Credit distribution structure for Two Year PG Program

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Syllabus for

Master of Management Studies (Computer Management) – WebTechnologies/Computer Applications / Data Analytics

Under

Faculty of Commerce & Management

MMS(CM): Semester III and IV
(w.e.f.-Academic Year 2024-25)

Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon

Faculty of Commerce & Management

Master of Management Studies (Computer Management) – WebTechnologies/Computer Applications/Data Analytics

(W. E. F. July 2024-25)

SEMESTER – III

Level (Semester): 6.5 (III)				Credits
VERTICALS		**Course**		
			Select Any One Major Out of Three Choices	**14 Credit**
Major	**Mandatory(DSC)** **DSC-23** **DSC-24** **DSC-25** **DSC-26**	**Web Technologies**	**231A:** Web Scripting using PHP and MySQL	4
			232A: Programming with C#	4
			233A: Practical Based on 231A and 232A	4
			234A: Practical Based on 235	2
		Computer Applications	**231B:** Core Java	4
			232B: Programming with C#	4
			233B: Practical Based on 231B and 232B	4
			234B: Practical Based on 235	2
		Data Analytics	**231C:** R language	4
			232C: Data Visualization using Power BI and Tableau	4
				4
			233C: Practical Based on 231C and 232C	2
			234C: Practical Based on 235	
Elective(DSE) (For all Majors)			**235:** RDBMS	**4 Credit**
RM			--	--
OJT/ FP			--	--
RP			**236:** Research Project	**4 Credit**
Cumulative Credits/Sem			--	**22 Credits**
Degree/Cumulativee Cr.			--	**66 Credits**

Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon

Faculty of Commerce & Management

Master of Management Studies (Computer Management) – WebTechnologies/Computer Applications/Data Analytics

(W. E. F. July 2024-25)

SEMESTER – IV

Level (Semester): 6.5 (IV)				Credits
VERTICALS		**Course**		
			Select Any One Major Out of Three Choices	**12 Credit**
Major	**Mandatory(DSC)** **DSC-27** **DSC-28** **DSC-29**	**Web Technologies**	**241A:** Internet Computing with ASP.NET	4
			242A: Python Programming	4
			243A: Practical Based on 241A and 242A	4
		Computer Applications	**241B:** Advance Java	4
			242B: Python Programming	4
			243B: Practical Based on 241B and 242B	4
		Data Analytics	**241C:** Data Structure and Algorithms	4
			242C: Python Programming	4
			243C: Practical Based on 241C & 242C	4
Elective (DSE) (For all Majors)			**244:** Software Engineering	**4 Credit**
RM			--	
OJT/FP			--	
RP			**245:** Research Project (Software Development)	**6 Credit**
Cumulative Credits/Sem			--	**22 Credits**
PG Degree/CumulativeCr.				**88 Credits**

Abbreviations: Yr.: Year; Sem.: Semester; OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology; Research Project: RP; Cumulative Credits: Cum. Cr.

Level(Semester): 6.5(III)

Course No: 231A Web Scripting using PHP and MySQL

Course Learning Objectives:

- To learn the fundamentals of PHP scripting language.
- To understand PHP syntax and structure.
- To master PHP forms, including form creation, validations, and using $_GET and $_POST methods.
- To grasp object-oriented programming (OOP) concepts in PHP.
- To explore advanced PHP functionalities such as file uploading, session management, etc.
- To understand the integration of PHP with MySQL databases.

Reference Books:

- Beginning PHP Apache, MySQL Web Development by Michael K. Glass et al. (2004, Wiley Publishing (Wrox), ISBN: 9780764557446)
- Head First PHP & MySQL by Elisabeth Robson and Kelly Wand (2008, O'Reilly Media, ISBN: 9780596529055).
- PHP & MySQL Web Development by Luke Welling and Laura Thomson (2016, Apress, ISBN: 9781484219052).
- PHP & MySQL for Dummies by Janet Valade (2014, John Wiley & Sons, ISBN: 9781118833449).
- PHP: The Right Way [Online resource] https://phptherightway.com/
- MySQL Documentation [Online resource] https://dev.mysql.com/doc/
- PHP Manual [Online resource] https://www.php.net/docs.php

Session Plan:

Topics	No. of Session
Unit-1:Introduction Introduction to PHP, History, Features & Drawbacks of PHP, Applications of PHP, Web architecture, web Server (xamp Server, apache server, Wamp server)Installation, Starting PHP Script, Hello World using PHP (Printing Single line in PHP), Commenting PHP Code, Running PHP Script.	**10**
Unit-2: Language Basics Structure and Syntax, Using HTML, Variables, Constants and Operators, Decision Making in PHP, PHP Loops, for-each Constructs, PHP string Manipulations, String functions, Functions in PHP, working with Arrays, Index Vs Associative Array, Sorting Arrays, Taking Advantages of arrays in Application, Different array functions in PHP.	**10**
Unit-3: PHP Forms <Form> tag and its attributes, Creating forms, PHP Form Validations, Passing Variables between Pages, Using PHP $_GET, $_POST, $_GET Vs $_POST, Exit, Return, Die, Include and Require Statements	**10**
Unit-4: Oops in PHP Class, Object, Visibility (Public, Private and Protected) Constructor, Destructors, Inheritance, Abstract classes, Final classes, Interface, Exception Handling	**10**
Unit-5: Advanced PHP Concepts Advanced PHP: File Upload, Session, Cookies, Emailing in PHP, Study of different PHP Framework(Laravel, CodeIgniter, Symfony, Drupal)	**10**
Unit-6: PHP with MySQL Introduction to MySQL, installation & configuration with PHP, MySQL Structure and Syntax, interacting with Databases, MySQL Connect, Create, Insert, select, Where, Order by (DESC), Update, Delete.	**10**

Level (Semester): 6.5(III)

Course No: 232A Programming with C#

Course Learning Objectives:

- To understand the .NET framework's fundamentals, including its components like CLR, MSIL, and JIT compilation.
- To grasp the essentials of C# programming, covering its structure, variables, data types, operators, arrays, functions, control and looping constructs.
- To master object-oriented programming in C#, including classes, objects, inheritance, interfaces, access modifiers, polymorphism, and sealed classes.
- To learn effective exception handling in C#, including identifying error types, syntax for handling exceptions, and implementing try-catch blocks.
- To develop skills in creating Windows applications using C#/.NET, utilizing GUI components such as Windows Forms, buttons, labels, menus, and dialogs.
- To gain proficiency in ADO.NET for database connectivity and Crystal Reports for generating basic reports.

ReferenceBooks:

- Illustrated C# 2008 by Jesse Liberty (2008, Apress, ISBN: 978-81-8128-958-2)
- Professional C# 4.0 and .NET 4 by Christian Nagel et al. (2010, Wrox, ISBN: 978-0-470-50225-9)
- Beginning C# Object-Oriented Programming by Dan Clark (2014, Apress, ISBN: 978-1-4302-3531-6)
- ADO.NET Examples and Best Practices for C# Programmers by Peter D. Blackburn (2008, Apress, ISBN: 978-1-59059-012-6)
- Database Programming with C# by Carsten Thomsen (2007, Apress, ISBN: 978-1-59059-010-2)
- C# Programming Language by Anders Hejlsberg, Scott Wiltamuth, and Peter Golde (2008, Microsoft Press, ISBN: 978-0-7356-2235-0).
- Head First C# by Jennifer Greene (2008, O'Reilly Media, ISBN: 978-0-596-52516-8).

Session Plan:

Topics	No. of Session
UNIT 1: The .Net framework a) Introduction to .NET framework, b) The Origin of .Net Technology c) Common Language Runtime (CLR), d) Microsoft Intermediate Language (MSIL) e) Just-In –Time Compilation (JIT)	**10**
UNIT 2: C# as a Language a) Introduction to C # b) Advantages & Disadvantages of C# c) Programming Structure of C# d) Basic Constructs – Variables, Data types, Operators, arrays, functions e) Control Statements (if statement, if....else statement, nesting of if. ..else statement, the else if ladder,switch statement), Looping Construct(while statement, do statement, for statement)	**10**
UNIT 3:Object Oriented Programming in C# a) Class and Object, b) Constructors and Destructors c) Inheritance, d) Interfaces e) Access modifiers: Public, Private, Protected, f) Polymorphism g) Overloading and Overriding h) Sealed Classes	**10**
UNIT 4:Exception handling a) Types of errors b) Syntax of exception handling code c) Try and catch block d) Multiple Catch Blocks	**10**
UNIT 5: Windows Applications in C#.NET a) Introduction to GUI Programming b) GUI Components/ Controls (Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, Radio Buttons, List Boxes, Combo Boxes, Picture Boxes, Timer, Scrollbars, Menus, Built-in Dialogs, Image List, Tree Views, List Views)	**10**
UNIT 6: ADO.NET & Crystal Report a) Introduction to ADO.NET b) Components of ADO.NET c) ADO.NET Data Providers d) Working with Disconnected Data e) Introduction to Crystal report , Creating Simple Report by wizard	**10**

Level (Semester): 6.5(III)

Course No: 233A Practical Based on 231A and 232A

	No. of Session
Practical based on - 231A: Web Scripting using PHP and MySQL 1. Demonstration of Installation of Xampp server, MySQL Server and setting path, user and password. 2. Write different PHP script to demonstrate passing variables through a URL. 3. Demonstrate arrays in PHP. 4. Write a PHP script to demonstrate use of user defined Function. 5. Create registration form using different controls (text box, check box, radio button, select, submit button) and display user entered data on new PHP page. 6. Write different PHP script to demonstrate session's variables. 7. Write PHP script to demonstrate Cookies variables. 8. Write a PHP script to Demonstrate Class and object. 9. Write a PHP script to Demonstrate Constructor. 10. Write a PHP script to create a Simple Login Window with database. 11. Write a PHP script to perform insert, update and delete operations in MySQL database. 12. Write a PHP script to read data from database table and display all data in table format on output screen.	**30**
Practical based on - 232A: Programming with C# 1. Write a program to print "Teach One, Each One, Tree One" given number of times 2. Write a program to show use of different operators 3. Write a program to show use of Looping Constructs 4. Write a program to show use of Constructor 5. Write a program to demonstrate Inheritance 6. Write a program to show use of Exception Handling 7. Create a simple C# application using Label, TextBox, and Button control 8. Create a C# application using ListBox, ComboBox control 9. Demonstrate the use of Timer control in C# 10. Create a C# application using PictureBox, ScrollBar control 11. Demonstrate Simple Database Connectivity using wizard.	**30**

Level (Semester): 6.5(III)

CourseNo:**234A:** Practical Based on 235

Session Plan:

Topics	No. of Session
234A: Practical Based on 235(RDBMS) 1. Create a table, Insert 10 Records into it. Also perform alter table 2. Demonstrate simple SQL queries 3. Demonstrate use of operators IN, OR, AND, BETWEEN, NOT, LIKE, EXISTS 4. Create table w th various constraints, insert records and also perform alter, update, delete etc. 5. Demonstrate Aggregate functions, Date functions, String functions, 6. Demonstrate the use of Group By and Having Clause 7. Demonstrate Joins and nested queries. 8. Demonstrate View, Sequence, and Synonym. 9. Create User. Grant and Revoke privileges to and from user. 10. 10. Demonstrate concurrency control.	**30**

Level(Semester): 6.5(III)

Course No: 231B Core Java

Course Learning Objectives:

- To understand Java basics: history, features, JDK, JRE, data types, variables, operators, control structures, loops, compiling, and arrays.
- To grasp object-oriented concepts: classes, objects, constructors, overloading, packages, strings, and date/time functions.
- To comprehend inheritance, interfaces, and abstract classes, along with exception handling fundamentals.
- To learn different utility classes available in java.
- To explore multithreading and file handling: threads, stream classes, and file operations.
- To gain practical skills in Java programming through hands-on exercises and projects.

Reference Books:

- Core Java Volume I: Fundamentals by Cay S. Horstmann and Gary Cornell (Prentice Hall, Sun Microsystems Press).
- Programming with Java by E. Balagurusamy (Tata McGraw Hill, ISBN: 9780070141698).
- The Complete Reference Java 2 (Fifth Edition) by Herbert Schildt (Tata McGraw Hill, ISBN: 007881538).
- Effective Java (Third Edition) by Joshua Bloch (Addison-Wesley Professional, ISBN: 0134685993).
- Head First Java (Second Edition) by Kathy Sierra and Bert Bates (O'Reilly Media, ISBN: 9780596009207).
- Java: The Complete Reference (Eleventh Edition) by Herbert Schildt (McGraw-Hill Education, ISBN: 9781259886530).
- Clean Code: A Handbook of Agile Software Craftsmanship by Robert C. Martin (Addison-Wesley Professional, ISBN: 0136694097).

Session Plan:

Topics	No. of Session
Unit - 1 : Introduction to JAVA History and Features of Java ,JDK,JRE,JIT,Data Types, Variables,Types of Comments ,Operators ,Control Structures and Loops , Compiling and running Java programs using command line and Editors, command line arguments Accepting Input from Console (Using Buffered Reader, Scanner Classes), Arrays.	**10**
Unit - 2 :Objects and Classes Introduction to classes and Objects, Defining Your Own Classes, Access Specifies, Data members and Methods, Constructors and its types, Overloading, Creating Packages, String functions, Date and Time functions.	**10**
Unit - 3 :Inheritance and Interface in JAVA Inheritance Basics ,Function Overriding and Polymorphism ,Use of super and this keywords ,final keyword with respect to functions and classes ,Interfaces, Abstract class and abstract method.	**10**
Unit - 4 :Exception handling in JAVA Exception handling fundamentals, Types of Exceptions, Use of try-catch-finally, Creating user defined exceptions.	**10**
Unit - 5 : Utility Classes Built In Classes like Math, Vector, Wrapper Classes, StringBuffer and StringTokenizer	**10**
Unit - 6 : Multithreading, Streams and Files in JAVA Threads, Thread States, Multithreading in java, Using the File Class, Stream classes, Byte Stream Class, Character Stream Class, and Create/Read/Write File.	**10**

Level(Semester): 6.5(III) Course No: 232B Programming with C#

Course Learning Objectives:

- To understand the .NET framework's fundamentals, including its components like CLR, MSIL, and JIT compilation.
- To grasp the essentials of C# programming, covering its structure, variables, data types, operators, arrays, functions, control and looping constructs.
- To master object-oriented programming in C#, including classes, objects, inheritance, interfaces, access modifiers, polymorphism, and sealed classes.
- To learn effective exception handling in C#, including identifying error types, syntax for handling exceptions, and implementing try-catch blocks.
- To develop skills in creating Windows applications using C#/.NET, utilizing GUI components such as Windows Forms, buttons, labels, menus, and dialogs.
- To gain proficiency in ADO.NET for database connectivity and Crystal Reports for generating basic reports.

Reference Books:

- Illustrated C# 2008 by Jesse Liberty (2008, Apress, ISBN: 978-81-8128-958-2)
- Professional C# 4.0 and .NET 4 by Christian Nagel et al. (2010, Wrox, ISBN: 978-0-470-50225-9)
- Beginning C# Object-Oriented Programming by Dan Clark (2014, Apress, ISBN: 978-1-4302-3531-6)
- ADO.NET Examples and Best Practices for C# Programmers by Peter D. Blackburn (2008, Apress, ISBN: 978-1-59059-012-6)
- Database Programming with C# by Carsten Thomsen (2007, Apress, ISBN: 978-1-59059-010-2)
- C# Programming Language by Anders Hejlsberg, Scott Wiltamuth, and Peter Golde (2008, Microsoft Press, ISBN: 978-0-7356-2235-0).
- Head First C# by Jennifer Greene (2008, O'Reilly Media, ISBN: 978-0-596-52516-8).

Session Plan:

Topics	No. of Session
UNIT 1:The .Net framework a) Introduction to .NET framework, b) The Origin of .Net Technology c) Common Language Runtime (CLR), d) Microsoft Intermediate Language (MSIL) e) Just-In –Time Compilation (JIT)	**10**
UNIT 2: C# as a Language a) Introduction to C # b) Advantages & Disadvantages of C# c) Programming Structure of C# d) Basic Constructs – Variables, Data types, Operators, arrays, functions e) Control Statements (if statement, if....else statement, nesting of if. ..else statement, the else if ladder,switch statement), Looping Construct(while statement, do statement, for statement)	**10**
UNIT 3:Object Oriented Programming in C# a) Class and Object, b) Constructors and Destructors c) Inheritance, d) Interfaces e) Access modifiers: Public, Private, Protected, f) Polymorphism g) Overloading and Overriding h) Sealed Classes	**10**
UNIT 4:Exception handling a) Types of errors b) Syntax of exception handling code c) Try and catch block d) Multiple Catch Blocks	**10**
UNIT 5: Windows Applications in C#.NET a) Introduction to GUI Programming b) GUI Components/ Controls (Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, Radio Buttons, List Boxes, Combo Boxes, Picture Boxes, Timer, Scrollbars, Menus, Built-in Dialogs, Image List, Tree Views, List Views)	**10**
UNIT 6:ADO.NET & Crystal Report a) Introduction to ADO.NET b) Components of ADO.NET c) ADO.NET Data Providers d) Working with Disconnected Data e) Introduction to Crystal report , Creating Simple Report by wizard	**10**

Level(Semester): 6.5(III)

Course No: 233B Practical Based on 231B and 232B

	No.of Session
Practical based on - 231B: Core Java 1. Write a program in Java to print Fibonacci series. 2. Write a program in Java to print Factorial of a number. 3. Write a program in Java to demonstrate command line arguments. 4. Write a program in Java to create student information using array. 5. Write a program in Java to implement user defined package. 6. Write a program in Java to implement default & parameterized constructor. 7. Write a program in Java to demonstrate various operations on string functions. 8. Write a program in Java to demonstrate wrapper classes. 9. Write a program in Java to implement inheritance. 10. Write a program in Java to demonstrate exception handling. 11. Write awt/Swing program in java to create students' registration form 12. Write awt/Swing program in java to demonstrate different events 13. Write a program in Java to demonstrate text stream object that take input from user & write it into text file.	**30**
Practical based on – 232B: Programming with C# 1. Write a program to print "Teach One, Each One, Tree One" given number of times 2. Write a program to show use of different operators 3. Write a program to show use of Looping Constructs 4. Write a program to show use of Constructor 5. Write a program to demonstrate Inheritance 6. Write a program to show use of Exception Handling 7. Create a simple C# application using Label, TextBox, and Button control 8. Create a C# application using ListBox, ComboBox control 9. Demonstrate the use of Timer control in C# 10. Create a C# application using PictureBox, ScrollBar control 11. Demonstrate Simple Database Connectivity using wizard.	**30**

Level (Semester): 6.5(III)

CourseNo:**234B:** Practical Based on 235

Session Plan:

Topics	No. of Session
234B: Practical Based on 235(RDBMS) 1. Create a table, Insert 10 Records into it. Also perform alter table 2. Demonstrate simple SQL queries 3. Demonstrate use of operators IN, OR, AND, BETWEEN, NOT, LIKE, EXISTS 4. Create table w th various constraints, insert records and also perform alter, update, delete etc. 5. Demonstrate Aggregate functions, Date functions, String functions, 6. Demonstrate the use of Group By and Having Clause 7. Demonstrate Joins and nested queries. 8. Demonstrate View, Sequence, and Synonym. 9. Create User. Grant and Revoke privileges to and from user. 10. Demonstrate concurrency control.	**30**

Level (Semester): (III)

CourseNo:231C - R Language

Course Learning Objectives:

- Learn Fundamentals of R.
- Covers how to use different functions in R, how to read data into R, accessing R packages, writing R functions, debugging, and organizing data using R functions.
- Cover the Basics of statistical data analysis with examples.
- The whole syllabus will give an idea to collect, compile and visualize data using statistical functions.

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
231C.1	Understand the basics of Fundamentals of R	1
231C.2	Understands the loading, retrieval techniques of data.	3
231C.3	Understand how data is analysed and visualized using statistic functions.	5

Reference Books:

- SandipRakshit,RProgrammingforBeginners,McGrawHillEducation(India),2017,ISBN: 978-93-5260-455-5.
- Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN:978-93-5260-524-8.
- TutorialsPoint(I)simplyeasylearning,OnlineTutorialLibrary(2018),*RProgramming*,Retrievedfromhttps://www.tutorialspoint.com/r/r_tutorial.pdf.
- Andrie de Vries, JorisMeys, R for Dummies A Wiley Brand, 2nd Edition, John WileyandSons,Inc, 2015,ISBN: 978-1-119-05580-8

Session Plan:

Topics	No. of Session
Unit 1 - Introduction to R What is R? Why R?Advantages of R over Other ProgrammingLanguages RStudio: R command Prompt, R scriptfile, comments – Handling Packages inR:InstallingaRPackage, Fewcommandstogetstarted:installed.packages(),packageDescription(), help(), find.package(), library() Input and Output – Entering Datafrom keyboard– Printingfewerdigitsormoredigits Special Values functions :NA, Inf and–inf.	**10**
Unit 2 - R Data Types Vectors, Lists, Matrices, Arrays, Factors,Data Frame **R - Variables:**Variable assignment, Datatypes of Variable, Finding Variable ls(), Deleting Variables **ROperators**:ArithmeticOperators,Relati onalOperators,LogicalOperator,Assignm entOperators,Miscellaneous Operators **R DecisionMaking:** ifstatement, if –elsestatement, if– else if statement, switch statement **R Loops:** repeat loop, while loop, for loop - Loopcontrolstatement: breakstatement,next statement.	**10**

Unit 3: R-Function • Function definition, Built in functions: mean(), paste(), sum(), min(), max(),seq(),user-definedfunction,callingafunction,callingafunctionwithoutanargument,calling a function with argument values • **R-Strings** – Manipulating Text in Data:substr(),strsplit(), paste(), grep(), toupper(), tolower() • **R Vectors –** Sequence vector, rep function,vectoraccess,vectornames,vector math,vectorrecycling**,**vectorelementsorting • **RList :**Creating a List, List Tags and Values, Add/Delete Element to or from aList, Size of List,Merging Lists, Converting List to Vector • **R Matrices –** Accessing Elements of a Matrix,Matrix Computations: Addition, subtraction, Multiplication and Division- • **R Arrays:** NamingColumns and Rows, Accessing Array Elements, ManipulatingArray Elements, CalculationAcrossArrayElements • **R Factors** –creating factors,generatingfactorlevels gl()	**10**
Unit 4: Data Frames Create Data Frame, Data FrameAccess, Understanding Data in Data Frames:dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Datafrom Data Frame **Expand Data Frame**: Add Column,Add Row - Joining columns and rowsin a Data frame rbind() and cbind() Merging Data frames merge() Melting and Castingdatamelt(), cast(). **Loading and handling Data in R: Getting and Setting the WorkingDirectory** – getwd(),setwd(), dir() **R-CSV Files-** Input as a CSV file, Reading a CSV File, Analyzing the CSVFile: summary(), min(), max(), range(), mean(), median(), apply() Writing into a CSV File **R-ExcelFile**– Readingthe Excel file.	**10**
Unit 5: DescriptiveStatistics **DataRange,Frequencies,Mode,MeanandMedian:**MeanApplying TrimOption,Applying NAOption,Median– Mode **StandardDeviation–**Correlation-SpottingProblemsinData **Visualization:**visuallyCheckingDistributions for a single Variable **R –Pie Charts**: Pie Chart title and Colors– SlicePercentages and ChartLegend, 3D Pie Chart **RHistograms** – Density Plot **R – BarCharts**:Bar ChartLabels, Titleand Colors	**10**

Unit 6: Data Manipulation &Visualization using R. **The dplyr package-** Selecting columns: select (), filtering rows: filter (), The magrittr pipe Add newvariables: mutate (), Split-apply- combine data analysis: group_by() and summarize() functions Order observations (rows): arrange() **The tidyr package**- From long towide format and viceversa: pivot_longer(), and pivot_wider(),Other tidyr functions **Visualization**- ggplot2	**10**

Level (Semester):6.5 (III)

Course No: 232C - Data Visualization using Power BI and Tableau

Course Learning Objectives:

- Data Visualization is a fundamental aspect of Data Analysis and Decision-Making Processes.
- Its objective range from exploration data to communicating insights, fostering better understanding, and enabling data-driven decision-making across industries.
- Data Visualization using Power Bi and Tableau shares many common objective, given that both tools are used to create interactive and insightful visualizations.

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
1	Apply quantitative modeling and data analysis techniques to the solution of real-world business problems	1
2	Understand the importance of data visualization and the design and use of many visual components	3
3	Understand as products integrate defining various analytical process flow.	5
4	Learn the basics of troubleshooting and creating charts using various formatting tools.	5
5	Learn basics of structuring data and creating dashboard stories adding interactivity dashboard stories.	3

ReferenceBooks:

- "Data Points: Visualization that means something" by Nathan Yu
- “Microsoft Power BI for Dummies” by Jack A. Hyman – John Wiley and Sons
- “Mastering Microsoft Power BI” by Brett Powell – Packt Publishing Ltd.
- “Introducing Microsoft Power BI” by Alberto Ferrari and Marco Russo – Microsoft Press
- "Tableau For Dummies" by Molly Monsey and Paul Sochan
- Tableau Your Data! - “Daniel G. Murray and the Inter Works BI Team”-Wiley
- "Practical Tableau: 100 Tips, Tutorials, and Strategies from a Tableau Zen Master" by Ryan Sleeper
- "Communicating Data with Tableau: Designing, Developing, and Delivering Data Visualizations" by Ben Jones

Session Plan:

Topics	No. of Session
Unit 1 - Introduction To DataVisualization Definition and purpose of data visualization. Importance of visual representation in understanding data. **Data Types and Variables**: Understandingdifferent types of data (numerical, categorical, ordinal, etc.). Identifying variables and their roles in datavisualization. **Exploratory Data Analysis (EDA):** Overview of EDA and its role in understanding data. Introducing EDA keyaspects (Data Summary, Identifying data Patterns, Outlier Detection, Data distribution, Data preprocessing, missing data, Interactive exploration).	**10**
Unit 2 - Introduction To VisualizationTools And Basic Techniques: **Data Visualization Tools:** Introduction to popular data visualizationtools and software (e.g., Excel, Google Sheets, Tableau Public, Power Bi Desktop etc.)., Introductions and overview of Tableau and Power BI, steps for installation and configuration of Tableau and Power BI Tools, Understanding the basic features and functionalities of these tools. **Data Visualization Basic Techniques:** Introduction to common chart types likebar charts, line charts, and pie charts. Learning when to use each chart type basedon the data characteristics.	**10**

Unit 3: Introduction To Power BI Power BI History, Importance, Power BI Components, Power BI Architecture Power BI Tools, Power BI Advantages, Power BI Disadvantages, Download and Install Power BI Desktop, Power BI Dashboard **Manipulating data in Power BI:** Data Loading and Transformation, Data cleaningand shaping using Power Query Editor, Connecting to various data sources (Excel, SQL Server, etc.), Combining and merging data tables.	**10**
Unit 4: Data Visualization With PowerBI: **Creating Visualizations:** Building basic visualizations (bar charts, line charts, pie charts, etc.), Customizing visual elements (colors, labels, tooltips, etc.), Utilizingslicers and filters to interact with visualizations. **Advanced Visualizations and Customization:** Matrix and table visualizations, Cards, gauges, and KPIs, Custom visuals and importing from the marketplace. **Interactive Reports and Dashboards:** Creating interactive dashboards and reports Utilizing bookmarks, drill-through, and drill-down features, Adding tooltips and dynamic elements **DAX Basics:** DAX syntax, creating calculated columns, Measures, and Tables. Filter context and Row context, DAXfunctions and expressions.	**10**
Unit 5: TABLEAU: Introduction to Tableau software and its capabilities Installing Tableau Desktop and connecting to data sources Understanding Tableau interface and workspace **Manipulating Data in Tableau:** Connecting to different data sources (Excel, CSV, databases, etc.), Data cleaning and structuring for visualization, Joins, blends, and data relationships in Tableau **Basic Arithmetic Calculations:** Addition (+), subtraction (-), multiplication (*), and division (/) operations to create new calculated fields. Aggregations: SUM (), AVG (), MIN (),MAX (), COUNT (), etc., to perform aggregations on data.	**10**
Unit 6: Data Visualization WithTableau: **Building Basic Visualizations:** Creating charts (bar charts, line charts, scatter plots, and pie charts), Customizing visual elements (colors, labels, tooltips, etc.),Applying filters and sorting data. **Formatting Visualizations:** FormattingTools and Menus, formatting specific partsof the view, Editing and Formatting Axes. **Creating Dashboards & Stories:** Creating dashboard and Story, combining multiplevisualizations into a dashboard, creating interactive elements (filters, parameters,actions etc.), Adding interactivity and drill-down features. **Distributing & Publishing Visualization:** Tableau file types, Publishing to Tableau Online, sharing your visualization, Printing, and exporting. .	**10**

Level (Semester): (III)

Course No: 233C: Practical Based on 231 C and 232C

Course Learning Objectives:

- To use of basic functions
- Create their own customized functions
- Construct tables and figures for descriptive statistics
- Learn to understand new data sets and functions by yourself
- Work on built in real time cases for analysis and visualization

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
1	Enable to build programming logic and thereby developing skills in Programming	1
2	Clear understanding on how to organize data and analyze data using real time examples	5

Session Plan:

Topics	No. of Session
233C: Practical Based on 231 C and 232C **Lab on 231C R Programming** 1. Write a program to check whether a year (integer) entered by the user is a leap year or not? 2. Write an R program to find the sum of natural numbers without formula using the if–elsestatement and the while loop. 3. Write a program that prints the grades of the students according to the marks obtained.The grading of the marks should be as follows. 4. Write an R program to make a simple calculator that can add, subtract, multiply and divideusing switch cases and functions. 5. Write a set of instructions to create the following matrix using vectors and rbind() function. Rename the rows to Lang1, Lang2 & Lang3 respectively and use the function to access any one elements using row names. 6. Write a program to perform searching within a list (1 to 50). If the number is found in the list, print that the search is successful otherwise print that the number is not in the list. 7. Create a list and data frame that stores the marks of any three subjects for 10 students.Find out the total marks, average, maximum marks and minimum marks of every subject. 8. Write the steps to import data from Excel to CSV files and apply data viewer functionslike rm(),dim(), head(), tail(), sorting, filtering, searching to view few set of rows. 9. Write an R program to create a list containing strings, numbers, vectors and logical valuesand do the following manipulations over the list.	**30**

Marks	Grades
800-1000	A+
700 – 800	A
500 – 700	B+
400-500	B
150 – 400	C
Less than 150	D

MatrixOfTechnology

Rows	Columns			
	1	2	3	4
1	C#	Java	Cobol	.Net
2	JavaScript	NodeJs	**R**	Azure
3	Power BI	ASP.Net	Unity	Block Chain

a. Access the first element in the list b. Give the names to the elements in the list c. Add element at some position in the list d. Remove the element e. Print the fourth element f. Update the third element 10. Write a program to create two 3 X 3 matrices A and B and perform the following operations **Lab on 232C** **Power BI** 1. Installation of Power BI and Tableau. 2. 3. Import your data from various sources such as Excel, CSV, SQL Databases, etc. and establish connections to the data sources using Power BI. 4. Cleans and preprocess the data to remove duplicates, null values, and irrelevant information using Power BI. 5. Choose appropriate visualization types (e.g., Bar Charts, Line Charts, Scatter Plots, etc.) for your data using Power BI. 6. Add interactive elements like filters, slicers, and parameters to allow users to explore the data dynamically using Power BI. 7. To generate summary statistics to describe key aspects of the data, such as sales revenue, order quantity, and profit margins. **Tableau** 8. Create different types of visualizations (e.g., bar chart, line chart, scatter plot) to analyze different aspects of the data using Tableau 9. To demonstrate Data preprocessing and Cleaning using tableau 10. Adding filters, parameters, and actions for interactivity 11. Create Patient Risk Healthcare Forecast Dashboard 12. Interactive Sales Dashboard 13. Techniques for effective data storytelling using dashboards	**30**

Level (Semester): 6.5(III)

CourseNo:**234C:** Practical Based on 235
235: Practical on RDBMS

Session Plan:

Topics	No. of Session
234C: Practical Based on 235(RDBMS) 1. Create a table, Insert 10 Records into it. Also perform alter table 2. Demonstrate simple SQL queries 3. Demonstrate use of operators IN, OR, AND, BETWEEN, NOT, LIKE, EXISTS 4. Create table w th various constraints, insert records and also perform alter, update, delete etc. 5. Demonstrate Aggregate functions, Date functions, String functions, 6. Demonstrate the use of Group By and Having Clause 7. Demonstrate Joins and nested queries. 8. Demonstrate View, Sequence, and Synonym. 9. Create User. Grant and Revoke privileges to and from user. 10. Demonstrate concurrency control.	**30**

Level (Semester): 6.0 (III)

Course No: 235: RDBMS

Course Learning Objectives:

- Understand the concepts of DBMS & File System
- Understand the concepts of Relational Database Design.
- Understand the concepts of Structured Query Language.
- Understand the Concurrency Control & Transaction Management.

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
1	Student will possess basic concept DBMS & File System	1
2	Students will possess concepts of Relational Database Design.	3
3	Students will possess knowledge Structured Query Language statements & Concurrency Control & Transaction Management	5

Reference Books:

1. Abraham Silberschatz, Henry F. Korth & S. Sudarshan, "Database System Concepts", McGraw-Hill
2. Ivan Bayross, "Oracle", BPB Publication
3. "Oracle DBA Certification Guide", Oracle Press OCP Guide
4. Pranab kumar Das Gupta, P. Radhakrishna, "Database Management System Oracle SQL and PL/SQL", PHI publications

Session Plan :

Topics	No. of Session
UNIT 1: Database Systems& Data Models ➢ Definition of DBMS& RDBMS ➢ File processing system vs. DBMS Limitation of file processing system ➢ Advantages and Disadvantages ofRDBMS ➢ Relational Model, Network Model,Hierarchical Model, Entity Relationship Model	**10**
UNIT 2: Relational Database Design ➢ Entity, Attribute, relationship SetERD Keys: Primary, Super, Candidate, Foreign Key ➢ Codd's Rules Normalization, Normal Form:1NF, 2 NF, 3 NF	**10**
UNIT 3: Introduction to SQL (StructuredQuery Language) ➢ Types of SQL: DDL, DML, DCLStatements. ➢ Constraints: Not Null, Unique, PrimaryKey, Check, Referential Integrity. ➢ Clauses: where, group by, having, orderby. Functions: Numeric Functions, Character Functions, AggregateFunctions, Date Functions	**10**
UNIT 4: Nested Queries, Joins&Database Objects ➢ Nested Queries ➢ Joins: inner join, outer join Database Objects: Sequence,View, Synonym, Index	**10**
UNIT 5: Managing Users: ➢ Creating user, ➢ Granting privileges – ObjectLevel and Database Level ➢ Revoking Privileges – ObjectLevel and Database Level. Access Matrix	**10**

UNIT 6: Concurrency Control &Transaction Management ➢ Concept of ConcurrencyManagement ➢ Rollback and Commitstatements ➢ Types of Locks ➢ Select …for update & Locktable command. ➢ Transaction – Definition ACID properties, state oftransaction ➢ Protocols – timestamp protocol, 2 phase lockingprotocol. Deadlock – concept, prevention and recovery	**10**

Level (Semester): 6.5(III)
CourseNo:236: Research Project

Course Learning Objectives:

1. **Understanding Research Methodologies**: Students should grasp different research methodologies such as quantitative, qualitative, and mixed-method approaches, and understand when and how to apply them.

2. **Literature Review Skills**: Ability to conduct a comprehensive literature review to identify existing research gaps, theories, and relevant studies related to the chosen research topic.

3. **Research Design**: Proficiency in designing a research study, including formulating research questions or hypotheses, selecting appropriate sampling methods, and designing data collection instruments.

4. **Data Collection and Analysis**: Competence in collecting data using various techniques such as surveys, interviews, experiments, or observations, and analyzing the data using appropriate statistical or qualitative analysis methods.

5. **Critical Thinking and Analytical Skills**: Development of critical thinking skills to evaluate research findings, identify limitations, and draw meaningful conclusions based on evidence.

6. **Ethical Considerations in Research**: Awareness of ethical principles and guidelines governing research conduct, including obtaining informed consent, ensuring participant confidentiality, and avoiding plagiarism.

7. **Research Writing and Communication**: Ability to write research proposals, reports, and academic papers following standard formatting and citation styles (e.g., APA, MLA) and effectively communicate research findings to both academic and non-academic audiences.

8. **Project Management Skills**: Proficiency in managing research projects, including setting timelines, allocating resources, and addressing unexpected challenges or setbacks.

9. **Presentation Skills**: Development of effective presentation skills to communicate research findings orally, using visual aids such as slides, posters, or multimedia presentations.

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
236.1	Student will possess basic **Research Work**	1
236.2	Students will possess Analysis Concepts	3
236.3	Students will possess knowledge of Research Mythology	5

Each student shall have to undergo Research Project during 3rd Semester
1. In the 3rd semester examination student are required to carry out Research Project Work Individually It should becompulsorily based on research-oriented work. The topic should be decided with consultation and guidance of internal teacher of the Institute. The work should be necessarily Research oriented, Innovative and Problem solving.

2. The student has to write a report based on the actual Research work, he/she should attach the questionnaire prepared by him/her, on completion he/she should submit THREE typed copies of the same to the Head / Director of the institute /Principal of the college. One copy of the report submitted by the student shall be forwarded to the University by the Institute.

3. Research work viva shall be conducted at the end of Semester III

4. The Student has to prepare Power Point presentationbased on Research work to be presented at the time of Viva voce.

5. The Research work will carry maximum 100 marks, of which internal teacher shall award marks out of maximum 40 marks on the basis of work done by the student. Remaining marks shall be awarded out of maximum 60 marks by examining the student during Viva voce, by the External examiner.

Course Assessment & Evaluation Criteria

SrNo	Criterion	Marks
1	Introduction to subject	6
2	Literature Review	6
3	Problem Definition and Scope of work	6
4	Research Methods	6
5	Objective of the research work	6
6	Data Collection method: Questionnaire	10
7	Hypothesis	10
8	Research Outcomes	10

Level (Semester): 6.5(IV)

Course No: 241A Internet Computing with ASP.NET

Course Learning Objectives:

- To grasp ASP.NET basics: history, features, page structure, and web pages model.
- To work with ASP.NET controls: web form, HTML server, basic, rich, and validation controls.
- To understand ASP.NET intrinsic objects and state management: HTTPRequest, HTTPResponse, session, ViewState, and cookies.
- To learn web site design principles: site mapping, master pages, content pages, and navigation controls.
- To explore data access using ADO.NET: creating connections, using SqlDataSource controls, and working with data-bound controls.
- To implement security and configurations: using controls for user authentication and authorization.

ReferenceBooks:

- ASP.NET: The Complete Reference by Matthew MacDonald (McGraw-Hill Osborne Media, 2002, ISBN: 0072195134)
- ASP.NET 4.5 in Simple Steps (Simple Steps Series) by Kogent Learning Solutions Inc. (2013, ISBN: 978-9350049996)
- Programming ASP.NET (3rd Edition) by Jesse Liberty and Dan Hurwitz (O'Reilly Media, 2006)
- ASP.NET and VB.NET Web Programming by Matt J. Crouch (Addison-Wesley Professional, 2002, ISBN: 9780201734409)
- ASP.NET MVC 5 Pro by Stephen Walther (Apress, 2013)
- Professional ASP.NET Core 3.0 by Adam Freeman (Wrox, 2019)
- Microsoft ASP.NET Documentation [Online resource]. https://learn.microsoft.com/en-us/aspnet/core/?view=aspnetcore-8.0

Session Plan:

Topics	No. of Session
Unit – 1 Introduction to ASP.NET History of Asp.Net Introduction to Asp.Net Features of Asp.Net Structure of Asp.Net Page ASP.NET Web Pages Model(Single Page Model, Two Page Model)	**10**
Unit – 2 ASP.NET Controls Working with Basic Web Form Controls. HTML Server Controls Miscellaneous Basic Controls ASP.Net Rich Controls, Validation Controls(Required Field Validator, Range Validator, Compare Validator)	**10**
Unit – 3 ASP.Net Intrinsic Objects and State Management HTTPRequest Object, HTTPResponce Object HTTPServerUtility HTTPApplicationState Object HTTP Session state Object State Management - View State, Session, Application, Cookies Global Application Class (global.asax) Web Configuration File (Web.config)	**10**
Unit – 4 Web Site Designing Webpage designing Principals Site map Master pages and content Pages Navigation controls: Tree view, Menu navigation	**10**
Unit – 5 Data Access With ADO.Net Object Overview of ADO.NET Create and retrieve Database Connections SqlDataSource Controls ASP.NET Data-Bound Controls GridView, Repeater, DataList, Details View, Form View	**10**
Unit – 6 Security and Configuration Using the CreateUserWizard control Using the LoginStatus control Using the Login control Using the LoginView control	**10**

Level(Semester): 6.5(IV)

CourseNo: 242A–Python Programming

CourseLearning Objectives:

1) To learn Python syntax, data types, variables, and basic operations.

2) To study how to read and write data from various sources such as CSV files, Excel spreadsheets.

3)To understand techniques for data manipulation using some basic libraries.

CourseLearning Outcomes:

Thesuccessfulcompletion ofthis courseenables thestudentsto -

CLO No.	CLO	Cognitive level
1	Understandthebasicsconcept of python programming	1
2	Familiarity with key libraries and frameworks for data analytics.	4
3	Proficiency in writing Python code to manipulate, analyzes, and visualizes data effectively.	3

Reference Books:

1. John V Guttag (2013), Introduction to Computation and Programming Using Python,Prentice Hallof India, 2013, ISBN: 9780262525008
2. Peter C. Norton, Alex Samuel and others, ―Beginning Python‖, Wrox Publication,2005ISBN 10:0764596543 ISBN 13: 9780764596544
3. R. NageswaraRao(2016), Core Python Programming, Dreamtech Press, 2016, ISBN-13:9789351199427.
4. https://www.w3schools.com/python/
5. https://www.tutorialspoint.com/python/index.htm
6. https://www.geeksforgeeks.org/python-programming-language/

Session Plan:

Topics	No. of Session
Unit 1 - Introduction to PythonProgramming • Introduction to Python: History ofPython, Version of Python, Need,Features of Python, Applications of Python, Installing Python on Linux and Windows, Installing Python IDE, • Basics of Python Programming :Python Identifiers, Variables andKeywords, Putting Comments, Expressions and Statements • Standard Data Types – Basic, None, Boolean, Numbers, Type Conversion Function, Operators inPython, Operator Precedence, Accepting Input and Displaying Output	**10**
Unit 2 - Flow Control Statements,Tuples and Dictionary • Flow Control Statements: Conditional Statements, LoopingStatements, break, continue, passStatements. • Introduction to Tuples: Creating Tuples, Deleting Tuples, Accessing elements in a Tuple,Tuples Operations: Concatenation, Repetition, Membership, and Iteration. Built-in Tuples functions and methods • Introduction to Dictionary: Dictionaries: Concept of key-valuepair. Creating, Initializing and Accessing elements in a Dictionary. Traversing, Updating and Deleting elements in a Dictionary, Built- in Dictionary functions and methods.	**10**

Unit 3: Python Strings and Lists :4 • Introduction to String: String • Literals, Assign String to a • Variable, Multiline Strings, • Operations on Strings. • Index Operator: Working with • the Characters of a String, String • Methods, Length, The Slice • Operator, and String Comparison. • Concepts of Python Lists: • Creating, Initializing and • Accessing elements in lists, • Traversing, Updating and • deleting elements from Lists. • List Operations: Concatenation,List Indexing, Slices, Built- in List functions and methods	**10**
Unit 4: Python Functions andModules • Introduction to Functions: Defining a Function (def.), Calling a Function, Function ArgumentsRequired arguments,Keyword arguments, Default arguments, Variable-length arguments, Scope of Variables, Void functions and Function returning values, Recursion, • Advance Function Topics: Anonymous Function Lambda,Mapping Functions. Introduction to Modules: Creating Modules and Packages, Importing Modules, Using the dir.() Function, Built-in Modules	**10**
Unit 5: Object Oriented Concepts inPython • Overview of OOP Terminology, Creating Classes,Creating Objects, Accessing Attributes, Built-in Class Attributes, Garbage Collection: Constructor, Overloading Methods, Overriding Methods	**10**
Unit 6: EDA Using Python Python Libraries (Types oflibraries) Working on DataFrame Exploratory Data Analysis (EDA) Using Pandas (head(), tail(), isna(), DataFrame.sort_values(), DataFrame.truncate(), DataFrame.describe(), drop_dublicates) Exploratory data visualization with Pandas library	**10**

Level(Semester): (IV)

CourseNo: 243 A Practical Based on 241A & 242A

CourseLearning Objectives:

- Be capable to identity the appropriate data structure for given problem.
- Analyse the various sorting and searching algorithms.
- Apply the different linear data structures like stack and queue.
- To understand basics of python programming.
- To implement different applications using python.

CourseLearning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
1	Enable to build programming logic and there by developing Programmingskills	1
2	Clear understanding on how to organize data and analyze data using real time examples	3
3	Students will acquire knowledge about Python programming to use for data analytics	5

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Kavayitri Bahinabai Chaudhari North Maharashtra University,
Jalgaon Master of Management Studies (Computer Management)
(W.E. F.July 2024-25)

Credit:4 **SessionDuration:60Hrs.**

SessionPlan:

Topics	No. of Session
243 A Practical Based on 241A & 242A **Lab on 241A – Internet Computing with ASP.Net** 1.Demonstration of creating a simple web form 2.Demonstrate how to handle Application Level Errors. 3.Demonstrate how to check Browser Capabilities. 4. Demonstrate the use of Server. Transfer and Query String 5. Demonstrate how to use SiteMapPath control. 6.Demonstrate how to use Tree View control. 7.Demonstrate use of Master Pages. 8. Demonstrate use of global.asax 9. Demonstration of Grid View Data Control. 10. DemonstrationofASP.NETobjects(HTTPApplicationState,HTTPSessionState)	**30**
Lab on 242A - Python Programming Note: Forpractical you can use any Python IDEs and Code Editors (Ex. PyCharm, Spyder, Thonnyetc…) 1. Installing python and setting up environment. Simple statements like printing the names (“Hello World”). 2. Write a program to print "n" terms of Fibonacci Series using Iteration 3. Write a Program related to Functions & Modules. 4. Write a program that demonstrate concept of Functional Programming. 5. Write a program to demonstrate the use of list & related functions. 6. Write a program to demonstrate the use of Dictionary & related functions. 7. Write a program to demonstrate the working of Class and Objects. 8. Write a program to demonstrate the working of Inheritance 9. Write a program to demonstrate the working of Overloading Methods 10. Write a program to demonstrate Numpy library. 11. Write a program to demonstrate panda’s library for data analytics.	**30**

Kavayitri Bahinabai Chaudhari North Maharashtra University,
Jalgaon Master of Management Studies (Computer Management)
(W.E. F.July 2024-25)

Credit:4 **SessionDuration:60Hrs.**

Level(Semester): 6.5(III)

CourseNo: 241B Advance Java

CourseLearning Objectives:

- To understand Java advance basics: Applet,AWT, Swings, JDBC, Servlets and Web desiging,
- To grasp Events Handling Concepts and Layout management.
- To understand Network basics using TCP/IP and UDP Sockets
- To focus on developing applications for enterprise-level use, including web applications, server-side programming, and integration with various technologies like databases, Server side and client-side scripting
- To gain practical skills in Java programming through hands-on exercises and projects.

Reference Books:

- Core Java Volume II: Fundamentals by Cay S. Horstmann and Gary Cornell (Prentice Hall, Sun Microsystems Press).
- Programming with Java by E. Balagurusamy (Tata McGraw Hill, ISBN: 9780070141698).
- The Complete Reference Java 2 (Fifth Edition) by Herbert Schildt (Tata McGraw Hill, ISBN: 007881538).
- Head First Servlets and JSP by Bryan Basham, Kathy Sierra, and Bert Bates
- Java Network Programming" by Elliotte Rusty Harold
- Clean Code: A Handbook of Agile Software Craftsmanship by Robert C. Martin (Addison-Wesley Professional, ISBN: 0136694097).

Kavayitri Bahinabai Chaudhari North Maharashtra University,
Jalgaon Master of Management Studies (Computer Management)
(W.E. F.July 2024-25)

Credit:4 **SessionDuration:60Hrs.**

Session Plan:

Topics	No.ofSession
Unit - 1: Applet Programming Executing Applet Code in HTML, Executing Applet code using Appletviewer, Graphics Class and its Methods, Life Cycle of Applet, Applet Tag. Working with Frames, Program to draw a Frame and display message on it.	**10**
Unit - 2: AWT(Abstract Windowing Toolkit) Introduction to AWT Controls, Adding controls on Applet and Frame, Event Handling, Event sources, Listeners(Action,Item and Adjustment), Adapters(Mouse,Key,Window), Layout Manager (Flow,Border,Grid,Card,GridBagLayout and adding controls without layout manager)	**10**
Unit - 4 :Swing Components Introduction to Swing, Swing Model-View-Controller (MVC) Architecture**,** Swing Components such as JFrame, JPanel, JButton, JLabel, JCheckBox, JRadioButton, JTextField, JTextArea, JList, JComboBox, JTable, JMenuBar, JMenuItem and JTree	**10**
Unit - 5 : Network Programming Overview of key classes such as InetAddress, Socket, ServerSocket, DatagramSocket, etc., Creating TCP client and server applications using Socket and ServerSocket classes, Developing UDP client and server applications using DatagramSocket and DatagramPacket classes.	**10**
Unit – 5: Java Database Connectivity Introduction to JDBC, Overview of JDBC architecture, including JDBC drivers, connection management, statement execution, and result set handling. Writing and executing SQL statements (queries, updates, inserts, deletes) using JDBC Statement and PreparedStatement interfaces	**10**
Unit - 6 : Introduction to Servlet Programming Introduction to Web Base Programming and Servlet, Servlet Life Cycle, Servlet API, Simple Servlet Codes using NetBeans or Eclipse, Connecting to Database like MS Access or MySQL.	**10**

Level(Semester): 6.5(IV)

CourseNo: 242B–Python Programming

Course Learning Objectives:

1) To learn Python syntax, data types, variables, and basic operations.

2) To study how to read and write data from various sources such as CSV files, Excel spreadsheets.

3)To understand techniques for data manipulation using some basic libraries.

CourseLearning Outcomes:

The successful completion of this course enables the students to -

CLO No.	CLO	Cognitive level
1	Understand the basics concept of python programming	1
2	Familiarity with key libraries and frameworks for data analytics.	4
3	Proficiency in writing Python code to manipulate, analyzes, and visualizes data effectively.	3

ReferenceBooks:

1. John V Guttag (2013), Introduction to Computation and Programming Using Python,Prentice Hallof India, 2013, ISBN: 9780262525008
2. Peter C. Norton, Alex Samuel and others, ―Beginning Python‖, Wrox Publication,2005ISBN 10:0764596543 ISBN 13: 9780764596544
3. R. NageswaraRao(2016), Core Python Programming, Dreamtech Press, 2016, ISBN-13:9789351199427.
4. https://www.w3schools.com/python/
5. https://www.tutorialspoint.com/python/index.htm
6. https://www.geeksforgeeks.org/python-programming-language/

Session Plan:

Topics	No. of Session
Unit 1 - Introduction to PythonProgramming • Introduction to Python: History ofPython, Version of Python, Need,Features of Python, Applications of Python, Installing Python on Linux and Windows, Installing Python IDE, • Basics of Python Programming :Python Identifiers, Variables andKeywords, Putting Comments, Expressions and Statements • Standard Data Types – Basic, None, Boolean, Numbers, Type Conversion Function, Operators inPython, Operator Precedence, Accepting Input and Displaying Output	**10**
Unit 2 - Flow Control Statements,Tuples and Dictionary • Flow Control Statements: Conditional Statements, LoopingStatements, break, continue, passStatements. • Introduction to Tuples: Creating Tuples, Deleting Tuples, Accessing elements in a Tuple,Tuples Operations: Concatenation, Repetition, Membership, and Iteration. Built-in Tuples functions and methods • Introduction to Dictionary: Dictionaries: Concept of key-valuepair. Creating, Initializing and Accessing elements in a Dictionary. Traversing, Updating and Deleting elements in a Dictionary, Built- in Dictionary functions and methods.	**10**

Unit 3: Python Strings and Lists • Introduction to String: String • Literals, Assign String to a • Variable, Multiline Strings, • Operations on Strings. • Index Operator: Working with • the Characters of a String, String • Methods, Length, The Slice • Operator, and String Comparison. • Concepts of Python Lists: • Creating, Initializing and • Accessing elements in lists, • Traversing, Updating and • deleting elements from Lists. • List Operations: Concatenation,List Indexing, Slices, Built- in List functions and methods	**10**
Unit 4: Python Functions andModules • Introduction to Functions: Defining a Function (def.), Calling a Function, Function ArgumentsRequired arguments,Keyword arguments, Default arguments, Variable-length arguments, Scope of Variables, Void functions and Function returning values, Recursion, • Advance Function Topics: Anonymous Function Lambda,Mapping Functions. Introduction to Modules: Creating Modules and Packages, Importing Modules, Using the dir.() Function, Built-in Modules	**10**
Unit 5: Object Oriented Concepts inPython • Overview of OOP Terminology, Creating Classes,Creating Objects, Accessing Attributes, Built-in Class Attributes, Garbage Collection: Constructor, Overloading Methods, Overriding Methods	**10**
Unit 6: EDA Using Python Python Libraries (Types oflibraries) Working on DataFrame Exploratory Data Analysis (EDA) Using Pandas (head(), tail(), isna(), DataFrame.sort_values(), DataFrame.truncate(), DataFrame.describe(), drop_dublicates) Exploratory data visualization with Pandas library	**10**

Level(Semester): (IV)

CourseNo:243 B Practical Based on 241B & 242B

CourseLearning Objectives:

- Be capable to identity the appropriate data structure for given problem.
- Analyse the various sorting and searching algorithms.
- Apply the different linear data structures like stack and queue.
- To understand basics of python programming.
- To implement different applications using python.

CourseLearning Outcomes:

Thesuccessfulcompletion ofthis courseenables thestudents

CLO No.	CLO	Cognitive level
1	Enable to build programming logic and there by developing Programmingskills	1
2	Clear understanding on how to organize data and analyze data using real time examples	3
3	Students will acquire knowledge about Python programming to use for data analytics	5

Kavayitri Bahinabai Chaudhari North Maharashtra University,
M.M.S. (Computer Management)
(W.E. F.July 2023-24)

Credit:4 **SessionDuration:60Hrs.**

Session Plan:

Topics	No. of Session
243 B Practical Based on 241B & 242B **Lab on 241B – Advance Java** 1. Demonstration of Applet Program in HTML file 2. Demonstration of frames 3. Demonstration of AWT controls on Applet/Frame 4. Demonstration of Event Handling such as action listener 5. Demonstration of Layout Management 6. Demonstration of Swing Controls 7. Demonstration of Chatting Application using Network Programming 8. Demonstration of Data Base Connectivity using JDBC 9. Demonstration of Simple Servlet Code 10. Demonstration of Servlet Code connecting to MySQL/Access	**30**
Lab on 242B - Python Programming Note: Forpractical you can use any Python IDEs and Code Editors (Ex. PyCharm, Spyder, Thonnyetc…) 1. Installing python and setting up environment. Simple statements like printing the names ("Hello World"). 2. Write a program to print "n" terms of Fibonacci Series using Iteration 3. Write a Program related to Functions & Modules. 4. Write a program that demonstrate concept of Functional Programming. 5. Write a program to demonstrate the use of list & related functions. 6. Write a program to demonstrate the use of Dictionary & related functions. 7. Write a program to demonstrate the working of Class and Objects. 8. Write a program to demonstrate the working of Inheritance 9. Write a program to demonstrate the working of Overloading Methods 10. Write a program to demonstrate Numpy library. 11. Write a program to demonstrate panda's library for data analytics.	**30**

Credit:4 **SessionDuration:60Hrs.**

Level(Semester): 6.5(IV)

Course No: 241C – Data Structure and Algorithms

Course Learning Objectives:

1) To study algorithms and algorithm correctness.
2) To understand searching and sorting techniques.
3) To know stack, queue and linked list operation.
4) To understand tree and graphs concepts.

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
1	Understand the basics of Data structure and algorithms	1
2	Understands the basic concept of searching, sorting techniques in data structure.	3
3	Understand the knowledge about tree and graphs in data structure.	5

Reference Books:

1. Data Structure and Algorithms: Concept, Techniques and Application ,G. A. V. Pai ISBN 10: 0070667268
2. "Data Structures and Algorithm Analysis in C++" by Mark Allen Weiss
3. https://www.javatpoint.com/data-structure-tutorial
4. Data Structures Tutorial - GeeksforGeeks
5. "Data Structures and Algorithm Analysis in C++" by Mark Allen Weiss:
6. An Introduction to Data Structures with Application, Jean-Paul Tremblay, Paul Sorenson.

SessionPlan:

Topics	No. of Session
Unit 1 - Introduction Meaning of Data, Data item, Elementaryand Group Data items, Meaning of Data Structure, Linear and Non, Linear Data Structure, Meaning of Algorithm, Algorithm development.	**10**
Unit 2 - Array Introduction to Arrays, Definition, OneDimensional Array and Multidimensional Arrays, Representation of linear array in memory, Traversing linear array, Inserting and Deleting, Sorting (Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort), Searching (Linear Search, Binary Search).	**10**
Unit 3: Stack Introduction to Stack, Definition, Stack Implementation, Operations of Stack, Applications of Stack , Polish notation, Arithmetic expression, Recursion	**10**

Unit 4: Queue Introduction to Queue, Definition, Queue Implementation, Operations ofQueue, Circular Queue, De-queue and Priority Queue, Queue Applications	**10**
Unit 5: Linked List Introduction, Representation andOperations of Linked Lists-Traversing, Searching, Insert and Delete, Singly Linked List, DoublyLinked List, Circular Linked List, AndCircular Doubly Linked List	**10**
Unit 6: Trees and Graphs Introduction to Tree, Binary tree, representing binary trees in memory, traversing binary trees, Threaded Binary Tree. Graph: - Types, representation in memory.	**10**

Level (Semester): 6.5(IV)

Course No: 242 C – Python Programming

Course Learning Objectives:

3) To learn Python syntax, data types, variables, and basic operations.

4) To study how to read and write data from various sources such as CSV files, Excel spreadsheets.

3)To understand techniques for data manipulation using some basic libraries.

CourseLearning Outcomes:

The successful completion of this course enables the students to -

CLO No.	CLO	Cognitive level
1	Understandthebasicsconcept of python programming	1
2	Familiarity with key libraries and frameworks for data analytics.	4
3	Proficiency in writing Python code to manipulate, analyzes, and visualizes data effectively.	3

ReferenceBooks:

1. John V Guttag (2013), Introduction to Computation and Programming Using Python,Prentice Hallof India, 2013, ISBN: 9780262525008
2. Peter C. Norton, Alex Samuel and others, ―Beginning Python‖, Wrox Publication,2005ISBN 10:0764596543 ISBN 13: 9780764596544
3. R. NageswaraRao(2016), Core Python Programming, Dreamtech Press, 2016, ISBN-13:9789351199427.
4. https://www.w3schools.com/python/
5. https://www.tutorialspoint.com/python/index.htm
6. https://www.geeksforgeeks.org/python-programming-language/

Session Plan:

Topics	No. of Session
Unit 1 - Introduction to PythonProgramming • Introduction to Python: History ofPython, Version of Python, Need,Features of Python, Applications of Python, Installing Python on Linux and Windows, Installing Python IDE, • Basics of Python Programming :Python Identifiers, Variables andKeywords, Putting Comments, Expressions and Statements • Standard Data Types – Basic, None, Boolean, Numbers, Type Conversion Function, Operators inPython, Operator Precedence, Accepting Input and Displaying Output	**10**
Unit 2 - Flow Control Statements,Tuples and Dictionary • Flow Control Statements: Conditional Statements, LoopingStatements, break, continue, passStatements. • Introduction to Tuples: Creating Tuples, Deleting Tuples, Accessing elements in a Tuple,Tuples Operations: Concatenation, Repetition, Membership, and Iteration. Built-in Tuples functions and methods • Introduction to Dictionary: Dictionaries: Concept of key-valuepair. Creating, Initializing and Accessing elements in a Dictionary. Traversing, Updating and Deleting elements in a Dictionary, Built- in Dictionary functions and methods.	**10**

Unit 3: Python Strings and Lists • Introduction to String: String • Literals, Assign String to a • Variable, Multiline Strings, • Operations on Strings. • Index Operator: Working with • the Characters of a String, String • Methods, Length, The Slice • Operator, and String Comparison. • Concepts of Python Lists: • Creating, Initializing and • Accessing elements in lists, • Traversing, Updating and • deleting elements from Lists. • List Operations: Concatenation,List Indexing, Slices, Built- in List functions and methods	**10**
Unit 4: Python Functions andModules • Introduction to Functions: Defining a Function (def.), Calling a Function, Function ArgumentsRequired arguments,Keyword arguments, Default arguments, Variable-length arguments, Scope of Variables, Void functions and Function returning values, Recursion, • Advance Function Topics: Anonymous Function Lambda,Mapping Functions. Introduction to Modules: Creating Modules and Packages, Importing Modules, Using the dir.() Function, Built-in Modules	**10**
Unit 5: Object Oriented Concepts inPython • Overview of OOP Terminology, Creating Classes,Creating Objects, Accessing Attributes, Built-in Class Attributes, Garbage Collection: Constructor, Overloading Methods, Overriding Methods	**10**
Unit 6: EDA Using Python Python Libraries (Types oflibraries) Working on DataFrame Exploratory Data Analysis (EDA) Using Pandas (head(), tail(), isna(), DataFrame.sort_values(), DataFrame.truncate(), DataFrame.describe(), drop_dublicates) Exploratory data visualization with Pandas library	**10**

Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon
M.M.S. (Computer Management)
(W. E. F. July 2024-25)

Credit: 4 **Session Duration: 60 Hrs.**

Level (Semester): (IV)

Course No: 243 C Practical Based on 241C & 242C

Course Learning Objectives:

- Be capable to identity the appropriate data structure for given problem.
- Analyze the various sorting and searching algorithms.
- Apply the different linear data structures like stack and queue.
- To understand basics of python programming.
- To implement different applications using python.

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
1	Enable to build programming logic and there by developing Programming skills	1
2	Clear understanding on how to organize data and analyze data using real time examples	3
3	Students will acquire knowledge about Python programming to use for data analytics	5

Session Plan:

Topics	No. of Session
243 C Practical Based on 241C & 242C **Lab on 241C - Data Structure and Algorithms** **Note: Implement all practical's using 'C++' Language** 1. Write a program to implement Stack operations: push, pop, display. 2. Write a program to implement Linear Queue operations: Insert, Delete, Display. 3. Write a program to implement Bubble sort. 4. Write a program to implement Quick sort 5. Write a program to implement Selection sort. 6. Write a program to implement Insertion sort. 7. Write a program to implement Binary search.	**30**
Lab on 242C - Python Programming Note: For practical you can use any Python IDEs and Code Editors (Ex. PyCharm, Spyder, Thonny etc…) 1. Installing python and setting up environment. Simple statements like printing the names ("Hello World"). 2. Write a program to print "n" terms of Fibonacci Series using Iteration 3. Write a Program related to Functions & Modules. 4. Write a program that demonstrate concept of Functional Programming. 5. Write a program to demonstrate the use of list & related functions. 6. Write a program to demonstrate the use of Dictionary & related functions. 7. Write a program to demonstrate the working of Class and Objects. 8. Write a program to demonstrate the working of Inheritance 9. Write a program to demonstrate the working of Overloading Methods 10. Write a program to demonstrate Numpy library. 11. Write a program to demonstrate panda's library for data analytics.	**30**

Level (Semester): 6.5 (IV)

Course No: 244: Software Engineering

Course Learning Objectives:

1) To get the fundamental knowledge of Software Engineering.
2) To understand software requirement specification.
3) Estimate the size and cost of software product.
4) To get knowledge about different types of software testing.

CourseLearning Outcomes:

Thesuccessfulcompletion ofthis courseenables thestudents

CLO No.	CLO	Cognitive level
1	Student will possess basic knowledge about software engineering.	1
2	Students will possess concepts of software requirement specification	3
3	Students will possess knowledge about system and software development lifecycle.	5

Reference Books:

1. Roger S. Pressman, "Software Engineering a Practitioners Approach", ISBN 13: 9780071267823, 7thedition, McGraw Hill International Edition.
2. Fairly, Richard, "Software Engineering Concepts" ISBN 13: 9780074631218, McGraw Hill Education New Delhi-2001.
3. Rajib Mall, "Fundamental of Software Engineering", ISBN- 978-81-203- 3819-7 RD Edition, , PHI Learning Private Limited.

SessionPlan:

Topics	No. of Sessions
UNIT 1: System Concept and Information ➢ Definition and Characteristics ofSystem ➢ Elements of Systems ➢ Types of system – Conceptual, Physical, Natural, Artificial, Open &Closed, Deterministic etc	**10**
UNIT 2: System Development Life Cycle ➢ Roles of System Analysts- As an Architect, Change Agent, Investigator& Monitor, Organizer, Motivator etc. ➢ Introduction of Systems DevelopmentLife Cycle (SDLC) ➢ SDLC Models : ➢ Waterfall Model, ➢ Spiral Model ➢ RAD Model, Prototyping Model	**10**
UNIT 3: System Planning ➢ Data and fact gathering techniques: Interviews & Questionnaires, Group discussion, On-site observation, Reviewof Written Documents. ➢ Introduction to Feasibility Study ➢ Types of feasibility study - Technical,Economical and Operational ➢ Introduction to SRS (SoftwareRequirement Specifications) Need of SRS	**10**
UNIT 4: Software Design Design Concepts: Abstraction, Architecture, Patterns, Modularity, Cohesion, Coupling, Information hiding, Functionalindependence, Refinement. Decision Table & Decision Tree ,Entity Relationship Diagram, Data flow Diagram,Data Dictionary ,Design of input and Control, Design of User Interface design, Elements of good design, Design issues	**10**

UNIT 5: User Interface of System & SoftwareTesting ➢ User - Interface Design ➢ Graphical interfaces ➢ Elements of Good Interface Design ➢ Introduction to Software Testing Introduction to Black-Box and WhiteBox Testing	**10**
UNIT 6: Designing business application systemusing DFD, ERD ➢ Library Management System ➢ Inventory Management System ➢ Hospital Management System ➢ Sales/Purchase System	**10**

Level(Semester): 6.5(IV)

CourseNo:245: Research Project(Software Development)

Course Learning Objectives:

- **Understanding Software Development Life Cycle (SDLC)**: Students should be able to explain various phases of SDLC such as requirement gathering, design, development, testing, deployment, and maintenance.
- **Proficiency in Project Management Tools**: Students should gain proficiency in using project management tools.
- **Software Design Principles**: Understanding and application of software design principles such as modularity, encapsulation, and abstraction to create scalable and maintainable software solutions.
- **Quality Assurance and Testing**: Understanding of different testing methodologies (e.g., unit testing, integration testing, and acceptance testing) and ability to write and execute test cases to ensure software quality.
- **Software Architecture and Design Patterns**: Familiarity with various software architecture styles (e.g., monolithic, microservices) and design patterns (e.g., MVC, Observer) to design robust and scalable software systems.

Course Learning Outcomes:

The successful completion of this course enables the students

CLO No.	CLO	Cognitive level
1	Student will possess basic Software Designing Techniques	1
2	Students will possess concepts of Front End and Back End designs	3
3	Students will possess knowledge of putting all codes together to form a bunch of programming file to form software.	5

Each student shall have to undergo Research Project(Software Development) during 4th Semester

1. In the 4th semester examination student are required to carry out Research Project(Software Development) Work individually It should be compulsorily based on Software Development. The topic should be decided with consultation and guidance of internal teacher of the Institute.

2. The student has to write a report based on the actual Project work, on completion he/she should submit THREE typed copies of the same to the Head / Director of the institute /Principal of the college. One copy of the report submitted by the student shall be forwarded to the University by the Institute.

3. Research work viva shall be conducted at the end of Semester IV

4. Viva Voce for one student shall be of minimum 15 minutes. The Student has to present the actual Software designed by him/her.

5. The Research work will carry maximum 100 marks, of which internal teacher shall award marks out of maximum 40 marks on the basis of work done by the student. Remaining marks shall be awarded out of maximum 60 marks by examining the student during Viva voce, by the External examiner.