



Karmaveer Bhaurao Patil University, Satara

Syllabus for

B.Voc.-II (Software Development)

Under

Faculty of Science and Technology

With effect from Academic Year 2025-2026

Syllabus for Bachelor of Vocational Software Development:

PREAMBLE:

This syllabus is framed to give sound knowledge with an understanding of Software Development to undergraduate students in Second year of B.Voc. Degree course. It has been designed to meet the specific needs of B.Voc. Software Development student.

The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Bachelor of Vocation (B.Voc.) Degree with multiple exits such as Diploma/Advanced Diploma under the NSQF.

The proposed vocational programme in Software Development will be a judicious mix of skills, professional education related to Software Development and also appropriate content of general education. It is designed with the objective of equipping the students to cope with the emerging trends and challenges in the Software Development environment.

General Objective of the Programme:

- 1) Provide students with strong programming foundations in languages like Python, Java, C++ and C#.
- 2) Learn to design, develop and maintain web applications, mobile apps and database-driven systems.
- 3) Gain knowledge of modern domains such as Cloud Computing, Big Data, Data Analytics, IoT and Machine Learning.
- 4) Maintain a curriculum split (typically 60% skill development / practical labs and 40% general education) to ensure practical and theory knowledge.
- 5) Enhance professional communication, problem-solving and logical reasoning.
- 6) Prepare students for agile workplace, client interactions and project management.
- 7) Prepare graduates for direct placement in IT companies through mandatory internships, live industry projects and hands-on lab work.

General Outcome of the Programme:

The student will be able to...

- 1) **GPO1:** Apply fundamental programming, data structures and algorithms to design and develop software solutions.
- 2) **GPO2:** Build, deploy and maintain dynamic web, desktop and mobile applications using modern frameworks and database management systems.
- 3) **GPO3:** Analyze real-world problems and execute all phases of the Software Development Life Cycle (SDLC), including requirements gathering, architecture design, testing and debugging.
- 4) **GPO4:** Use industry-standard tools, environments, version control systems (e.g., Git) and modern deployment pipelines.
- 5) **GPO5:** Collaborate effectively in multidisciplinary project teams using modern methodologies like Agile or Scrum.
- 6) **GPO6:** Acquire technical concepts clearly through written documentation, client interaction and structured technical presentations.
- 7) **GPO7:** Demonstrate self-directed learning to adapt to rapidly evolving tech frameworks, languages and modern domains like Cloud, Data Analytics and AI.

Program Specific Objective:

- 1) Learn to create desktop programs and interactive websites using popular coding languages like Java, C#, PHP and MySQL.
- 2) Provide knowledge of how to organize information, design database systems and write advanced database commands using SQL and Data Structures.
- 3) Learn how to understand user requirements, plan out software systems and manage projects from start to finish.
- 4) Understand Artificial Intelligence (AI) and learn how to write simple automation scripts using Python.
- 5) Integrate basic business statistics to make smart decisions, digital marketing to promote software and how to build eco-friendly tech solutions.

Program Specific Outcome:

The student will be able to...

- 1) Write code using Java, PHP and ASP.NET with C# to build functional websites, desktop applications and dynamic online tools.
- 2) Create structured databases, write Advanced SQL commands to handle large amounts of data and use Data Structures.
- 3) Analyze business requirements, design system layouts and manage software projects from start to finish on time and within budget.
- 4) Write simple Python scripts to automate tasks and apply basic AI principles to solve real-world problems.
- 5) Use statistical data to make smart business decisions, run digital marketing campaigns to promote software online
- 6) Gain hands-on practice in computer labs to write clean code, find and fix bugs (debugging) and test applications before release.

1. **TITLE:** B.Voc (Software Development) Part II

2. **YEAR OF IMPLEMENTATION:** From 2025-2026

3. **DURATION:** 01 year

4. **PATTERN:** Semester

5. **MEDIUM OF INSTRUCTION:** English

6. COURSE STRUCTURE

B. Voc. II Semester III

General				Skill			
No.	Title	Credit	Hrs./Week	No.	Title	Credit	Hrs./Week
VS 331	Statistics for Business Development	4	4	VS 334	Programming in Java	4	4
VS 332	System Analysis & Design	4	4	VS 335	Advanced Web Development (PHP/MySQL)	4	4
VS 333	Environment Science	4	4	VS 336	ASP.NET with C#.NET	4	4
				VS 337	LAB: Programming in JAVA	2	4
				VS 338	LAB: Advanced Web Development (PHP/MySQL) Lab	2	4
				VS 339	LAB: ASP.NET with C#.NET Lab	2	4
Total		12	12	Total		18	18

Course Structure

B. Voc. II Semester IV

General				Skill			
No.	Title	Credit	Hrs./ Week	No.	Title	Credit	Hrs./ Week
VS 341	Software Project Management	4	4	VS 344	Advanced SQL	4	4
VS 342	Digital Marketing	4	4	VS 345	AI & Python	4	4
VS 343	Data Structure	4	4	VS 346	Advanced Java	4	4
				VS 347	Lab: Advanced SQL	2	4
				VS 348	Lab : AI & Python	2	4
				VS 349	Lab: Advanced Java	2	4
Total		12	12	Total		18	18

7. EVALUATION STRUCTURE

B. Voc.-II

Se m	Paper Code	Subject	General/ Skill	Credit	Cont. Hrs	Mark CCE	Mark ESE	Total Mark
III	VS 331	Statistics for Business Development	General	4	60	40	60	100
	VS 332	System Analysis and Design	General	4	60	40	60	100
	VS 333	Environment Science	General	4	60	40	60	100
	VS 334	Programming in Java	Skill	4	60	40	60	100
	VS 335	Advanced Web Development(PHP/MySQL)	Skill	4	60	40	60	100
	VS 336	ASP.NET with C#.NET	Skill	4	60	40	60	100
	VS 337	Lab : Java Programming	Skill	2	60	30	40	70
	VS 338	Lab : Advanced Web Development	Skill	2	60	30	40	70
	VS 339	Lab : ASP.NET with C#.NET	Skill	2	60	20	40	60
IV	VS 341	Software Project Management	General	4	60	40	60	100
	VS 342	Digital Marketing	General	4	60	40	60	100
	VS 343	Data Structure	General	4	60	40	60	100
	VS 344	Advanced SQL	Skill	4	60	40	60	100
	VS 345	AI and Python	Skill	4	60	40	60	100
	VS 346	Advanced Java	Skill	4	60	40	60	100
	VS 347	Lab : Advanced SQL	Skill	2	60	30	40	70
	VS 348	Lab : AI and Python	Skill	2	60	30	40	70
	VS 349	Lab: Advanced Java	Skill	2	60	20	40	60
		Total		60		480	1120	1600



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: General

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code : Statistics for Business Development(VS 331)

Course Objectives: Student should be able to...

- 1) Understand importance of Business Statistics.
- 2) Study concept of correlation and its significance.
- 3) Get knowledge of Probability concepts and applying probability distributions.
- 4) Learn regression analysis, Time series analysis and Index numbers.

Course Outcomes: Student will be able to ...

- 1) Use the statistical techniques applicable to business.
- 2) Apply statistical techniques for quantification of data in business.
- 3) Analyze Correlation and Regression.
- 4) Demonstrate knowledge of Index Numbers and Time Series Analysis.

Module	Title and Contents	Hrs.
Module -1: Introduction:	1.1 Meaning, definition, functions, objectives and importance of statistics. 1.2 Distrust of statistics-Collection, classification, tabulation and presentation of data. 1.3 Measures of central tendency 1.4 Measures of dispersion - relevance and applicability of each technique in business	15
Module -2: Correlation:	2.1 Meaning and definition-correlation and causation – Types of correlation 2.2 Methods of measuring correlation for ungrouped data -Karl Pearson 's co-efficient of correlation and its interpretation, Probable error 2.3 Coefficient of determination Spearman 's rank correlation- co-efficient of concurrent deviation 2.4 Application of different measures of correlation in business.	15
Module -3: Module -3: Regression Analysis:	3.1 Meaning and definition - Types of Regression 3.2 Regression lines- determination of simple linear regression- Regression equations and their application in business. 3.3 Properties of correlation and regression co-efficient 3.4 Comparison of regression and correlation.	15

Module -4:	Module -4: Index numbers: 4.1 Meaning and importance-Problems in construction of index numbers- Methods of constructing of index numbers- 4.2 Methods of constructing of index numbers- Simple aggregative, Average of Price relatives, Lapeyre's, Paasche 's, Dorbisch- Bowley 's, Marshall-Edgeworth 's and Fisher 's ideal index numbers. 4.3 Test of Consistency: Time Reversal Test and Factor Reversal Test. Chain Base Index Nos. Shifting of Base year. Cost of living Index and its use in determination of wages Wholesale Price Index Number, Population, Index, inflation index, Operational indices- Sensex and Nifty. 4.4 Time series analysis - Meaning and definition- components- Measurement of long-term trend-Moving average method- Method of Least squares- Application in business.	15
Reference Books: - 1) Elhance. D. L. Fundamentals of Statistics, Kitab Mahal, Allahabad. (Unit I) 2) Gupta.S.P. Statistical Methods, Himalaya Publishing House, Mumbai. (Unit I, UnitII) - 1998 3) Hahmann, Tara. Volunteering Counts: Formal and Informal Contributions of Canadians in 2018. Statistics Canada. April 23, 2021 4) Gupta.B.N. Statistics - Theory and Practice, SahityaBhawan Publications, Agra. (Unit I, Unit II)-2001 5) Sanchetti D.C and Kapoor. Statistics - Theory, Methods and Application, Sultan Chand & Sons (Unit III, Unit IV, Unit V)-1999		
Evaluation Pattern:		
Total Marks: 100		
Comprehensive Continuous Evaluation (40 Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) Compulsory. • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: General

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and code : System Analysis and Design (VS 332)

Course Objectives: Student should be able to

- 1) Understand concept of System.
- 2) Get knowledge of System Analysis and Design.
- 3) Learn Feasibility Study of System.
- 4) Study testing and maintenance tools.

Course Outcomes: Student will be able to

- 1) Analyze system and design of various system.
- 2) Evaluate various types of feasibility studies and how to use it.
- 3) Perform to test any system.
- 4) Analyze data using probability theory and apply common probability distributions.

Module	Title and Contents	Hrs
Module 1:	Introduction to System 1.1 System Concepts: Definition, characteristics of a system, basic components (Input, Process, Output, Control, Feedback, Environment, Boundary). 1.2 Types of Systems: Physical vs. Abstract, Open vs. Closed, Deterministic vs. Probabilistic, Man-made vs. Natural. 1.3 The Systems Analyst: Role, duties, responsibilities, technical skills, interpersonal skills, and ethical responsibilities. 1.4 Software Development Life Cycle (SDLC): Overview of SDLC phases. 1.5 SDLC Models: Waterfall, Prototyping, Spiral, Incremental, and Agile (Scrum) methodologies.	15
Module 2:	System Planning & Feasibility Analysis 2.1 System Planning: Identification of system requests, project selection, and initial scope definition. 2.2 Information Gathering Techniques: Interviews, questionnaires, document inspection, observations, and Joint Application Development (JAD). 2.3 Feasibility Study: Purpose and dimensions, Technical Feasibility 2.4 Economic Feasibility (Cost-Benefit Analysis: ROI, Payback Period, Net Present Value) 2.5 Operational Feasibility, Legal & Schedule Feasibility 2.6 Feasibility Report Writing: Structure and presentation to management.	15

Module 3: Systems Analysis & Process Modeling	3.1 Requirements Determination: Functional vs. Non-functional requirements, Software Requirements Specification (SRS) documentation. 3.2 Structured Analysis Tools: Data Flow Diagrams (DFD): Symbols, Context Diagram, Level-0, Level-1, and Level-2 DFDs, rules for drawing DFDs. 3.3 Data Dictionary: Structure, elements, and repository management. 3.4 Process Specifications: Decision Tables, Decision Trees, and Structured English. 3.5 Object-Oriented Analysis (OOA): introduction to Unified Modelling Language (UML), Use Case Diagrams and Use Case Descriptions.	15
Module 4: Testing and Maintenance	4.1 System Implementation: Software coding standards and module integration, System conversion/cutover strategies: Direct, Parallel, Pilot, and Phased. 4.2 System Testing: Levels of testing: Unit testing, Integration testing, System testing, User Acceptance Testing (UAT), Alpha and Beta testing. 4.3 System Security & Audit: Data security, access controls, backup strategies, and disaster recovery planning, System audit trails and privacy considerations. 4.4 Types of maintenance: Corrective, Adaptive, Perfective, and Preventive. Managing software updates and patch releases.	15
Reference Books: - 1) Shelly, Gary B., Harry J. Rosenblatt and Thomas J. Cashman. Systems Analysis and Design. 9th ed. Boston: Cengage Learning, 2012. 2) Kendall, Kenneth E. and Julie E. Kendall. Systems Analysis and Design. 10th ed. Boston: Pearson, 2019 3) Satzinger, John W., Robert B. Jackson and Stephen D. Burd. Systems Analysis and Design in a Changing World. 7th ed. Boston: Cengage Learning, 2016. 4) Whitten, Jeffrey L. and Lonnie D. Bentley. —Systems Analysis and Design Methods. Journal of Computer Information Systems 41, no. 3 (2001): 78–85. 5) Wasson, Charles S. and Robert D. Jones. "System Analysis, Design and Development." INSIGHT 11, no. 1 (2008): 50.		
Evaluation Pattern:		
Total Marks: 100		
Comprehensive Continuous Evaluation (40 Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) Compulsory. • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: General

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code : Environment Science (VS 333)

Course Objectives: Student should be able to

- 1) Get Knowledge about better awareness and current environmental issues
- 2) Understand a healthy respect and sensitivity to environment
- 3) Learn pride in social and environmental activism.
- 4) Discuss solutions regarding environmental issues.

Course Outcomes: Student Will be able to

- 1) Analyze Energy flow in the ecosystem, Ecological succession, Food chains
- 2) Define genetic, species and ecosystem diversity.
- 3) Differ various aspects of natural resources.
- 4) Analyze Social issues and the effects on environment.

Module	Title and Contents	Hrs
Module 1:	The Multi-disciplinary Nature of Environmental Studies: 1.1 Definition, scope and importance, Need for Public Awareness, 1.2 Ecology and Ecosystems: Definition of Ecology, Structure and function of an ecosystem, Producers, Consumers and Decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. 1.3 Introduction, types, characteristics features and function of ecosystem 1.4 Forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).	15
Module 2:	Role of IT in Biodiversity & its Conservation: 2.1 Definition and levels (genetic, species, ecosystem diversity), Importance of biodiversity. 2.2 Introduction to IT tools and techniques, Types of IT relevant to biodiversity (GIS, remote sensing, databases, AI, etc.). 2.3 Role of data in environmental decision-making, Geographic Information Systems (GIS).habitat mapping, species distribution, GPS Technology: 2.4 Wildlife tracking, movement studies.	15
Module 3:	Understanding of Natural Resources and Problem Solution Techniques through IT 3.1 Classification: Renewable (solar, wind, water, biomass) and non-renewable (fossil fuels, minerals), Resource availability and global distribution, Overexploitation and sustainability issues, 3.2 Deforestation, water scarcity, mining impacts, soil degradation, Remote Sensing: Land use mapping, vegetation cover, water bodies, 3.3 Applications: Mapping Forest covers change, Watershed management,	15

	Mining impact analysis, Decision Support Systems (DSS) for sustainable resource use. 3.4 Modeling & Simulation tools: Predictive models of resource, Depletion Simulation of land-use changes, Smart agriculture. 3.5 (IoT, AI, drones), Renewable energy systems management, Smart grids, solar/wind performance monitoring).	
Module 4:	Minimization of Social Issues of environment through IT 4.1 Environmental degradation and its social impact, Displacement due to deforestation, mining, or dams, Health issues from pollution (air, water, soil), inequitable resource distribution and access. 4.2 Digital Media and environmental campaigns, E-learning platforms for climate and sustainability education. 4.3 Mobile apps and online portals promoting eco- friendly behavior, Air and water quality tracking apps (e.g., AQI monitors). 4.4 Disease outbreak prediction linked to pollution or climate change, GIS mapping of affected communities, Decision Support Systems (DSS) for planning safer and healthier communities, Data- driven urban planning to reduce slums and pollution, AI/ML models to assess impact of Development projects on human well-being.	15

Reference Books: -

- 1) Frank R. Spellman, Environmental Science & Engineering, 2nd edition, CRC press, 2016
- 2) Jorgensen, S. E., Principles of Environmental Science and Technology (2nd ed). New York, 2015
- 3) Kiran B Chokkas, Mamata Pandya, Meena Raghunathan: "Understanding Environment", First Edition, December 2013, Sage publication.
- 4) Lester R Brown, Plan B: rescuing a planet under stress and a civilization in trouble, Pearson 2006
- 5) Watt, K. Principles of Environmental Science, New York: McGraw- Hill, 2000

Evaluation Pattern:

Total Marks: 100

Comprehensive Continuous Evaluation (40 Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) Compulsory. • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)
--	---



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: Skill

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code: Programming in Java(VS 334)

Course Objectives: Student should able to...

- 1) Study fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- 2) Gain fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism.
- 3) Learn the concepts of packages and interfaces.
- 4) Understand the concept of Exception handling exceptions.

Course Outcomes: Student will be able to...

- 1) Demonstrate comparison of Object Oriented Programming over structured programming.
- 2) Create new classes from existing one & design the classes needed given a problem specification
- 3) Design and develop java programs to meet real world problems.
- 4) Use object-oriented data structures and report software results.

Module	Title and Contents	Hrs
Module 1:	Java Basics: 1.1 Introduction: History of Java, Java features, Differentiate Java with C and C++, JVM, JIT and JRE. Variables and data types, declaring variables. 1.2 Java Operators: Arithmetic, relational, logical, assignment, increment and decrement, conditional, bitwise. 1.3 precedence and order of evaluation, statement and expressions, string arithmetic. 1.4 Arrays and Strings: One- and two-dimensional array, creating an Array, strings, string buffer.	15
Module -2:	Classes and Inheritance: 2.1 Various types of inheritance, super and subclasses, Types of Inheritance. 2.2. Keywords - <code>__extent's</code> , <code>__super</code> ', constructor chaining, method overriding, dynamic method dispatch, final variables and methods, final classes. 2.3. Abstract method and classes. 2.4 Interface: Defining interfaces, extending interfaces, implementing interfaces, Packages System packages, using system package.	15
Module -3:	Exception Handling and Threads: 3.1 Introduction to Threads, Creating Threads, Lifecycle of a Thread. 3.2 Synchronization Exception Handling: Exception-handling. Fundamentals, Exception types, Uncaught exceptions, Using try and	15

	catch, Multiple catch, clauses, nested try statements. 3.3 use of throw, throws and finally keywords. 3.4 Java's Built-in exceptions, User defined exception, Chained Exception.	
Module -4: File Handling and JDBC:	4.1 Concept of streams, stream classes, byte stream classes: Input Stream and Output Stream. 4.2-character stream classes: Reader and Writer, Difference between byte stream classes and character stream classes, File class, Reading / writing bytes / characters, random access file. 4.3 Introduction To JDBC, JDBC Architecture, Types of JDBC. 4.4 Drivers & Differences, Common JDBC Components, Importing Packages, Registering JDBC Drivers.	15
Reference Books: - 1) Bloch, Joshua. Effective Java. 3rd ed. Boston: Addison-Wesley, 2018. 2) D'Souza, Roshan and S. Sangeetha. —A Study on the Performance of Java Virtual Machine in Cloud Applications. International Journal of Computer Applications 180, no. 45 (2018): 1–5. 3) Eckel, Bruce. Thinking in Java. 4th ed. Upper Saddle River, NJ: Prentice Hall, 2006. 4) Gosling, James, Bill Joy, Guy Steele and Gilad Bracha. —The Java Language Specification.		
Evaluation Pattern:		
Total Marks: 100		
Comprehensive Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) Compulsory. • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: Skill

Marks: 100

Credits: 4

From: A. Y. 2025-26

**Name of the Course & Code : Advanced Web Development (PHP/MySQL)
(VS 335)**

Course Objectives: Student should be able to...

- 1) Understand application using PHP, MySQL.
- 2) Study the appropriate web tools/languages for creating web sites.
- 3) Describe current trends and styles in web design and applications.
- 4) Understand the concept of Object oriented programming.

Course Outcomes: Student will be able to...

- 1) Analyze PHP scripts and determine their behavior.
- 2) Construct PHP scripts to create dynamic web content.
- 3) Create PHP scripts capable of inserting and modifying data in a MySQL database.
- 4) Design web pages with the ability to retrieve and present data from a MySQL database.

Module	Title and Contents	Hrs
Module 1:	Introduction to PHP: 1.1 Concept of PHP, PHP Syntax, variables declaration, Constants, Comments, and Data types, Operators. 1.2 Command line arguments, Echo /Print statements. Introduction to XAMPP, Decision Making Statement (If- Else, Else if, Switch). 1.3 Looping statement (For, for each, While), Functions (string functions, user defined functions, Date and Time function). 1.4 Arrays.	15
Module 2:	PHP & MySQL 2.1 Basic introduction to database management system and its commands. 2.2 SQL commands, MySQL Interface, MySQL toolbar, MySQL Commands, Data Types. 2.3 Introduction to Databases, creating database, creating tables, inserting values in table, Displaying, changing, searching, and deleting records from the table. 2.4 Developing applications, SQL queries- insert, select, delete, update. 2.5 Where, order by clauses.	15
Module 3:	PHP File Management 3.1 PHP file system: File operating function, Create and open files., Read and write file contents, Append new data to existing files, Delete, copy, and rename files, Check file existence and file size. 3.2 File upload, file download. 3.3 PHP Cookies: Characteristics, cookies Operations, Applications of Cookies, Advantages and Disadvantages. 3.4 PHP Session: Characteristics, Session Operations, Applications of Session,	15

	Advantages and Disadvantages.	
Module 4:	Object Oriented Programming in PHP 4.1 Procedural vs. Object-Oriented Programming: Comparison, benefits, and architectural shifts. 4.2 Core OOP Concepts: Classes, Objects, Properties, and Methods. 4.3 Instantiating Objects: Using the new keyword and method chaining. 4.4 PHP 8 Enhancements: Constructor Property Promotion, Named Arguments, and Union Types. 4.5 Access Modifiers: public, protected, and private encapsulation, the \$this Pseudo-Variable: Contextual reference to object instances.	15

Reference Books: -

- 1) Beighley, Lynn and Michael Morrison. Head First PHP & MySQL: A Brain-Friendly Guide. 2nd ed. Sebastopol, CA: O'Reilly Media, 2009.
- 2) Gilmore, W. Jason. Beginning PHP and MySQL: From Novice to Professional. 5th ed. New York Apress, 2013.
- 3) Meloni, Julie C. and Matt Telles. PHP, MySQL & JavaScript All in One. 6th ed. Indianapolis, IN: Sams Publishing, 2018.
- 4) PHP.net. PHP Manual. Accessed May 3, 2025. <https://www.php.net/manual/en/>.
- 5) W3Schools. PHP Tutorial. Accessed May 3, 2025. <https://www.w3schools.com/php/>.

Evaluation Pattern:

Total Marks: 100

Comprehensive Continuous Evaluation (40 Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) Compulsory. • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)
--	--



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: Skill

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course Code: ASP.NET with C#.NET(VS 336)

Course Objectives: Student should be able to...

- 1) Understand ASP.NET technologies for designing and developing web applications.
- 2) Study object-oriented programming environment.
- 3) Get the knowledge of developing crystal report.
- 4) Learn the Connectivity of .NET applications and SQL Server.

Course Outcomes: Student will be able to...

- 1) Design UI & Implement AJAX.
- 2) Implement client/server validation controls.
- 3) Use dynamic Crystal Reports within an ASP.NET application.
- 4) Create and execute standard SQL queries (CRUD) using MS SQL Server 2008

Module	Title and Contents	Hrs
Module -1:	Introduction, Controls, Event and Validation & Ajax: 1.1 Introduction: IDE environment, ASP.NET life cycle, Using .NET Framework Class Library. 1.2 Different Controls: Introduction to control class. Event handling, click event, Text Changed event, Command event, Checked Changed event, post, Back events, Using event argument etc. 1.3 Validation Control: Introduction, basic validation controls. Validation techniques, State Management, using cookies and URL encode. 1.4 Master Pages, Navigation, Formatting the Sitemap Path Control, Using the Menu Control, Using Tree View Control. Ajax: Introducing AJAX, Working of AJAX, Using ASP.NET AJAX server controls.	15
Module -2:	Database with ADO.NET, LINQ and Crystal Report: 2.1 Database Elements: ADO.NET Object model, Introducing the ADO.NET Entity Framework, Mapping Your Data Model to an Object Model, 2.2 Microsoft SQL Server 2008 Overview: Introduction to Microsoft SQL Server 2008, Advantages /Features of SQL Server 2.3 Queries using SQL Server performing create, select, update, delete 2.4 Design View in SQL Server Various Constraints in SQL SERVER, 2.5 Various Function in SQL Server. Crystal Report: Adding a Crystal	15

	2.6 Report to an ASP.NET.	
Module -3:	C# language Basics 3.1 Overview of C# Literals, Variables, Data types, Operators, Expressions, Branching and looping operations, methods, arrays, strings. 3.2 Classes and Objects: class, objects, constructors, static members, Static constructors, private constructors, copy constructors, 3.3 Destructors, member, initialization. 3.4 This reference, nesting of classes.	15
Module -4:	C# language advanced features 4.1 Inheritance and Polymorphism: Classical inheritance, containment, inheritance. 4.2 Defining a subclass, visibility control. 4.3 Constructors, multilevel inheritance, overriding methods, hiding methods. 4.4 Abstract classes, abstract methods. Interface: Defining an interface, extending an interface, Implementing, interface, Difference between interface and abstract class, Operator overloading.	15
Reference Books: - 1) Esposito, Dino. Programming ASP.NET Core. 2nd ed. Redmond, WA: Microsoft Press, 2018. 2) Freeman, Adam and Matthew MacDonald. Pro ASP.NET with C#. 8th ed. New York: Apress, 2020. 3) Liberty, Jesse and Dan Hurwitz. Programming C#: Building .NET Applications with C#. 4th ed. Sebastopol, CA: O Reilly Media, 2005. 4) Microsoft. ASP.NET Documentation. Accessed May 3, 2025. https://learn.microsoft.com/en-us/aspnet/core/ . 5) Tutorials Teacher. ASP.NET Tutorial. Accessed May 3, 2025 6) Shah, Bipin Joshi. Beginning ASP.NET for Visual Studio 2022: Build Modern Web Apps with ASP.NET Core Blazor, MVC and Razor Pages. New York: Apress, 2022.		
Evaluation Pattern:		
Total Marks: 100		
Comprehensive Continuous Evaluation (40 Marks): - CCE - I : 20 Marks: Activity - CCE - II: 20 Marks: Activity - CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): - Question -1: Solve the following questions (Six questions of 2 Marks) Compulsory. - Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)	



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: Practical

Marks: 70

Credits: 2

From: A. Y. 2025-26

Name of the Course and Code :LAB Programming in JAVA(VS 337)

Practical Batch: 16 Student/Batch

Course Objectives: Student Should be able to ...

- 1) Study fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- 2) Gain fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism.
- 3) Learn the concepts of packages and interfaces.
- 4) Understand the concept of Exception handling exceptions.

Course Outcomes: Student will be able to ...

- 1) Analyze Object Oriented Programming paradigm over structured programming and become.
- 2) Create new classes from existing one & design the classes needed given a problem specification
- 3) Design and develop java programs.
- 4) Interpret object-oriented data and report results.

Sr.No.	Practical's Title	Hrs
1)	Testing out and interpreting a variety of simple Programs to demonstrate the syntax and use of the following Features of the language: basic data types, operators and control structures.	60
2)	Program for Class definitions and usage involving variety of constructors and finalizes.	
3)	Programs involving various kinds of inheritances.	
4)	Program involving Method Over-riding, Method Over-loading.	
5)	Program involving Abstract Class and Methods.	
6)	Program involving Interface in java.	
7)	Program to demonstrate creation and handling of packages, their imports And Class Path.	
8)	Programs involving a variety of Exception Handling situations.	
9)	Program to define a class that generates Exceptions and using objects of the class.	
10)	Program involving creating and handling threads in applications and applets.	
11)	Programs to demonstrate methods of various i/o classes.	
12)	Programs to demonstrate methods of string class.	

13)	Program to demonstrate AWT/Swing graphic methods.	
14)	Programs to demonstrate event handling.	
15)	Write a Java program to create a simple JTable using Swing to display tabular records	

Reference Books: -

- 1) Bloch, Joshua. *Effective Java*. 3rd ed. Boston: Addison-Wesley, 2018.
- 2) D'Souza, Roshan and S. Sangeetha. —A Study on the Performance of Java Virtual Machine in Cloud Applications. || *International Journal of Computer Applications* 180, no. 45 (2018): 1–5
- 3) Eckel, Bruce. *Thinking in Java*. 4th ed. Upper Saddle River, NJ: Prentice Hall, 2006.
- 4) Gosling, James, Bill Joy, Guy Steele and Gilad Bracha. —The Java Language Specification.
- 5) Horstmann, Cay S. and Gary Cornell. *Core Java Volume I—Fundamentals*. 11th ed. Upper Saddle River, NJ: Prentice Hall, 2019.

Evaluation Pattern:

Total Marks: 70

Comprehensive Continuous Evaluation: (20 Marks) • Journal - 10 Marks • Case Study - 10 Marks • Oral - 5 Marks • Attendance - 5 Marks	End Semester Examination:(50 Marks) Attempt any four Questions. • Question -1(10 Marks = 1 X 10 = 10 Marks) • Question -2(10 Marks = 1 X 10 = 10 Marks) • Question -3(10 Marks = 1 X 10 = 10 Marks) • Question -4(10 Marks = 1 X 10 = 10 Marks) • Question -5(10 Marks = 1 X 10 = 10 Marks)
---	--



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Programme: B. Voc. (Soft. Dev.)

Type: Practical

Marks: 70

Credits: 2

Credits: 2

**Name of the Course & Code : LAB: Advanced Web Development(VS 338)
Practical Batch: 16 Student/Batch**

Course Objectives: Student should be able to

- 1) Understand application using PHP, MySQL
- 2) Study the appropriate web tools/languages for creating web sites
- 3) Describe current trends and styles in web design and applications
- 4) Understand the concept of Object oriented programming.

Course Outcomes: Student will be able to...

- 1) Analyze PHP scripts and determine their behavior.
- 2) Construct PHP scripts to create dynamic web content.
- 3) Create PHP scripts capable of inserting and modifying data in a MySQL database.
- 4) Design web pages with the ability to retrieve and present data from a MySQL database.

Sr.No.	Practical's Title	Hrs
1.	Write a Program which shows working of if---else Loop.	60
2.	Write a Program which shows working of Do---while Loop.	
3.	Write a program which shows working of for---each Loop.	
4.	Write program which shows following output: * * * * * * * * * * * * * * *	
5.	Write a program to show given number is prime or not.	
6.	Write a program to create database and create table display message — Database and table created successfully.	
7.	Write a program to update a record in database.	
8.	Write program to create & write into PHP file.	
9.	Write a program to read from PHP file.	
10.	Write a program to rename the file in php.	
11.	Create one simple Registration Form with SAVE, DELETE, UPDATE, SEARCH Record using SQL database.	

12.	Write a function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.	
13.	Write a simple PHP class which displays an introductory message like "Hello All, I am Scott", where "Scott" is an argument value of the method within the class.	
14.	Write a PHP class that sorts an ordered integer array with the help to sort() function. <i>Sample array : array(11, -2, 4, 35, 0, 8, -9).</i>	
15.	Write a PHP Calculator class which will accept two values as arguments. then add them, subtract them, multiply them together, or divide them on request.	

Reference Books:

- 1) Lockhart, Josh. Modern PHP: New Features and Good Practices. Sebastopol, CA: O'Reilly Media, 2015.
- 2) Nixon, Robin. Learning PHP, MySQL & JavaScript: With Step-by-Step Guide to Creating Dynamic Websites. 6th ed. Sebastopol, CA: O'Reilly Media, 2021.
- 3) Tatroe, Kevin and Peter MacIntyre. Programming PHP: Creating Dynamic Web Pages. 4th ed. Sebastopol, CA: O'Reilly Media, 2020.
- 4) Zandstra, Matt. PHP 8 Objects, Patterns and Practice: Mastering OO Enhancements, Design Patterns and Development Tools. 6th ed. Berkeley, CA: Apress, 2021.

Evaluation Pattern

Total Marks: 70

Comprehensive Continuous Evaluation: (30 Marks) • Journal - 10 Marks • Case Study - 10 Marks • Oral - 5 Marks • Attendance - 5 Marks	End Semester Examination:(40 Marks) Attempt any four Questions. • Question -1(10 Marks = 1 X 10 = 10 Marks) • Question -2(10 Marks = 1 X 10 = 10 Marks) • Question -3(10 Marks = 1 X 10 = 10 Marks) • Question -4(10 Marks = 1 X 10 = 10 Marks) • Question -5(10 Marks = 1 X 10 = 10 Marks)
--	--



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: Practical

Marks: 60

Credits: 2

From: A. Y. 2025-26

Name of the Course Code: LAB: ASP.NET With C#.NET(VS 339)

Practical Batch: 16 Student/Batch

Course Objectives: Student should be able to...

- 1) Understand .NET technologies for designing and developing web applications.
- 2) Study object-oriented programming environment.
- 3) Get the knowledge of developing crystal report.
- 4) Learn the Connectivity of .NET applications and SQL Server.

Course Outcomes: Student will be able to...

- 1) Design UI & Implement AJAX.
- 2) Implement client/server validation controls.
- 3) Integrate dynamic Crystal Reports within an ASP.NET application.
- 4) Create and execute standard SQL queries (CRUD) using MS SQL Server 2008

Sr.No.	Practical's Title	Hrs
1)	Write a C# Sharp program to print the sum of two numbers.	60
2)	Write a C# Sharp program to swap two numbers.	
3)	Create one simple Web Site.	
4)	Write a C# program to print the odd numbers from 1 to 99. Prints one number per line.	
5)	Write a program in C# Sharp to create a file with text and read the file.	
6)	Write a C# Sharp program to compute the sum of the two given integer values. If the two values are the same, then return triple their sum.	
7)	Write a C# Sharp program to find the sum of first 10 natural numbers.	
8)	Write a C# Sharp program to check whether a given number is even or odd.	
9)	Write a program in C# Sharp to read a specific line from a file.	
10)	Create one simple Registration Form with SAVE, DELETE, UPDATE, SEARCH Record using SQL database.	
11)	Write a C# Sharp program to find the largest of three numbers.	
12)	Write a C# Sharp program to calculate factorial of a number using recursion.	

13)	Write a C# Sharp program to reverse a given string.	
14)	Write a C# Sharp program to check if a string is a Palindrome.	
15)	Write a C# Sharp program to perform basic exception handling (Try-Catch-Finally).	

Reference Books:

- 1) Esposito, Dino. Programming ASP.NET Core. 2nd ed. Redmond, WA: Microsoft Press, 2018.
- 2) Freeman, Adam and Matthew MacDonald. Pro ASP.NET with C#. 8th ed. New York: Apress, 2020.
- 3) Liberty, Jesse and Dan Hurwitz. Programming C#: Building .NET Applications with C#. 4th ed. Sebastopol, CA: O'Reilly Media, 2005.
- 4) Microsoft. ASP.NET Documentation. Accessed May 3, 2025. <https://learn.microsoft.com/en-us/aspnet/core/>.
- 5) Tutorials Teacher. ASP.NET Tutorial. Accessed May 3, 2025
- 6) Shah, Bipin Joshi. Beginning ASP.NET for Visual Studio 2022: Build Modern Web Apps with ASP.NET Core Blazor, MVC and Razor Pages. New York: Apress, 2022.

Evaluation Pattern

Total Marks: 60

Comprehensive Continuous Evaluation: (20 Marks) • Journal - 5 Marks • Case Study - 5 Marks • Oral - 5 Marks • Attendance - 5 Marks •	End Semester Examination: (40 marks) Attempt any four questions • Question -1(10 Marks = 1 X 10 = 10 Marks) • Question -2(10 Marks = 1 X 10 = 10 Marks) • Question -3(10 Marks = 1 X 10 = 10 Marks) • Question -4(10 Marks = 1 X 10 = 10 Marks) • Question -5 (10 Marks = 1 X 10 = 10 Marks)
---	---

Sem-II



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - IV

Type: General

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code: Software Project Management(VS 341)

Course Objectives: Student Should be able to...

- 1) Understand the Software Project Planning and Evaluation techniques.
- 2) Learn at each stage of the software development life cycle (SDLC).
- 3) Understand about the activity planning and risk management principles.
- 4) Manage software projects and control software deliverables.

Course Outcomes: Student will be able to...

- 1) Apply Project Management principles while developing software.
- 2) Analyze Basic project management concepts, framework and the process models.
- 3) Describe Software process models and software effort estimation techniques.
- 4) Estimate the risks involved in various project activities.

Module	Title and Contents	Hrs
Module -1:	Project Evaluation and Project Planning 1.1 Importance of Software Project Management, Activities, Methodologies, Categorization of Software Projects. 1.2 Setting objectives – Management Principles, Management Control, Project portfolio Management. 1.3 Core SPM Activities: Planning, execution, monitoring, risk management, and project closure. 1.4 Cost-Benefit Evaluation Techniques: Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period 1.5 Risk Evaluation: Quantifying operational and financial risks during project selection.	15
Module -2:	Project Life Cycle and Effort Estimation: 2.1 Estimation Fundamentals: Importance of Estimation, Cost and Effort Estimation Techniques: Expert Judgment, Analogy/Top-Down, And Bottom-Up. 2.2 COSMIC Full function points: 4 Data Movement Types, Sizing Formula. 2.3 COCOMO II- Evaluation, Sub-models-Application Composition Model, Early Design Model, Post-Architecture Model, Cost Drivers & Scale Factors. 2.4 A Parametric Productivity Model-Parametric Estimation Concept, Productivity Factors	15

Module -3:	Activity Planning and Risk Planning: 3.1 Objectives of Activity planning, Project schedules, Activities, Sequencing and scheduling. 3.2 Network Planning models, Formulating Network Model, Forward Pass & Backward Pass techniques. 3.3 Critical path (CRM) method, Risk identification, Assessment, Risk Planning, Risk Management. 3.4 PERT technique – Monte Carlo simulation Resource. 3.5 Allocation creation of critical paths, Cost Schedule.	15
Module -4:	Project management and Control 4.1 Framework for Management and control, Collection of data 4.2 Visualizing progress – Cost monitoring, Earned Value Analysis, Prioritizing Monitoring, Project tracking, Change control 4.3 Software Configuration Management 4.4 Managing contracts, Contract Management.	15

Reference Books: -

1. Hughes, Bob, Mike Cotterell and Rajib Mall. Software Project Management. 6th ed. New Delhi: McGraw-Hill Education, 2017.
2. Pressman, Roger S. Software Engineering: A Practitioner's Approach. 8th ed. New York: McGraw-Hill Education, 2015.
3. Sommerville, Ian. Software Engineering. 10th ed. Boston: Pearson, 2016.
4. Royce, Winston W. "Managing the Development of Large Software Systems." In Proceedings of IEEE WESCON, August 1970.
5. Taimoor Hasan. "Analyzing and Resolving Issues in Software Project Risk Management." Lahore Garrison University Research Journal of Computer Science and Information Technology 1, no. 1 (2017): 13–21.

Evaluation Pattern:

Total Marks: 100

Comprehensive Continuous Evaluation (40 Marks):

- CCE - I : 20 Marks: Activity
- CCE - II: 20 Marks: Activity
- CCE - III: 20 Marks: MCQ Test

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (60 Marks):

- Question -1: Solve the following questions (Six questions of 2 Marks)
- Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - IV

Type: General

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code: Digital Marketing(VS 342)

Course Objectives: Student Should be able to...

- 1) Understand modern business operations and strategies.
- 2) Learn basic concepts of e-commerce & business models.
- 3) Study various types of e-commerce websites and digital payment systems.
- 4) Gain the knowledge of security and legal rules & issues in e-commerce

Course Outcomes: Student will be able to...

- 1) Analyze Role of IT in business.
- 2) Create Virtual marketing advertisement.
- 3) Evaluate different types of e-commerce web sites and different modes of payments
- 4) Demonstrate security and legal issues in e-commerce

Module	Title and Contents	Hrs
Module -1: Introduction	1.1 History of E-Commerce: Evolution of commerce , Definition of e-commerce, History and growth of e-commerce ,Traditional commerce vs. e-commerce, Advantages and disadvantages of e-commerce ,Features of e-commerce, Scope and future trends of e-commerce 1.2 Classifications- B2B, B2C, C2C, G2C, B2G sites. 1.3 Applications of E-Commerce: education, financial, auction, news, entertainment, banking and finance, Healthcare, Travel and tourism, Agriculture, sectors. 1.4 Doing e-commerce: E-commerce business models, Setting up an online business, Website planning and development, Domain registration and web hosting, Customer relationship management (CRM).	15
Module -2: Systems	2.1 Electronic payment systems – relevance of currencies, credit cards, debit cards, smart cards, Mobile payments, payment gateways. 2.2 E-credit accounts, e-money, security concerns in e commerce, authenticity, privacy, integrity, electronic Fund Transfer (EFT), Authentication. 2.3 non-repudiation, encryption, secret key cryptography, public key cryptography, Hash functions, SSL/TLS protocols, Secure Electronic Transaction (SET), Malware and phishing. 2.4 Digital signatures, Digital certificates, Public Key Infrastructure	15

	(PKI), Firewalls: Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS), VPN in e-commerce.	
Module -3:	Segments in Business 3.1 Mass Marketing: segmentation, one-to-one marketing, personalization and behavioral marketing, Customer profiling, Customer lifecycle management. 3.2 Web advertising: online advertising methods, Banner advertisements, Pop-up and pop-under ads, Search engine marketing (SEM), Search engine optimization (SEO), 3.3 Advertising strategies and promotions. 3.4 Special advertising and implementation topics.	15
Module -4:	Advanced Informatics 4.1 Mobile Commerce: attributes and benefits, Mobile Devices, Computing software, Wireless Telecommunication devices 4.2 Mobile finance applications, Web 2.0 Revolution, social media and industry disruptors, Virtual communities 4.3 Online social networking: Basics and examples, Web 3.0 and Web 4.0 4.4 Civil law, intellectual property law, common law and EC legal issues.	15

Reference Books: -

- 1) Chaffey, Dave and Fiona Ellis-Chadwick. Digital Marketing. 7th ed. Harlow: Pearson Education, 2019.
- 2) Ryan, Damian. Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation. 5th ed. London: Kogan Page, 2021.
- 3) Kingsnorth, Simon. Digital Marketing Strategy: An Integrated Approach to Online Marketing. 3rd ed. London: Kogan Page, 2022.
- 4) Tiago, Maria Teresa Pinheiro and José Manuel Cristofaro Veríssimo. "Digital Marketing and Social Media: Why Bother?" Business Horizons 57, no. 6 (2014): 703–708.
- 5) Kannan, P. K. and Hong Shuang —Alicell Li. "Digital Marketing: A Framework, Review and Research Agenda." International Journal of Research in Marketing 34, no. 1 (2017): 22–45. <https://doi.org/10.1016/j.ijresmar.2016.11.006>.

Evaluation Pattern:

Total Marks: 100

Comprehensive Continuous Evaluation (40 Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)
--	--



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - IV

Type: General

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code: Data Structure (VS 343)

Course Objectives: Student Should be able to...

- 1) Understand efficient storage mechanisms of data for an easy access.
- 2) Get knowledge of implementation various basic and advanced data structures.
- 3) Learn various techniques for representation of the data
- 4) Study of application using data structures.

Course Outcomes: Student will be able to...

- 1) Define appropriate data structure as applied to specified problem definition.
- 2) Use operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- 3) Apply concepts learned in various domains like DBMS, compiler construction etc.
- 4) Design linear and non-linear data structures like stacks, queues and linked list.

Module	Title and Contents	Hrs
Module -1:	Introduction 1.1 Time and space complexity, Data Structures –Asymptotic Notations (Big O, Big Ω, Big Θ), Introduction to Data Structures, abstract data types. Classification of Data Structures (Linear and Non-linear), Primitive and Non-Primitive Data Structures. 1.2 Linear list – Linear List Concepts, singly linked list implementation, insertion, deletion and searching operations on linear list. 1.3 Circular Linked List Implementation, Doubly Linked List Implementation, Circular Doubly Linked List. 1.4 Operations and Applications: Insertion, Deletion and Searching Operations. 1.5 Reversing a Linked List, Merging Two Linked Lists.	15
Module -2:	Stacks 2.1 Stack ADT, Stack Operations (Push, Pop, Peek, IsEmpty, IsFull), Array Representation, Stack Implementation. 2.2 Applications of Stacks: Infix to Postfix Conversion, Infix to Prefix Conversion, Parenthesis Matching, Symbol Balancing, Function Call Management. 2.3 Expression Evaluation: Postfix Expression Evaluation, Prefix Expression Evaluation, 2.4 Expression Trees, Conversion between Infix, Prefix and Postfix	15

	Expressions. 2.5 Postfix expression evaluation. Recursion implementation.	
Module -3:	Queues 3.1 Operations, array and linked representations, Circular Queue operations. De queues, applications of queues. 3.2 Trees – Definitions, tree representation, properties of trees, Binary tree, Binary tree representation. 3.3 binary tree properties, binary tree traversals, 3.4 Binary tree implementation, applications of trees.	15
Module -4:	Searching and Sorting 4.1 Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, shell sort, radix sort 4.2 Searching- linear and binary search methods 4.3 Comparisons of sorting and searching methods.	15

Reference Books: -

- 1) M.A. Weiss, Pearson, Data structures and Algorithm Analysis in C, 2nd edition.,2001
- 2) A.M. Tanenbaum, Y. Langsam, M.J. Augenstein, Data Structures using C, Pearson. 1996
- 3) Kruse, C.L. Tondo and B. Leung, Data structures and Program Design in C, 2nd edition, Pearson 2005
- 4) Lafore, Robert. Data Structures and Algorithms in Java. 2nd ed. Indianapolis: Sams Publishing, 2002.
- 5) Weiss, Mark Allen. Data Structures and Algorithm Analysis in C++. 4th ed. Boston: Pearson, 2014
- 6) Goodrich, Michael T., Roberto Tamassia and Michael H. Goldwasser. Data Structures and Algorithms in Python. Hoboken, NJ: John Wiley & Sons, 2013.

Evaluation Pattern:

Total Marks: 100

Comprehensive Continuous Evaluation (40 Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)
--	--



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev)

Semester - IV

Type: Skill

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code: Advanced SQL With Oracle(VS 344)

Course Objectives: Student Should be able to...

- 1) Understand complex use of the technologies likeASQL, Oracle
- 2) Learn Advanced SQL Concepts.
- 3) Study Stored Procedures works.
- 4) Study Dynamic SQL Query.

Course Outcomes: Student will be able to...

- 1) Design complex relational database queries.
- 2) Execute SQL Functions, Stored procedure and PL/SQL blocks.
- 3) Apply SQL analytical functions and operators for data warehouse manipulation.
- 4) Analyze query execution performance.

Module	Title and Contents	Hrs
Module -1:	SQL Concepts: 1.1 Introduction of SQL, features, SQL data types. 1.2 DDL commands- create table, describe table, alter table, drop table commands etc. 1.3 DML-insert, delete, update commands etc. 1.4 DQL commands- All select commands, aggregate functions, order by clause.	15
Module -2:	Advanced SQL Concepts: 2.1 Writing Basic SQL Select Statements, Joins (Displaying Data from Multiple Tables), Aggregating Data using Group Functions. 2.2 Creating Views, inline views. 2.3 Controlling User Access, grant, revoke, rollback. 2.4 Creating Other Database Objects (Sequences, Indexes and Synonyms).	15
Module -3:	Procedural language: 3.1 Types of PL/SQL blocks, Identifiers, types of Identifiers, Declarative Section, variables, Scalar Data Types, The %TYPE Attribute. 3.2 PL/SQL Block Syntax, Deployment of SQL Functions in PL/SQL, Nested Blocks, Operators. 3.3 Control Structures: Conditional processing using IF Statements and CASE Statements, Loop Statement, While Loop Statement, For Loop Statement, the Continue Statement, Composite Data Types. 3.4 Handle Exceptions with PL/SQL. What is procedure? Syntax of Creating procedure, Creating procedure with parameters, IN parameter,	15

	3.5 OUT parameter, methods of passing parameter, Invoking procedure from 3.6 Other procedure, The PL/SQL Execution Environment, function And procedures.	
Module -4:	Dynamic SQL 4.1 Cursor: Definition, declare and define cursor, types of cursor. 4.2 Triggers: Definition, the Trigger Event Types and Body, Business Application Scenarios for Implementing Triggers. 4.3 Create DML Triggers using the CREATE TRIGGER Statement. 4.4 SQL Developer, Body and Firing (Timing), Statement Level Triggers And Row Level Triggers.	15

Reference Books: -

- 1) Murach 's Oracle SQL and PLSQL by Joel Murach, Murach and Associates. (Unit I-Unit II) 2002
- 2) Oracle Database 11g PL/SQL Programming Workbook By: Michael Mc Laughlin, John Harper (Unit II-Unit III) 2008
- 3) Oracle PL/SQL Programming Fifth Edition by Steven Feuerstein, Bill 2010
- 4) Kyte, Thomas and Darl Kuhn. Expert Oracle Database Architecture: Oracle Database 9i, 10g and 11g Programming Techniques and Solutions. 3rd ed. Berkeley, CA: Apress, 2014.
- 5) Rosenzweig, Benjamin and Elena Silvestrova Rakhimov. Oracle PL/SQL by Example. 5th ed. Boston: Addison-Wesley, 2014.

Evaluation Pattern:

Total Marks: 100

Comprehensive Continuous Evaluation (40 Marks): • CCE - I : 20 Marks: Activity • CCE - II: 20 Marks: Activity • CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)	End Semester Examination (60 Marks): • Question -1: Solve the following questions (Six questions of 2 Marks) • Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)
--	--



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev)

Semester - IV

Type: Skill

Marks: 100

Credits: 4

From: A. Y. 2025-26

Name of the Course and Code: AI and Python(VS 345)

Course Objectives: Student Should be able to...

- 1) Understand the basic concepts of scripting language.
- 2) Learn python data structures like Lists, Tuples etc.
- 3) Study the concept of Functions, Modules and Regular Expression
- 4) Discuss object-oriented programming and exception-handling mechanisms.

Course Outcomes: Student will be able to...

- 1) Demonstrate Python Integrated Development Environments (IDEs)
- 2) Write Python programs using basic syntax, operators and control flow.
- 3) Apply data using built-in Python structures like Lists, Tuples and Dictionaries.
- 4) Implement classes, objects and exception handling.

Module	Title and Contents	Hrs
Module 1:	Introduction 1.1 Introduction to Python, Uses of Python Programming Language / Python Applications, Features of Python, 1.2 Python for Software development, Python for Networking, Features of Python Programming Language 1.3 Print statements, Comments, Datatypes 1.4 String operations, Input/output formatting, Operators in python, Variables, Indentation.	15
Module -2:	Control Flow & functions 2.1 If statement and its related statements, looping statements- while, for loop, range statement, break and continue statements, List and tuples, 2.2 Writing and Calling Functions, Function Inputs and Outputs 2.3 Local and Global Scope, Python Class and Objects, Inheritance 2.5 File handling Concepts, modes, reading files., writing and appending to files	15
Module -3:	Applications of AI: 3.1 Basic Concept of Artificial Intelligence (AI). 3.2 What is Intelligence? Application of AI, Intelligent Agents. 3.3 Agents and environments, Nature of environments, Structure of agents. 3.4 Problem Solving: Problem-solving agents.	15

Module -4: Search Strategies in AI:	4.1 Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search 4.2 Game Playing: Adverbial search, Games, minimax, algorithm. 4.3 optimal decisions in multiplayer games, Alpha-Beta pruning 4.4 Evaluation functions, cutting of search	15
--	--	----

Reference Books: -

- 1) Russell, Stuart J. and Peter Norvig. Artificial Intelligence: A Modern Approach. 4th ed. Hoboken, NJ: Pearson, 2020.
- 2) Géron, Aurélien. Hands-On Machine Learning with Scikit-Learn, Keras and TensorFlow: Concepts, Tools and Techniques to Build Intelligent Systems. 3rd ed. Sebastopol, CA: O'Reilly Media, 2022.
- 3) VanderPlas, Jake. Python Data Science Handbook: Essential Tools for Working with Data. 2nd ed. Sebastopol, CA: O'Reilly Media, 2022.
- 4) Lantz, Brett. Machine Learning with R and Python for Beginners. Birmingham, UK: Packt Publishing, 2023
- 5) Chollet, François. Deep Learning with Python. New York: Manning Publications, 2017.

Evaluation Pattern:

Total Marks: 100

Comprehensive Continuous Evaluation (40 Marks):

- CCE - I : 20 Marks: Activity
- CCE - II: 20 Marks: Activity
- CCE - III: 20 Marks: MCQ Test

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (60 Marks):

- Question -1: Solve the following questions (Six questions of 2 Marks)
- Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - IV

Type: Skill

Marks: 100

Credit: 4

From: A. Y. 2025-26

Name of the Course and Code: Advanced JAVA(VS 346)

Course Objectives: Student Should be able to...

- 1) Understand Components of swing.
- 2) Learn Java Servlets Development Kit, creating, Compiling and running servlet
- 3) Understand Java Beans. Advantage, Installing / Starting/ Using BDk
- 4) Study JSP Architecture, JSP Access Model, JSP Syntax Basic.

Course Outcomes: Student will be able to...

- 1) Demonstrate working of Java Servlet.
- 2) Apply Java Servlets Development Kit, creating, Compiling and running servlet
- 3) Use Java Beans. Advantage, Installing / Starting/ Using BDk
- 4) Create Java programming database connectivity.

Module	Title and Contents	Hrs
Module -1: Introduction	1.1 Introduction to Swing J applet, Icons and Labels, Text Fields, Buttons, Jbutton Class, Check Box, Radio Buttons, The Container, Panel, Windows and Frame Classes, Combo Box, Tabbed Panes, Scroll Panes, Trees, Tables, Custom Rendering of Jlist Cells. 1.2 JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements. 1.3 Creating and Executing SQL statements. 1.4 Working with Result Set Object & Result Set Meta Data.	15
Module -2: Servlets:	2.1 Introduction to Servlets (Life cycle of servlets, Java Servlets Development Kit, creating, Compiling and running servlet 2.2 The servlet API: java servlet package, Reading the servlet Parameters, Reading Initialization parameter, The java servlet 2.3 http. Package, Handling HTTP Request and Response (GET / POST Request) vi) 2.4 Using Cookies, Session Tracking	15
Module -3: Introduction To Java Beans	3.1 Java Bean, Advantage, 3.2 Installing / Starting 3.3 Using BDk (Bean Development Kit, JAR Files, 3.4 Using the Java Beans API	

Module -4: File Handling and JDBC:	4.1 Concept of streams, stream classes, byte stream classes: Input Stream and Output Stream. 4.2 Character stream classes: Reader and Writer, Difference between byte stream classes and character stream classes, File class, Reading / writing bytes / characters, random access file. 4.3 Introduction to JDBC, JDBC Architecture, Types of JDBC. 4.4 Drivers & Differences, Common JDBC Components, Importing. 4.5 Packages, Registering JDBC Drivers.	15
---	---	----

Reference Books: -

- 1) Uttam K. Roy, Advanced Java Programming Textbook, 1 January 2018, Drea MTech Press
- 2) Clark Nathan, Java: Advanced Features and Programming Techniques Book, 1 January 2014, Dreamtech Press
- 3) Schildt, Herbert. Java: The Complete Reference. 12th ed. New York: McGraw-Hill Education, 2021.
- 4) Horstmann, Cay S. Core Java Volume II—Advanced Features. 11th ed. Boston: Pearson Education, 2019.
- 5) Eckel, Bruce. Thinking in Java. 4th ed. Upper Saddle River, NJ: Prentice Hall, 2006.

Evaluation Pattern:

Total Marks: 100

Comprehensive	Continuous	Evaluation	End Semester Examination (60 Marks):
(40 Marks): - CCE - I : 20 Marks: Activity - CCE - II: 20 Marks: Activity - CCE - III: 20 Marks: MCQ Test (Best of 2 from CCE I, II & III Selected for final Score)			- Question -1: Solve the following questions (Six questions of 2 Marks) - Attempt any four questions from Q. 2 to Q. 7 (each questions carry 12 marks)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - III

Type: Practical

Marks: 70

Credits: 2

From: A. Y. 2025-26

Name of the Course and Code: LAB: Advanced SQL(VS 347)

Practical Batch: 16 Student/Batch

Course Objectives: Student Should be able to...

- 1) Understand standard SQL syntax, query concepts and relational database.
- 2) Get knowledge about different type of SQL Constraint.
- 3) Demonstrate database schema setup and table construction.
- 4) Study the Use of different type of Key.

Course Outcomes: Student will be able to...

- 1) Design relational databases and tables using Oracle.
- 2) Write SQL queries to manage and retrieve data
- 3) Evaluate SQL analytical functions and operators for data warehouse manipulation
- 4) Apply working of ASQL and Oracle.

Sr.No.	Practical's List	Hrs
1)	Write a query to list first name, last name and their salary for employee contained in the employee's table.	60
2)	Write a query to display all the columns of employee's table.	
3)	Write a query to list first name, last name and their salary for first 10 employee contained in the employee's table.	
4)	Write a query to list the employees name and salary who's? Daily salary is more than \$100.	
5)	Write a query to list the names, salary of all the employees who are working with a commission package.	
6)	Write a query to display three numbers in three columns.	
7)	Write a query to display the result of an arithmetic expression.	
8)	Write a SQL statement to display specific columns like name and commission for all the salesmen.	
9)	Write a SQL statement to find the average purchase amount of all orders.	
10)	Write a SQL statement to make a list with order no, purchase amount, customer name and their cities for those orders which order amount between 500 and 2000.	
11)	Multi-Table Join-Display order number, customer name, salesman name and total amount for every order.	
12)	Subquery in WHERE clause- Find all employees who earn more than the average salary of the entire company.	
13)	Update existing data (UPDATE)-Give a 10% salary increase to all employees in Department 20.	
14)	Handle NULL values- Find all employees who do not receive a commission.	
15)	Unique records (DISTINCT)- Get a list of all unique job titles present in the company.	

Reference Books:

- 1) Murach's Oracle SQL and PLSQL by Joel Murach, Murach and Associates. (Unit I-Unit II) 2002
- 2) Oracle Database 11g PL/SQL Programming Workbook By: Michael Mc Laughlin, John Harper (Unit II-Unit III) 2008
- 3) Oracle PL/SQL Programming Fifth Edition by Steven Feuerstein, Bill 2010
- 4) Kyte, Thomas and Darl Kuhn. Expert Oracle Database Architecture: Oracle Database 9i, 10g and 11g Programming Techniques and Solutions. 3rd ed. Berkeley, CA: Apress, 2014
- 5) Rosenzweig, Benjamin and Elena Silvestrova Rakhimov. Oracle PL/SQL by Example. 5th ed. Boston: Addison-Wesley, 2014.

Evaluation Pattern:**Total Marks: 70****Comprehensive Continuous Evaluation: (30 Marks)**

- Journal - 10 Marks
- Case Study - 10 Marks
- Oral - 5 Marks
- Attendance - 5 Marks

End Semester Examination:(40 Marks)**Attempt any four Questions.**

- Question -1(10 Marks = 1 X 10 = 10 Marks)
- Question -2(10 Marks = 1 X 10 = 10 Marks)
- Question -3(10 Marks = 1 X 10 = 10 Marks)
- Question -4(10 Marks = 1 X 10 = 10 Marks)
- Question -5(10 Marks = 1 X 10 = 10 Marks)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - IV

Type: Practical

Marks: 70

Credits: 2

From: A. Y. 2025-26

Name of the Course and Code: LAB: AI and Python(VS 348)

Practical Batch: 16 Student/Batch

Course Objectives: Student Should be able to...

- 1) Understand the basic concepts of scripting language.
- 2) Learn python data structures like Lists, Tuples etc.
- 3) Study the concept of Functions, Modules and Regular Expression
- 4) Discuss object-oriented programming and exception-handling mechanisms.

Course Outcomes: Student will be able to...

- 1) Demonstrate Python Integrated Development Environments (IDEs).
- 2) Write Python programs using basic syntax, operators and control flow.
- 3) Apply data using built-in Python structures like Lists, Tuples and Dictionaries.
- 4) Implement classes, objects and exception handling

Sr.No.	Practical's List	Hrs
1)	Install and configure Python IDE.	60
2)	Write simple Python program to display message on screen.	
3)	Write simple Python program using operators: a) Arithmetic Operators b) Logical Operators c) Bitwise Operators	
4)	Write simple Python program to demonstrate use of conditional statements: if 'statement b) _if ... else 'statement c) Nested if statement d) while loop ,for 'loop ,Nested loops	
5)	Write a program for demonstration of indentation.	
6)	Write a program in Python to demonstrate classes and object.	
7)	Write a program in Python to demonstrate following operations: a) Simple inheritance b) Multiple inheritance	
8)	Write a Python program to read an entire text file.	
9)	Write a Python program to append text to a file and display the text.	
10)	Write a python program to implement Breadth First Search Traversal.	
11)	Write a Program to Implement Depth First Search using Python.	
12)	Write a program to implement Hangman game using python.	
13)	Write a python program to implement Water Jug Problem.	
14)	Write a Python program to implement Linear Search and Binary Search.	
15)	Write a Python program to perform Matrix Multiplication.	

Reference Books:

- 1) Russell, Stuart J. and Peter Norvig. Artificial Intelligence: A Modern Approach. 4th ed. Hoboken, NJ: Pearson, 2020.
- 2) Géron, Aurélien. Hands-On Machine Learning with Scikit-Learn, Keras and TensorFlow: Concepts, Tools and Techniques to Build Intelligent Systems. 3rd ed. Sebastopol, CA: O'Reilly Media, 2022.
- 3) VanderPlas, Jake. Python Data Science Handbook: Essential Tools for Working with Data. 2nd ed. Sebastopol, CA: O'Reilly Media, 2022.
- 4) Lantz, Brett. Machine Learning with R and Python for Beginners. Birmingham, UK: Packt Publishing, 2023
- 5) Russell Stuart J and Peter Norvig. Artificial Intelligence: A Modern Approach. 4th ed. Boston: Pearson, 2021.

Evaluation Pattern:**Total Marks: 70****Comprehensive Continuous Evaluation: (30 Marks)**

- Journal - 10 Marks
- Case Study - 10 Marks
- Oral - 5 Marks
- Attendance - 5 Marks

End Semester Examination: (40 Marks)**Attempt any 4 questions.**

- Question -1(10 Marks = 1 X 10 = 10 Marks)
- Question -2(10 Marks = 1 X 10 = 10 Marks)
- Question -3(10 Marks = 1 X 10 = 10 Marks)
- Question -4(10 Marks = 1 X 10 = 10 Marks)
- Question -5(10 Marks = 1 X 10 = 10 Marks)



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashvantrao Chavan Institute of Science, Satara

Board of Studies Software Development

Programme: B. Voc. (Soft. Dev.)

Semester - IV

Type: Practical

Marks: 60

Credits: 2

From: A. Y. 2025-26

Name of the Course and Code: LAB: Advanced Java (VS 349)

Practical Batch: 16 Student/Batch

Course Objectives: Student Should be able to...

- 1) Understand the concept of swing.
- 2) Describe the architecture, components and event-handling mechanisms of Java Swing and AWT.
- 3) Learn the Database connectivity using JDBC.
- 4) Gain knowledge about cookies and session.

Course Outcomes: Student will be able to...

- 1) Design and develop desktop GUI applications by applying Swing and AWT components
- 2) Demonstrate web applications using Java Servlets and JDBC.
- 3) Deploy Java Beans. Installing / Starting/ Using BDK
- 4) Analyze JSP Architecture, JSP Access Model.

Sr.No	Practical's List	Hrs
1)	Write a program using label to display message "Welcome to coding Hub"	60
2)	Write a program to select multiple languages known to user	
3)	Write a program to create three buttons with caption OK, RESET, CANCEL.	
4)	Write a java program to create a frame containing three buttons (Yes, No, Close). When button yes or no is pressed, the message "Button Yes/No Pressed" gets displayed in label control. On pressing CLOSE button frame Window gets closed.	
5)	Write a program to display "All the Best" in 5 different colors on screen. (Using AWT/Swing)	
6)	Write a Java program to create a combo box, which includes list of subjects. Display the selected subject in the text field using Swing.	
7)	Write a program to demonstrate concept of border layout	
8)	Write a program to demonstrate concept of grid layout	
9)	Write a program on Servlet JDBC.	
10)	Write a program to create Simple application using JSP.	
11)	Write a Java program to implement Simple Calculator using AWT	
12)	Write a Java program using Swing to create a Login Form	
13)	Write a Java program to demonstrate Flow Layout Manager	
14)	Write a Java program to demonstrate Mouse Event Handling (MouseListener)	
15)	Write a Java program to create a Simple JTable using Swing	

Reference Books:

- 1) Uttam K. Roy, Advanced Java Programming Textbook, 1 January 2018, Dreamtech Press
- 2) Clark Natha, Java: Advanced Features and Programming Techniques Book, 1 January 2014, Dreamtech Press
- 3) Schildt, Herbert. Java: The Complete Reference. 12th ed. New York: McGraw-Hill Education, 2021.
- 4) Horstmann, Cay S. Core Java Volume II—Advanced Features. 11th ed. Boston: Pearson Education, 2019.
- 5) Eckel, Bruce. Thinking in Java. 4th ed. Upper Saddle River, NJ: Prentice Hall, 2006.

Evaluation Pattern:**Total Marks: 60****Comprehensive Continuous Evaluation: (20 Marks)**

- Journal - 5 Marks
- Case Study - 5 Marks
- Oral - 5 Marks
- Attendance - 5 Marks

End Semester Examination: (40 marks)**Attempt any four questions**

- Question -1(10 Marks = 1 X 10 = 10 Marks)
- Question -2(10 Marks = 1 X 10 = 10 Marks)
- Question -3(10 Marks = 1 X 10 = 10 Marks)
- Question -4(10 Marks = 1 X 10 = 10 Marks)
- Question -5 (10 Marks = 1 X 10 = 10 Marks)