SHIVAJI UNIVERSITY, KOLHAPUR

Accredited By NAAC with 'A++' Grade

Choice Based Credit System with Multiple Entry and Multiple Exit Options

As per NEP-2020

Syllabus for

B.Sc. Part – III

COMPUTER SCIENCE

SEMESTER –V AND VI

(Syllabus to be implemented from Academic Year 2024-25)

Structure of B.Sc. Programme Sem - V&VI

SEMESTER–V (Duration–6Months)																		
Sr. No.	Subject Title	TEACHING SCHEME						EXAMINATION SCHEME										
		THEORY			PRACTICAL			THEORY					PRACTICAL					
								Internal			University							
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max Marks	Min Marks	Hours	Max Marks	Min Marks	Hours	Max Marks	Min Marks			
1	DSE-E	**2**	3	2.4	**8**	**20**	**16**	10	4	2	40	**14**	**PRACTICAL EXAMINATIONIS ANNUAL**					
2	DSE-E	**2**	3	2.4				10	4	2	40	**14**						
3	DSE-E	**2**	3	2.4				10	4	2	40	**14**						
4	DSE-E	**2**	3	2.4				10	4	2	40	**14**						
5	AECC-E	**4**	4	3.2				10	4	2	40	**14**						
6	SEC-V	Any one from pool of courses			**2**	---	---	---	---				**2**	**50**	**18**			
	TOTAL	**12**	**16**	**12.8**	**10**	**20**	**16**	**50**			**200**							
SEMESTER–VI (Duration–6 Months)																		
1	DSE-F	**2**	3	2.4	**8**	**20**	**16**	10	4	2	40	**14**	**As per BOS Guide-Lines**	**200**	**70**			
2	DSE-F	**2**	3	2.4				10	4	2	40	**14**						
3	DSE-F	**2**	3	2.4				10	4	2	40	**14**						
4	DSE-F	**2**	3	2.4				10	4	2	40	**14**						
5	AECC-E	**4**	4	3.2				10	4	2	40	**14**						
6	SEC-VI	Any one from pool of courses			**2**	---	---						**2**	**50**	**18**			
	TOTAL	**12**		**12.8**	**10**		**16**	**50**			**200**							
	GRAND TOTAL	**24**	**32**	**25.6**	**20**	**40**	**32**			**400**	**800**							

• Student contact hours per week: 28.8 Hours (Min)	• Total Marks for B.Sc.-III (Including English): 8**00**
• Theory and Practical Lectures: 48 Min. Each	• Total Credits for B.Sc.-III (Semester V&VI): 44
• **DSE-Discipline Specific Elective.** A candidate shall select one course (subject) from the three Courses (Subjects)selected at B.Sc.–II. Select any 4 pairs of papers from DSE-E1 to DSE-E84 for Sem –V and DSE- F1 to DSE-F84 for Sem-VI	
• **AECC**-Ability Enhancement Compulsory Course (E & F): English for communication	
• ***There shall be separate passing for internal, theory and practical examinations.***	
• ***Practical Examination shall be conducted annually for 200 marks, and minimum 70 marks are required for passing.***	
• ***University semester end exam shall be of 40 marks per paper and minimum 14 marks are required for passing.***	
• ***Minimum 4 marks are required for passing out of 10 for Internal Examination of each paper.*** • ***Examination of SEC shall be either theory or practical depending upon type of SEC.***	

Class	B. Sc. - I	B. Sc. - II	B. Sc. - III	Total
Marks	1200	1100	800	3100
No. of Credits	60	56	44	160

B.Sc. Computer Science (Optional) Semester - V and VI

(CBCS) NEP-2020 Syllabus to be implemented from June 2024 Onwards

1. **TITLE:** Computer Science
2. **YEAR OF IMPLEMENTATION**: Revised Syllabus will be implemented from June 2023 onwards.
3. **DURATION:** B.Sc. in Computer Science Part - III The duration of the course shall be one year and two semesters.
4. **PATTERN:** The pattern of examination will be semester.
5. **STRUCTURE OF COURSE:**

STRUCTURE OF COURSE

Sr. No.	Paper	Name of Paper	Marks		
			Theory	Internal	Total
Computer Science (Semester - V)					
1	DSE-E21	Core Java	40	10	50
2	DSE-E22	C# Programming	40	10	50
3	DSE-E23	Linux Operating System	40	10	50
4	DSE-E24	Basics of Python	40	10	50
Computer Science (Semester - VI)					
5	DSE-F21	Advanced Java	40	10	50
6	DSE-F22	ASP.NET	40	10	50
7	DSE-F23	Advanced Linux OS	40	10	50
8	DSE-F24	Advanced Python	40	10	50
Practical (Annual)					
9	Practical Paper-IV	Computer Science Practical Paper Based on DSE-E21, E22, F21 and F22	50 (Practical)	-	50
10	Practical Paper-V	Computer Science Practical Paper Based on DSE-E23, E24, F23 and F24	50 (Practical)	-	50
11	Practical Paper-VI	Software Project	100	-	100

B.Sc. Part – III Computer Science (Optional) (Semester – V)
Course Code: DSE-E21 Computer Science Paper – IX
Course Title: Core Java
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) use the syntax and semantics of java programming language and basic concepts of OOP.
2) apply the concepts of Multithreading and Exception handling to develop efficient and error free code
3) develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
4) design and program stand-alone Java applications and GUI

Unit – 1: Introduction to Java and Object Oriented Programming (18 Hrs.)

(A) Introduction to Java: History of Java and features of Java, Primitive Data Types- Integer (byte, short, int, long), floating point (float, double), char, boolean, Non-Primitive Data Type – String, Java Keywords, variables, constants, Operators- arithmetic, relational, logical, unary, ternary, bitwise, Branching and looping statements, Typecasting- Implicit and Explicit, wrapper classes, Command line arguments, Writing simple java program, compiling and executing Java program (javac, java commands).

(B) Object Oriented Programming using Java: Introduction- Class, Object and methods, Access modifiers and accessibility, Static members, constructors, destructor and this keyword, Encapsulation and Abstraction, Inheritance- Definition and its types single, multilevel, hierarchical, Interface – definition and implementation, Abstract Class – definition and use, Polymorphism- Definition and concepts of method overloading and overriding, Final method and Final Class, Java Packages – introduction, defining packages, CLASSPATH, importing packages, System Packages – java, lang, awt, javax, swing, net, io, util.

Unit – 2: Multithreading, Exception Handling, GUI Programming and Event Handling

(18 Hrs.)

(A) Multithreading and Exception Handling: Introduction to Multithreading, Understanding Threads, Thread Life-Cycle, Creating threads using Thread class & Runnable Interface, Thread Priorities, Exception handling - Fundamentals of exception handling, Exception types, Using try and catch, multiple catch clauses, throw, throws and finally, Built- in exceptions, Creating own exception sub classes.

(B) GUI Programming and Event Handling: Introduction to GUI, Abstract Window Toolkit

(AWT), Component and Container, Using Containers - Frame and Panel, Layout Managers - FlowLayout, GridLayout, CardLayout, BorderLayout, AWT Components – Label, Button, TextField, CheckBox, ChekBoxGroup, Event Handling- The Delegation event model, Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

Reference Books –

1. Programming with Java A Primer, E. Balaguruswamy, Tata McGraw Hill Companies.
2. Java : The Complete Reference, Herbert Schildt, Tata McGraw-Hill
3. Java Programming- Rajendra Salokhe (Aruta Publication)
4. THE Java™ Programming Language, Fourth Edition By Ken Arnold, James Gosling, David Holmes
5. Introduction to Java programming, By Y. Daniel Liang, Pearson Publication.
6. Java How to Program, Sixth Edition, H.M.Deitel and P.J.Deitel, Pearson Education/PHI
7. The Java Tutorials: http://docs.oracle.com/javase/tutorial/

Practical Based on DSE-E21

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. Write a Java program to test whether given number is Odd or Even.
2. Write a Java program to check whether given number is palindrome or not.
3. Write a program to find the LCM of two numbers.
4. Write a java program which initialization earning of an employee. The program should calculate the income tax to be paid by the employee as per the criteria given below:

Slab rate	**IT rate**
Upto Rs. 50,000	Nil
Upto Rs. 60,000	10% on additional amount
Upto Rs. 1,50,000	20% on additional amount
Above Rs. 1,50,000	30% on additional amount

5. Write a Java program to display following pattern
   A
   A B
   A B C
   A B C D
6. Write a program to input 3 numbers on command line argument and find maximum of them.
7. Design a class for a bank database the database should support the following operations.
   a) Deposit a certain amount into an account,
   b) Withdrawing a certain amount from an account,
   c) Return a value specifying the amount (i.e., balance) in an amount.
8. Create a person inherit two classes from its politician & sportsman provide constructors & calculate salary & display functions.
9. Write a Java program to count objects of a class running in memory (use static members).
10. Create an abstract class employee, having its properties & abstract function for calculating net salary and displaying the information. Drive manager & clerk class from this abstract class & implement the abstract method net salary and override the display method.
11. Write a Java program to create an interface Shape with the getArea() method. Create three classes Rectangle, Circle, and Triangle that implement the Shape interface. Implement the getArea() method for each of the three classes
12. Create a package College and add two classes Student and StaffMember to it. Add appropriate members to the classes.
13. Write a program to create two threads, one prints “HELLO” and other prints “HI”.
14. Write a Java program that creates two threads to find and print even and odd numbers from 1 to 20.
15. Write a Java program that throws an exception and catch it using a try-catch block.
16. Write a Java program to create a method that takes an integer as a parameter and throws an exception if the number is odd.
17. Design a simple GUI with a Label and Button. Each time user clicks the button increase counter and display number of counts on the label.

18. Design a simple GUI for Temperature converter, using appropriate components.
19. Write a java program using swing to create a frame having three text fields. Accept number in first textfield and display previous number in second textfield and next number in the third textfield.
20. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

B.Sc. Part – III Computer Science (Optional) (Semester – V)
Course Code: DSE-E22 Computer Science Paper –X
Course Title: C# Programming
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) understand framework and architecture of .NET.
2) learn common type system of .NET.
3) learn object oriented concepts of C#.net
4) learn graphical user interface (GUI) with windows form controls their properties, methods and events.

Unit – 1: Introduction to .Net **(18 Hrs.)**

An Overview of C#, History and Features of C#, .NET Framework Architecture, IDE – (Integrated Development Environment), Components of .NET: CLR, CLS, Microsoft Intermediate Language ("MSIL" or "IL"), The Common Type System (CTS), Data Types, Value and Reference Types, C# - Flow Control: Branching and Looping, Type casting, Boxing and Unboxing, JIT compiler and it's types, .DLL and .EXE

Unit – 2: Object Oriented Concepts and Windows Form Applications Using C# **(18 Hrs.)**

Object Oriented Concepts: Classes and Objects, Command Line Arguments, Polymorphism, Inheritance and it's types- Single, Multiple, Multilevel, Hierarchical, Parameter Passing Mechanism – 'val' and 'ref', Abstract Classes, Sealed Classes, Partial Classes, Exception Handling

Introduction to Windows Form Applications Using C#: Developing GUI Application Using WINFORMS - Basic Controls, Form Controls: Label, Button, Textbox, Checkbox, Radio Button, Timer, calendar, List Box, Image and overview of remaining all common controls its properties and events.

Reference Books –

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 DSE-E22

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

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 to demonstrate type casting
6. Write a C# program to demonstrate boxing and unboxing
7. Write a C# program to demonstrate Inheritance.
8. Write a C# program to demonstrate Interface.
9. Write a C# program to demonstrate sealed class
10. Write a C# program to demonstrate abstract class.
11. Write a C# program to demonstrate partial class
12. Write a C# program to demonstrate exception handling.

B.Sc. Part – III Computer Science (Optional) (Semester – V)
Course Code: DSE-E23 Computer Science Paper –XI
Course Title: Linux Operating System
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) learn architecture and basics of Linux Operating System.
2) understand the kernel-shell and general purpose utilities.
3) understand file system of Linux operating system.
4) learn Process management and Simple BASH Programming.

Unit – 1: Introduction to Linux, File System and System Calls (18 Hrs.)

Introduction to Linux: Operating System Basics, History of Linux, Architecture of Linux, Operating System Services, Shell, Types of Shell, Kernel, Login and Logout, General Purpose Utilities (banner, cal, date, calendar, who, tty, uname, password, lock, echo, tput, bc, clear, script, wc, echo, test, expr), Finding Information of commands.

File System: Basic file system management, Files Types, Boot block, Super block, Inode table, Storage and Accessibility of files, File and Directory Manipulation commands, File ownership and permission, File system commands, File locating command (find), File permissions.

System Calls: Open, Read, Write, Close

Unit – 2: Process and BASH Shell Scripting (18 Hrs.)

Process: Process Basics and its options, Mechanism of Process Creation, Process States and Transitions, Killing Process with Signals, Process Management (background processing: No logging out, Log out safely, job scheduling using at and batch command, Nice, Corn).

BASH Shell Scripting: Shell Scripts, Choosing a Shell, Operators in BASH shell (Arithmetic, Relational, Logical, Assignment, Reassignment, Bit wise), Invoking the Shell Variables, Getting input from keyboard, Special Variables, Conditional Control Statement, Iterative Control Statements, Using test and [ ] to evaluate expressions.

Reference Books –

1. LINUX with Operating System Concepts by Richard Fox, CRC Press
2. Linux Commands- Instant Reference by Bryan PF affenberge
3. The Design of the Unix Operating System- Bach

4. Unix Shell Programming- Yashwant Kanetkar
5. Unix Concepts and Application – Sumitabhadas
6. Linux : The Complete Reference- Richard Peterson

Practical Based on DSE-E23

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

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: DSE-E24 Computer Science Paper –XII
Course Title: Basics of Python
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) understand why Python is a useful scripting language for developers.
2) learn how to write loops and decision statements in Python.
3) learn how to use lists, tuples and dictionaries in Python programs.
4) use of functions and modules in Python programs.

Unit – 1: Python Preliminaries **(18 Hrs.)**

Introduction to Python: History, Features, Working with Python, Basic Syntax, Keywords, Variable and Data Types, Operators, Input - output functions.

Conditional Statements & Looping: If, If-else, Nested if-else, For, While, Nested loops.

Control Statements: Break, Continue, Pass.

String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods.

Unit – 2: Basic Data Structures, Functions and Modules in Python **(18 Hrs.)**

Basic Data Structures: List - Accessing list, Operations, Working with lists, Function and Methods, **Tuple -** Accessing tuples, Operations, Working, Functions and Methods, **Dictionaries -** Accessing values in dictionaries, Working with dictionaries, Properties, Functions.

Functions: Defining a function, Calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables.

Modules: Importing module, Math module, Random module, Packages, Composition

Reference Books –

1. Practical Programming: An introduction to Computer Science Using Python, second edition, Paul Gries, Jennifer Campbell, Jason Montojo, The Pragmatic Bookshelf.
2. Python for Informatics: Exploring Information, Charles Severance
3. Learning Python, Fourth Edition, Mark Lutz, O'Reilly publication
4. Introduction to Python for Computational Science and Engineering (A beginner's guide), Hans Fangohr
5. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
6. R. Nageswara Rao, "Core Python Programming", Dreamtech
7. "Glimpses of Python Programming Development" by Budake R. D.

Practical Based on DSE-E24

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. Write a Python program to add two numbers
2. Write a Python program for factorial of a number
3. Write a Python program for simple interest
4. Write a Python program to check if a string is palindrome or not
5. Write a Python program to reverse words in a given string in python
6. Write a Python program to find out ways to remove i'th character from string in python
7. Write a Python program to check if a substring is present in a given string
8. Write a Python program to interchange first and last elements in a list
9. Write a Python program to swap two elements in a list
10. Write a Python program to find out different ways to clear a list in Python
11. Write a Python program to reversing a List
12. Write a Python Program for Linear Search
13. Write a Python Program for Insertion Sort
14. Write a Python Program to demonstrated use of dictionaries by Key or Value
15. Write a Python Program to remove a key from dictionary
16. Write a simple Python function to check whether x is even or odd
17. Write a simple Python program to demonstrate default arguments to function
18. Write a simple module (e.g. calc.py) for addition and subtraction
19. Write a program for importing sqrt() and factorial from the module math

B.Sc. Part – III Computer Science (Optional) (Semester – VI)
Course Code: DSE-F21 Computer Science Paper –XIII
Course Title: Advanced Java
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) 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) learn database programming using Java.
4) study web development concept using Servlet and JSP.

Unit – 1: Java Swing and JDBC **(18 Hrs.)**

(A) Java Swing: Overview of Java Swing and its advantages, Java Swing MVC architecture, Component of swing: JFrame, JComponent, JLable, JTextfields, JCheckbox, JPanel, JRadiobuttons, JTabbed Pane, JButton, JTree, JTable, JMenu, Difference between AWT and Swing, Event handling in Swing.

(B) JDBC: Introduction Java Data Base Connectivity (JDBC), JDBC Architecture and Components, Establishing a connection to a database using DriverManager, Handling database connections: opening and closing connections, Overview of JDBC statements: Statement, PreparedStatement, Executing SQL queries and updates, Retrieving and processing result sets, Types of ResultSet.

Unit – 2: Servlet and Java Server Pages (JSP) **(18 Hrs.)**

(A) Servlet: Introduction to Servlet and Servlet Class Hierarchy, Life-Cycle of Servlet, Servlet API, Directory structure of Servlet Application, ServletConfig and ServletContext, Handling HTML form data – get and post method, Session tracking –URL rewriting, Cookies, and HTTpSession.

(B) Java Server Pages (JSP): Introduction to JSP, Life cycle of JSP, JSP v/s Servlet, Components of JSP: Directives, Tags, Scripting elements – Declarations, Expressions, Scriptlets, Comments, Implicit objects of JSP, Connecting to database.

Reference Books –

1. Programming with Java A Primer, E. Balaguruswamy, Tata McGraw Hill Companies.
2. Java : The Complete Reference, Herbert Schildt, Tata McGraw-Hill
3. Java Programming- Rajendra Salokhe (Aruta Publication)
4. THE Java™ Programming Language, Fourth Edition By Ken Arnold, James Gosling, David Holmes
5. Introduction to Java programming, By Y. Daniel Liang, Pearson Publication.

6. Java How to Program, Sixth Edition, H.M.Deitel and P.J.Deitel, Pearson Education/PHI
7. Java Database Best Practices, by George Reese, O'Reilly
8. Head First Servlets and JSP" by Bryan Basham, Kathy Sierra, and Bert Bates.
9. "Java Swing" by Marc Loy
10. The Java Tutorials: http://docs.oracle.com/javase/tutorial/

Practical Based on DSE-F21

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. Develop a program that has only one button in the frame, clicking on the button cycles through the colours: red->green- >blue and so on. Colour changes per click. (use getBackGround() method to get the current colour)
2. Develop an program that contains three check boxes and 30 x 30 pixel canvas.The three checkboxes should be labelled "Red", "Green","Blue". The selection of the check boxes determines the colour of the canvas. For example, if the user selects both "Red" and "Blue", the canvas should be purple
3. Create an application that displays a frame with a menu bar. When a user selects any menu or menu item, display that selection on a text area in the centre of the frame.
4. Develop a Graphical User Interface that performs the following SQL operations: a) Insert b) Delete c) Update
5. Develop a simple servlet program which maintains a counter for the number of times it has been accessed since its loading.
6. Develop a simple JSP program for user registration and then control will be transfer it into second page.
7. Develop an EMI calculator using Servlet.
8. Create a web form which processes servlet and demonstrates use of cookies and sessions.
9. Assume that the information regarding the salary and age for all employees of an organization are available in a database. Develop a Servlet application which takes the employee id of an employee as a request parameter and displays the marksheet for the student.
10. Create a custom JSP tag that prints current date and time.
11. Develop a JSP program to display the grade of a student by accepting the marks of five subjects.
12. Create a Login application using servlet and JSP, where the user will provide his login details in a servlet page and if the login is successful then, a JSP page with "Welcome" message and "Log Out" button should be shown. If the login is failed, then message of failure and link to further login should be shown on a JSP page. If the failure count reaches to 3 then the webpage should be closed. The students are advised to make use of session tracing mechanisms and database.

B.Sc. Part – III Computer Science (Optional) (Semester – VI)
Course Code: DSE-F22 Computer Science Paper –XIX
Course Title: ASP.NET
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) understand Web server, HTTP request response architecture.
2) learn Web forms and their controls.
3) learn state management in web forms.
4) understand ADO.NET Architecture with connection oriented and Disconnected layer.

Unit – 1: Introduction to ASP.NET (18 Hrs.)

Introduction to Scripting Languages, ASP.NET Introduction, Features of ASP.NET, Web browser and web server, HTTP request response structure, HTML form elements, GET/POST method, Client side and Server side programming, Web form life cycle, Page events, Server Controls: Textbox, Listcontrols, FileUpload, Linkbutton, Imagemap, Image, Imagebutton, Calender, Literal control, Radiobutton, Checkbox, Validation Controls, Navigation controls, Master Page.

Unit – 2: State Management and Database Connectivity (18 Hrs.)

State Management: Cross page postback property of button, Response.Redirect, Server.transfer, Response.Write, State Management - Session, Application, Global.asax, Caching.

Database Connectivity: SqlServer Database, Data controls- Gridview, Listview , FormView, DetailsView, Repeater, 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.

Basics of Crystal reports

Reference Books –

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

Practical Based on DSE-F22

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

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 an Asp.Net program using while or for loop.
6. Write an Asp.Net 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 an Asp.Net 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. Write an Asp.Net Program to perform Insert and update operation in Database.
11. Write an Asp.Net program to perform Search and Delete operation in Database.

B.Sc. Part – III Computer Science (Optional) (Semester – VI)
Course Code: DSE-F23 Computer Science Paper –XV
Course Title: Advanced Linux OS
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) understand the working and use of NANO editor.
2) learn Regular expressions using metacharacters.
3) learn filters with the help of regular expression.
4) learn advanced BASH shell Programming.

Unit – 1: Memory Management, NANO Editor and Regular Expressions (18 Hrs.)

Memory Management: Swapping, Demand Paging, Paging, and Segmentation.

NANO Editor: Installing the Nano Text Editor in Linux, Nano Command Keys, Create a New File using Nano, Open an Existing File Using Nano, Edit Files Using Nano Text Editor in Linux, Cut and Paste Lines of Text Using Nano, Valid Shortcuts in Nano Text Editor, Search Text Using Nano, Spell Check Using Nano, Save Your Work Using Nano, Save with Backups.

Regular Expressions: Metacharacters, Controlling Repeated Characters through *, +, and ?, Using and Modifying the '.' Metacharacter, Controlling Where a Pattern Matches, Matching from a List of Options, Matching Characters That Must Not Appear, Matching Metacharacters Literally, Controlling Repetition, Selecting between Sequences

Unit – 2: Filters and Advanced BASH Shell Programming (18 Hrs.)

Filters: cat, tac, head, tail filters and options, sed and sed options, grep and grep options, Line Addressing, Multiple Instruction(-E and -F), Context Addressing, Writing Selected Lines to a File.

Advanced BASH Shell Programming: Seq Command for sequence, Shell and subshell, Exporting Shell Variables, Arrays, String Manipulation, Shell Functions.

Reference Books –

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

Practical Based on DSE-F23

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. Write a shell script using grep command to print prime numbers between 1 to 30.
2. Writer a shell script that check given input is a valid email id.
3. 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.
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. Create a data file which contains given format and perform the given operations on that data file using sed.
7. 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.
8. Write a shell script, which works similar to wc command accept filename as command line argument.
9. Accept any word through command line argument and find out its length.
10. Write a shell script, which sort an array of integers in ascending order.

B.Sc. Part – III Computer Science (Optional) (Semester – VI)
Course Code: DSE-F24 Computer Science Paper –XVI
Course Title: Advanced Python
Total Contact Hours: 36 Hrs (45 Lectures of 48 Min.)
Teaching Scheme: Theory – 03 Lect. / Week

Credits: 02 **Total Marks: 50**

Course Outcomes:

After successful completion of this course, students will able to:

1) learn how to use exception handling in Python applications for error handling.
2) makes code more reusable and easier to work with larger programs using oops.
3) understand Python programming using Django framework.
4) develop web pages or web applications using Django.

Unit – 1: Exception Handling and Object Oriented Programming Concepts (18 Hrs.)

Exception Handling: Exception, Exception Handling, Except clause, Try, finally clause, User Defined Exceptions.

Object Oriented Programming Concepts: Class and object, Attributes, Inheritance, Overloading, Overriding, and Data hiding.

Unit – 2: Introduction to Django (18 Hrs.)

Introduction to Django: Concepts of Web Page**,** Django Project & server configuration**,** MVT Design Pattern**,** View**,** Template**,** URL Mapping**,** Django Forms**,** Form Validation**,** Database connectivity**,** Django Middleware**,** Session & cookies.

Reference Books –

1. Practical Programming: An introduction to Computer Science Using Python, second edition, Paul Gries, Jennifer Campbell, Jason Montojo, The Pragmatic Bookshelf.
2. Python for Informatics: Exploring Information, Charles Severance
3. Learning Python, Fourth Edition, Mark Lutz, O'Reilly publication
4. Introduction to Python for Computational Science and Engineering (A beginner's guide), Hans Fangohr
5. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
6. R. Nageswara Rao, "Core Python Programming", Dreamtech
7. "Glimpses of Python Programming Development" by Budake R. D.

Practical Based on DSE-F24

Following is a sample list of assignments for practical; instructors are advised to provide more lab assignments to students to meet the course specified outcomes.

1. Write a simple Python function to check whether x is even or odd.
2. Write a simple Python program to demonstrate default arguments to function.
3. Write a simple module (e.g. calc.py) for addition and subtraction.
4. Write a program for importing sqrt() and factorial from the module math.
5. Write a Python program to handle simple runtime error.
6. Write program to handle multiple errors with one except statement.
7. Write a python program to create user-defined exception.
8. Write Python code to illustrate clean up (finally) actions.
9. Write a program to demonstrate the use of class.
10. Write a Python program to demonstrate inheritance.
11. Write a Python program to demonstrate overloading.
12. Write a Python program to demonstrate overriding.
13. Creating CURD application in Django.

6. EXAMINATION SCHEME

Theory: Theory examination will be conducted at the end of each semester. Paper Duration: 2 Hrs., **Maximum Marks: 40**. Minimum for passing: 35%.

10 Marks for Termwork / Internal

10 Marks for Assignments / Unit Test / Mid test / presentation or activity-based learning/ Group exercise/ Laboratory work/ Library work

Practical: Practical Examination will be conducted annually towards the end of Second Term of every Academic year. Duration: 3 hours, Maximum Marks: 50, Minimum for passing: 35%.

There shall be separate passing for internal, theory and practical examinations.

- **NATURE OF QUESTION PAPER AND SCHEME OF MARKING**

For all DSE theory courses

Que. No.	Question	Marks
Q.1.	08 Multiple Choice Questions (One Mark each)	**08 Marks**
Q.2.	Attempt any TWO out of THREE (08 marks each)	**16 Marks**
	a)	
	b)	
	c)	
Q.3.	Attempt any FOUR (4 marks each)	**16 Marks**
	a)	
	b)	
	c)	
	d)	
	e)	
	f)	
	Total Marks	**40 Marks**

- **Nature of Practical Examination:**
  - ✓ **The Practical Paper – IV is based on DSE-E21, E22, F21 and F22.**
  - ✓ **The Practical Paper – V is based on DSE-E23, E24, F23 and F24.**
  - ✓ **The Practical Paper – VI is of Software Project (Major Project) work done by the student.**

1) The practical question paper IV and V for B.Sc.-III (Computer Science) will be of maximum 50 marks each.
2) The practical paper VI for B.Sc.-III (Computer Science) will be of maximum 100 marks.
3) The Practical Paper - IV having four questions out of which two questions are based on

DSE-E21 (Sem-V) DSE-F21 (Sem-VI) and two questions are based on DSE-E22 (Sem-V) DSE-F22 (Sem-VI).

4) The Practical Paper - V having four questions out of which two questions are based on DSE-E23 (Sem-V) DSE-F23 (Sem-VI) and two questions are based on DSE-E24 (Sem-V) DSE-F24 (Sem-VI).

5) The Student has to attempt any TWO questions out of FOUR questions. Each question carries 20 marks.

6) ***No paper work is required for the Practical exam. No marks for paper work.***

7) The duration of practical will be 3 hours.

8) The mark distribution for Practical Paper - IV and V will be as follows:

Each question carries	: 20 marks (20 X 2 = 40 marks)
Certified Journal carries	: 5 marks.
Viva based on practical carries	: 5 marks.

9) The mark distribution for Practical Paper - VI will be as follows:

Project Documentation	: 30 marks
On-line Presentation	: 20 marks.
Project Based Viva-voce	: 30 marks.
Industrial Visit Report	: 20 marks
Total Marks	**: 100 marks**

- **Practical Paper - VI: Software Project work - 100 marks**

Project work Guidelines:

1) Institute is expected to conduct ***Industrial visit*** to any computerized industry and students are supposed to submit the report based on same.

2) Software development project is to be carried out by the candidate in actual consumer environment taking some real life problem.

3) The candidate submit the project work according to norms of software engineering i.e. the project document should contain Introduction, detailed design, sample testing and conclusion (Guidelines and other details are mentioned at ***Appendix -1 and 2***)

4) Project will have internal guide to supervise and monitor the progress of the project. The internal guide may assign the project to the student or within the group of student (maximum 2 candidates in group). The language / platform / technology (for front end and back end) of the software-project development to be used from the subject studied in previous

and present semester.

5) There will be online demonstration of project work in the presence of the external examiner and it will be considered for the evaluation.

Appendix- 1

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 Arial 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

d. Front Cover:

The front cover should contain the following details:

- TOP: The title in block capitals of 6mm to 15mm letters.
- CENTRE: Full name in block capitals of 6mm to 10mm letters.
- BOTTOM: Name of the University, Course, Year of submission -all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and centering.

e. Blank Sheets:

At the beginning and end of the report, two white black bound papers should be provided, one for The purpose of binding and other to be left blank.

Appendix - 2

- Input Design
- Report Design
- Implementation
- Testing

Standard Project Report Documentation Format

a) Covering Page

b) Institute/College certificate

c) Guide Certificate

d) Student declaration

e) Acknowledgement

f) Index (Chapter Scheme)

1) Introduction to Project

- Introduction
- Existing System
- Need and scope of System
- Organization Profile

2) Proposed System

- Objectives
- Requirement Engineering.
- Requirement Gathering.
- SRS

3) System Diagrams

- DFD
- ERD
- UML(if applicable)

4) System Requirements

- Hardware
- Software

5) System Design

- Database Design
- Input Design
- Output Design

6) User Guideline

- Installation process

7) Source Code (Optional)

8) Outputs

- Input screens and Reports (with valid Data)

9) Conclusion and Suggestions

- Conclusion and suggestions
  - Future enhancement
  - Bibliography:

Note: Minimum 5 reports are essential as outputs of the project work done by the student