

**SARDAR PATEL UNIVERSITY**  
**Bachelor of Vocation (Software Development)**  
**Semester: IV**  
**Syllabus with effect from: June 2022**

| Course Type              | New Course Code      | TITLE   | T/P | Credit | Exam Duration in Hrs | Contact Hrs Per Week  | Component of Marks |               |               | Evaluation Responsibility |
|--------------------------|----------------------|---|-----|--------|----------------------|-----------------------|--------------------|---------------|---------------|---------------------------|
|                          |                      |   |     |        |                      |                       | Internal           | External      | Total         |                           |
|                          |                      |   |     |        |                      |                       | Total/Passing      | Total/Passing | Total/Passing |                           |
| <b>General Component</b> | US04FBVS51           | Fundamental Of Operating System                     | T   | 3      | 3                    | 3                     | 30/12              | 70/28         | 100/40        | University/ College       |
|                          | US04FBVS52           | Operations Research                                 | T   | 3      | 3                    | 3                     | 30/12              | 70/28         | 100/40        | University/ College       |
|                          | US04FBVS53           | Web Development using PHP                           | T   | 3      | 3                    | 3                     | 30/12              | 70/28         | 100/40        | University/ College       |
|                          | US04FBVS54           | Object Oriented Programming with Java               | T   | 3      | 3                    | 3                     | 30/12              | 70/28         | 100/40        | University/ College       |
| <b>Skill Component</b>   | <b>Lab/Practical</b> |   |     |        |                      |                       |                    |               |               |                           |
|                          | US04CBVS51           | Web Development using PHP Practical Lab             | P   | 3      | 3                    | 3                     | 30/12              | 70/28         | 100/40        | University/ College       |
|                          | US04CBVS52           | Object Oriented Programming with Java Practical Lab | P   | 3      | 3                    | 3                     | 30/12              | 70/28         | 100/40        | University/ College       |
|                          | NSQF Level 5         | Web Developer (SSC/Q0503)                           | P   | 12     |                      | 400 hours in Semester |                    |               |               | SSC                       |

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|   |                        |
|---|------------------------|
| <b>Paper Code: US04FBVS51</b>                           | <b>Total Credits:3</b> |
| <b>Title Of Paper:</b> Fundamentals of Operating System |                        |

| <b>Unit</b> | <b>Description in detail</b>   | <b>Weightage (%)</b> |
|-------------|--|----------------------|
| <b>1</b>    | <b>Introduction and Scheduling</b> <ul style="list-style-type: none"> <li>- Introduction to Operating System, Functions of OS</li> <li>- Different types of Operating Systems: Real time, Multi-user, Timesharing</li> <li>- OS Structure – Monolithic, Layered, Virtual Machine, Client-Server</li> <li>- CPU Scheduling: Introduction to process, process control block, process scheduling</li> </ul>   | <b>25%</b>           |
| <b>2</b>    | <b>Memory Management</b> <ul style="list-style-type: none"> <li>- Memory Management: Concept, Basic memory management techniques, Swapping, Virtual Memory System, Demand Paging               <ul style="list-style-type: none"> <li>a) The Optimal Page Replacement Algorithm</li> <li>b) The NRU Page Replacement Algorithm</li> <li>c) The FIFO Page Replacement Algorithm</li> </ul> </li> </ul>  | <b>25%</b>           |
| <b>3</b>    | <b>Process Synchronization, Deadlocks and Introduction to Linux</b> <ul style="list-style-type: none"> <li>- Introduction to Cooperating process</li> <li>- Process Synchronization,</li> <li>- Critical Section Problem</li> <li>- Two process solution, Multiple process solution</li> </ul> <b>Deadlock and characterization</b> <ul style="list-style-type: none"> <li>- Introduction to Linux System &amp; History</li> <li>- Features of Linux</li> </ul> <ul style="list-style-type: none"> <li>- Introduction to File System &amp; Memory Management</li> </ul>  | <b>25%</b>           |
| <b>4</b>    | <b>Basic Linux commands</b> <ul style="list-style-type: none"> <li>- Basic Command-s: login, logout, date, man, pwd, who, whoami, dir, ls, cd, mkdir, rmdir</li> <li>- Use of Wild card characters and introduction to vi editor</li> <li>- Introduction to environment variable like HOME, PATH, PS1</li> <li>- Types of FAP, use of chmod command</li> <li>- Basic commands like cp, mv, rm, rev, file redirection,</li> <li>- grep, cut, paste, find sort commands with example</li> <li>- Introduction to shell script: execution of it, shell script variable, expr, test commands</li> <li>- Control structure: if, if..else, case structure</li> <li>- Iteration: while, for construct, break, continue, exit commands</li> </ul> | <b>25%</b>           |
|             | <b>Practical:</b>  |                      |
|             | The students are required to do Dictation, Narration, Listening Comprehension, Note Making/Note Taking as given by concerned faculty   |                      |

**MAIN REFERENCE BOOKS :**

1. Andrew S. Tanenbaum: Operating System design & Implementation, Prentice Hall International
2. James Peterson and Abraham Silberschatz: Operating System Concept, Addison Wesley
3. Linux Commands Instant reference – Bryan Pfaffenberger, BPB Publication
4. Advanced Linux Programming – Samuel, Techmedia Publications

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|  |                        |
|--|------------------------|
| <b>Paper Code: US04FBVS52</b>              | <b>Total Credits:3</b> |
| <b>Title Of Paper: Operations Research</b> |                        |

| Unit   | Description in detail   | Weightage (%) |
|--|---|---------------|
| <b>1</b>   | <b>Linear Programming Problem (LPP) - I</b> <ul style="list-style-type: none"> <li>- History, meaning and scope of OR</li> <li>- Applications, advantages and limitations of OR</li> <li>- Meaning, Applications and limitationsof LPP</li> <li>- Formulation of LPP</li> </ul>   | <b>25%</b>    |
| <b>2</b>   | <b>Linear Programming Problem- II</b> <ul style="list-style-type: none"> <li>- Methods to determine solution to LPP : Graphical method, Simplex method, Big M method (Simple examples only)</li> </ul>  | <b>25%</b>    |
| <b>3</b>   | <b>Transportation Model and Assignment Model</b> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Mathematical model of Transportation problem</li> <li>- Initial basic feasible solution by North-west corner rule, Least-cost method, Vogel's approximation method.</li> <li>- Introduction to an Assignment Model</li> <li>- Mathematical model of Assignment problem</li> <li>- Solution by Hungarian method</li> </ul> | <b>25%</b>    |
| <b>4</b>   | <b>Sequencing and Network analysis</b> <ul style="list-style-type: none"> <li>- Sequencing problems and applications</li> <li>- Network Analysis : Introduction to CPM and PERT, Rules for Network construction</li> <li>- CPM: Calculations of EST, EFT, LST, LFT and SLACKS (Total float, Free float)</li> </ul>  | <b>25%</b>    |
| <b>Practical:</b>  |   |               |
| The students are required to do Dictation, Narration, Listening Comprehension, Note Making/Note Taking as given by concerned faculty |   |               |

**MAIN REFERENCE BOOKS :**

1. Taha H. A. : Operations Research, Macmillan, New York (1987)
2. Sharma S.D. : Operations Research. Kedar Nath Ram Nath & Co. Meerut , 1988-89.
3. Gillett B. E.: Introduction to Operations Research - a computer oriented algorithmic approach, McGraw-Hill, 1976

**BOOKS FOR ADDITIONAL READING :**

1. Bronson Richard : Operations Research, Schaum's outline Series, 1983.
2. Kapoor V K : Problems and solutions in Operations Research, Sultan Chand & sons, 1996

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|--|------------------------|
| <b>Paper Code: US04CFBVS53</b>                   | <b>Total Credits:3</b> |
| <b>Title Of Paper: Web Development using PHP</b> |                        |

| Unit   | Description in detail   | Weightage (%) |
|--|---|---------------|
| <b>1</b>   | <b>Introduction to PHP and Language basics</b> <ul style="list-style-type: none"> <li>- Intro to PHP for Web Development</li> <li>- History &amp; Future Scope of PHP</li> <li>- Intro to JSP, Advantage of PHP over JSP</li> <li>- Variables, Language Construct, Type Juggling, Deleting a Variable, Operators, Comments, echo, print, conditional statement , Loops (for, while), switch</li> </ul>  | <b>25%</b>    |
| <b>2</b>   | <b>Datatypes, Arrays and Functions</b> <ul style="list-style-type: none"> <li>- What is Datatype, Types of Datatype, Type Casting, Garbage Value</li> <li>- Arrays: What is an Array, Types of Array, print_r(), foreach</li> <li>- Important Built-in functions of array : explode(), implode(), shuffle(), rand(), count(), array_key_exists(), 2 array_reverse(), sort(), ksort(), rsort(), array_push(), array_pop(), array_merge(), array_key_exists(), array_reverse()</li> <li>- Multi-dimensional Arrays</li> <li>- Functions : What is a function?, Types of Function, return statement</li> <li>- How to call a function</li> <li>- Function without parameters, Function with parameters</li> <li>- Static Variable, Difference between Call By Value and Call By Reference.</li> <li>- Important Built-in functions of array : ceil(), floor(), round(), fun_get_args(), fun_num_args().</li> </ul> | <b>25%</b>    |
| <b>3</b>   | <b>Working with forms, regular expressions, session and cookie</b> <ul style="list-style-type: none"> <li>- What is a Form?</li> <li>- Important HTML Tags, Super-Global Variable</li> <li>- Different ways to carry form data (GET, POST) ,isset(), isempty()</li> <li>- Regular Expression: What is Regular Expression?, Important Symbols used in regular expression with explanation, Validations</li> <li>- Session : What is a Session? , Creating a Session, Use of Session, Destroying a Session, Login/Logout</li> <li>- Cookie: What is a Cookie? , Difference between Session &amp; Cookie, Types of Cookie, Creating a Cookie, Fetching value of Cookie, Deleting a Cookie</li> </ul>   | <b>25%</b>    |
| <b>4</b>   | <b>Introduction to MySQL</b> <ul style="list-style-type: none"> <li>- What is a database?, What is SQL Injection?</li> <li>- Different kinds of Datatypes used in MySQL</li> <li>- Connecting PHP with MySQL</li> <li>- Creating a Database, Creating a Table-Insert, update, delete, select</li> <li>- Truncate, alter, drop, grant, revoke, commit, rollback, rename</li> </ul>   | <b>25%</b>    |
| <b>Practical:</b>  |   |               |
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**Reference Books:**

1. Beginning PHP5
- 2, PHP Bible, 3, Professional PHP5, 4, PHP Manual

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| <b>Paper Code: US04FBVS54</b>                                | <b>Total Credits:3</b> |
| <b>Title Of Paper:</b> Object Oriented Programming with Java |                        |

| Uni      | Description in detail  | Weightage (%) |
|----------|--|---------------|
| <b>1</b> | <b>Introduction</b> <ul style="list-style-type: none"> <li>- History of Java, features, the Java environment, the Java Virtual Machine (JVM)</li> <li>- Structure of a Java program, a simple Java program, implementing a Java program</li> <li>- Tokens, comments, constants, variables and data types</li> <li>- Scope of variables, type casting</li> <li>- Operators: arithmetic, relational, logical, assignment, increment/decrement, conditional, ternary operator &amp; special operators</li> <li>- Decision making: if statement, if...else statement, nesting of if...else, the else if ladder, switch statement</li> <li>- Looping: while, do...while, for, for each loop jumps in loops, labeled loops</li> <li>- Arrays: one, two dimensional arrays</li> </ul> | <b>25%</b>    |
| <b>2</b> | <b>Classes, Objects, Interfaces and Inheritance</b> <ul style="list-style-type: none"> <li>- Defining a class, members of a class: variables and methods, creating objects, constructors, accessing class members</li> <li>- Static members v/s instance members</li> <li>- Introduction to inheritance, <i>super</i> keyword</li> <li>- Interfaces: introduction</li> <li>- Final variables, methods and classes, abstract methods and classes</li> <li>- Introduction to method overloading and overriding</li> </ul>  | <b>25%</b>    |
| <b>3</b> | <b>Exception Handling, I/O Management and Packages</b> <ul style="list-style-type: none"> <li>- Managing errors &amp; exceptions: introduction, types of errors, exceptions syntax of exception handling construct, multiple catch statements, the finally clause, defining and throwing user-defined exceptions, the throw statement</li> <li>- Managing I/O files : introduction, concept of streams, Character stream classes</li> <li>- Introduction to the concept of package, Java API packages, using the System package</li> <li>- Using java.lang (String, Math)</li> </ul>   | <b>25%</b>    |

|  |  |            |
|--|--|------------|
| 4  | <b>Applet Programming and JDBC</b> <ul style="list-style-type: none"> <li>- Applet architecture and skeleton</li> <li>- java.awt package (Button, CheckBox, CheckBoxGroup, Choice, Color, Label, List, TextArea, TextField)</li> <li>- HTML applet tag, display techniques (DrawString, Lines, Rectangle, Ellipses, Circles, Arcs, Polygons, Color)</li> <li>- Introduction to event handling</li> <li>- Introduction to JDBC, types of drivers</li> <li>- java.sql package</li> <li>- Retrieving, inserting, deleting and updating data through Java</li> </ul> | <b>25%</b> |
| <b>Practical:</b>  |  |            |
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**MAIN REFERENCE BOOKS :**

1. Programming with Java- A Primer by E. Balaguruswami, 3<sup>rd</sup> Edition, TMH Publication
2. The Complete Reference –Java 2 7<sup>th</sup> Edition Herbert Schildt. TMH Publication

**BOOKS FOR ADDITIONAL READING :**

1. Saba Zame , Handbook of Object technology, CRC Press, Washington DC, 1999
2. Mary Campion and Kathy Walrath, Java tutorial, Second Edition, Addison Wesley Pun. 1998.
3. Java 2 Programming Black Book, Steven Holzner

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| <b>Paper Code: Code: US04CBVS51</b>                            | <b>Total Credits:3</b> |
| <b>Title Of Paper:</b> Web Development using PHP Practical Lab |                        |

| <b>Part</b> | <b>Description in detail</b>   | <b>Weightage (%)</b> |
|-------------|--|----------------------|
| <b>1</b>    | <ul style="list-style-type: none"><li>• Practical based on Web Development using PHP Practical Lab</li></ul> | <b>100%</b>          |

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| <b>Paper Code: Code: US04CBVS52</b>  | <b>Total Credits:3</b> |
| <b>Title Of Paper:</b> Object Oriented Programming with Java Practical Lab |                        |

| <b>Part</b> | <b>Description in detail</b>   | <b>Weightage (%)</b> |
|-------------|--|----------------------|
| <b>1</b>    | <ul style="list-style-type: none"><li>• Practical based on Object Oriented Programming with Java</li></ul> | <b>70%</b>           |