computer Science Entire Part-III
Course Code: MN-BCSE23-606
Course Title: Computer Network
Total Contact Hours: 48 hrs (60 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory: 04 Lectures / Week Total Marks: 40

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

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**

	• passive and active operant the transmission control blocks (TCB).	
4	**Physical Layer concept** • Physical Layer Basic Concepts - Bit rate, bit length, base band transmission, • Network Security- Introduction, • concept of cryptography, authentication protocols, • firewall, virtual private networks (VPN), • wireless security, email security, • web security- SSL, • Digital signature – symmetric key signature, • public key signature, and message digest	**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

Major Practical: MJ-BCSE23-607

Practical based on MJ-BCSE23-601 Linux Operating System

1. Remote login procedure through telnet- login , logout
2. Display , copy , move , delete and print files form different directories
3. Change file access permissions using chmod and confirm using ls –l command
4. Creating text files using VI editor Shell scripts-
   1. Write a shell script to get any number and display its square , cube sum of its digits .
   2. Write a script to display sequences such as 2 4 6 8 10 0 1 1 2 3 5 8
   3. Use of set and shift in a script to use positional parameters.
   4. Write a script using case structure to validate inputs
   a) Accept only two digit number.
   b) Accept employee code such as first character of code must be a letter
   c) Accept only four character long string.

Practical based on MJ-BCSE23-602 Advanced Java

1. Program to design simple frame using swing components like JButton, JLabel , JTextField
2. Program to design simple frame using swing components like JButton, JLabel,JTextField, JComboBox, JCheckBox
3. Program on JDBC.
4. Program to design simple Login Page application using JDBC.
5. Program on servlet.
6. Program to maintain session using cookies
7. Program to create simple JSP application to check given number is prime or not.
8. Program to create simple JSP application to print Fibonacci sequence for given

number.

9. Program to create simple JSP application to check given string is palindrome or not.

Practical based on MJ-BCSE23-603 ASP.NET

1. Program on server controls
2. Program on SqlDataSource.
3. Program on data controls
4. Program on ADO.Net connected architecture.
5. Program on ADO.Net disconnected architecture
6. Program on Response.Redirect.
7. Program on cross page posting.
8. Program on client side state management.
9. Program on server side state management.
10. Program to design master page for university website.

Practical based on MJ-BCSE23-604 Advanced PHP Programming

1) Program on Uploading a File in PHP
2) Program on form validations
3) Programs on database connectivity
4) Program on development of web calculator
5) Program to develop user registration and login 7
6) Programs on cookie and session
7) Program on Uploading a File in PHP
8) Program on form validations

Major Project Work-II -MPBCSE23-608(On Job Training)

Standard Project Report Documentation Format

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

i. Introduction to Project
   -Introduction
   -Existing System
   -Need and scope of Computer System
   -Organization Profile

ii. Proposed System
   -Objectives
   -Requirement Engineering.
   1. Requirement Gathering
   2. SRS

iii. System Analysis
   System Diagram
   1. DFD
   2. ERD
   3. UML(if applicable)

iv. System Design
    1. Database Design
    2. Input Design
    3. Output Design

v. Implementation
    - System Requirements
    1. Hardware
    2. Software

    -User Guide line
    - Installation process

vi. Outputs-
    Screens and Reports (with valid Data)

vii. Conclusion and Suggestions
    1. Conclusion
    2. Limitations (future enhancement)
    3. Suggestion

viii. Bibliography:

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