

**GOVT. POLYTECHNIC, HAMIRPUR (H.P.)**  
**Lesson Planning and Coverage**

**Branch:** Computer Engineering

**Semester:** 5<sup>th</sup>

**Subject:** OOP using Java

**Course Code:** COPE301-III

**Session:** August 2025

**Teacher:** Indu Bala

**Laboratory:** Yes

Sr. No.	No of Lectures	Chapter/Unit Description	Detailed contents	Reference Resources	Remarks
1	10	OOPs Concepts and Java programming Overview	Procedure-oriented programming vs object-oriented programming (OOP), advantages of object-oriented programming, concept of objects and classes, Essential characteristics of OOP languages – data abstraction, encapsulation, inheritance, polymorphism, dynamic binding. Brief history of Java, features of Java language, Java programming terminology – JVM, JRE, JDK, JNI, WORA, Java compiler, Java interpreter, source code, bytecode, coding conventions.	R1,R2,R3	
2	10	Fundamentals of Java Programming	Structure of a typical Java program, comments – single-line, multi-line and documentation; role of main() method, Java tokens – identifiers, operators, keywords, constants, strings, special symbols; Java statements, variables – local, instance and static; scope and lifetime of variables, data types, literals, Console based IO using System.in and System.out objects, Operators - Arithmetic, Logical, Relational, Bit-wise, Assignment and Conditional Operators, Special Operators, Operator precedence and associativity.	R1,R2,R3	
3	8	Control Statements	Selection control structures – if, if...else, if...else if ladder, nested if, switch...case; Looping control structures – while loop, do...while loop, for loop, for each loop; Jump statements – break, labelled break, continue, return.	R1,R2,R3	
4	10	Object-oriented Programming in Java	Basic OOP concepts – class, instance variables, methods, object, constructor; creating objects, static members, final variables and methods, final classes, garbage collection, finalizer method, packages, access modifiers, wrapper classes, Compile time versus runtime polymorphism, method overloading, inheritance, method overriding, abstract methods, abstract class, multiple inheritance using interfaces.	R1,R2,R3	
5	10	Arrays, Strings and Exception Handling	Array definition, one dimensional array – declaring, initializing and accessing its elements; Multi-dimensional arrays, String, string literals, escape sequences, String methods – charAt(), indexOf(),	R1,R2,R3	

			length(), substring(), toLowerCase(), toUpperCase(), replace(), trim(). Concept of exceptions, checked and unchecked exceptions, built-in exceptions, implementing exception handling – try, catch and finally blocks, using multiple catch statements, user-defined exceptions, throw and throws statements		
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**References:**

1. Programming with Java: A Primer by E. Balaguruswamy, Tata McGraw Hill Publication
2. Java How to Program by Paul Deitel, Harvey Deitel, Pearson Education
3. Java, the Complete Reference by Herbert Schildt, McGraw-Hill Education

**COURSE OUTCOMES:**

**After completing this course students will be able to:**

**CO 1** Use the syntax and semantics of java programming language and basic concepts of OOP.

**CO 2** Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.

**CO 3** Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.

**CO 4** Use java standard API library to write complex programs

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**GOVT. POLYTECHNIC, HAMIRPUR (H.P.)**  
**Practical Planning**

**Branch:** Civil Engineering

**Semester:** 1<sup>st</sup>

**Subject:** OOP using Java Lab

**Course Code:** COPE305-III

**Session:** August 2025

**Teacher:** Indu Bala

**Laboratory:** OSL

Sr. No.	No of Practical hours planned	Aim of the Practical	Reference for Procedure/ Writeup	Remarks
1	6	a) To install and configure JDK on a Windows/ Linux based computer system. b) To display a simple message like "Hello Java !" on the computer monitor.	R1,R2	
2	4	To demonstrate the use of various operators	R1,R2	
3	12	To demonstrate the use of different control statements: a) To display the grade of a student based on the marks obtained using 'if...else if' ladder. b) To compute the factorial of a given number using while loop. c) To implement a menu-driven calculator using do...while and switch...case statements. d) To determine the largest element in a 1-dimensional array using 'for each' loop. e) To compute the sum of two matrices using nested for loops.	R1,R2	
4	10	a) To define a class and create its objects. b) To demonstrate the use of constructor and finalizer methods of a class. c) To create a hierarchy of packages.	R1,R2	
5	6	a) To inherit new classes from existing Java classes. b) To demonstrate the use of different access modifiers.	R1,R2	
6	6	a) To demonstrate method overloading. b) To demonstrate method overriding.	R1,R2	
7	6	a) To demonstrate the use of abstract methods and abstract classes b) To demonstrate the use of multiple inheritance using interfaces.	R1,R2	
8	12	a) To demonstrate the use of arrays. b) To demonstrate the use of various string functions. c) To demonstrate the exception handling mechanism of Java.	R1,R2	

**References:**

R1: Lab Manual

R2: /www.w3schools.com/java

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**GOVT. POLYTECHNIC, HAMIRPUR (H.P.)**  
**Lesson Planning and Coverage**

**Branch:** Computer Engineering

**Semester:** 5th

**Subject:** Renewable Energy Technologies

**Session:** Aug -Dec 2025

**Teacher:** Ritesh Avasthi

**Laboratory:** No

Sr. No.	No of Lectures	Chapter/Unit Description	Detailed contents	Reference Resources	Remarks
1	12	UNIT 1: Introduction	World Energy Use; Reserves of Energy Resources; Environmental Aspects of Energy Utilization; Renewable Energy Scenario in India and around the World; Potentials; Achievements/Applications; economics of renewable energy systems.	R1,R2	
2	13	UNIT 2: Solar energy	Solar Radiation; Measurements of Solar Radiation; Flat Plate and Concentrating Collectors; Solar direct Thermal Applications; Solar thermal Power Generation; Fundamentals of Solar Photo Voltaic Conversion; Solar Cells; Solar PV Power Generation; Solar PV Applications.	R1,R2	
3	13	UNIT 3: Wind Energy	Wind Data and Energy Estimation; Types of Wind Energy Systems; Performance; Site Selection; Details of Wind Turbine Generator; Safety and Environmental Aspects.	R1,R2	
4	13	UNIT 4: Bio-Energy	Biomass direct combustion; Biomass gasifiers; Biogas plants; Digesters; Ethanol production; Biodiesel; Cogeneration; Biomass Applications.	R1,R2	
5	13	UNIT 5: Other Renewable Energy Sources	Tidal energy; Wave Energy; Open and Closed OTEC Cycles; Small Hydro-Geothermal Energy; Hydrogen and Storage; Fuel Cell Systems; Hybrid Systems.	R1,R2	

**References:**

R1. O.P. Gupta, Energy Technology, Khanna Publishing House, Delhi.

R2. Online resources.

**COURSE OUTCOMES:**

**After completing this course students will be able to:**

CO1: Understand present and future energy scenario of the world.

CO2: Understand various methods of solar energy harvesting.

CO3: Identify various wind energy systems.

CO4: Evaluate appropriate methods for Bio-energy generations from various Bio-wastes.

CO5: Identify suitable energy sources for allocation.

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**GOVT. POLYTECHNIC, HAMIRPUR (H.P.)**  
**Lesson Planning and Coverage**

**Branch:** Computer Engineering

**Semester:** 5th

**Subject:** Introduction to e - Governance

**Session:** Aug-Dec 2025

**Teacher:** Mukesh Bhardwaj

**Laboratory:** No

Sr. No.	No of Lectures	Chapter/ Unit Description	Detailed contents	Reference Resources	Remarks
1	12		Exposure to emerging trends in ICT for development; Understanding of design and implementation of e-Government projects, e-governance lifecycle.	R1, R2	
2	12		Need for Government Process Re-engineering (GPR); National e-Governance Plan(NeGP) for India; SMART Governments & Thumb Rules.	R1, R2	
3	16		Architecture and models of e-Governance, including Public Private Partnership (PPP); Need for Innovation and Change Management in eGovernance; Critical Success Factors; Major issue including corruption, resistance for change, e-Security and Cyber laws.	R1, R2	
4	16		Focusing on Indian initiatives and their impact on citizens; Sharing of case studies to highlight best practices in managing e-Governance projects in Indian context. Visits to local e-governance sites (CSC, eSeva, Post Office, Passport Seva Kendra, etc) as part of Tutorials.	R1, R2,R3	
5	8		Mini Projects by students in groups - primarily evaluation of various e-governance project	R1, R2,R3	

**References:**

R1: e-Government -The Science of the Possible. J Satyanarayana, Prentice Hall, India

R2: <https://negd.gov.in>

R3: <https://www.nisg.org/case-studies-on-e-governance-in-india>

**COURSE OUTCOMES:**

After completing this course students will be able to:

CO-1 Understand the different models of E-governance.

CO-2 Describe the e-governance projects at Union and State Govt. level.

CO-3 Understand the benefits and reasons for the introduction of e-

CO-4 governance at the local level.  
Realize the issues and challenges of e-governance.

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## Govt. Polytechnic Hamirpur (H.P.)

### Activities Planning

**Branch :** Computer Engineering

**Semester:** 5<sup>th</sup>

**Subject :** SCA

**Session:** Aug. - Dec. 2025

**Teacher:** Ekta Sharma

<b>Sr. No.</b>	<b>Periods</b>	<b>Description of Activities</b>	<b>Remarks</b>
1.	4	Newspaper reading	
2.	4	Quiz Competition	
3.	4	Group Discussion	
4.	10	Sports activity	
5.	6	Cleanliness of Lab/ Class Room	
6.	4	Dumb Charades/ Antakshri	

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**GOVT.POLYTECHNIC,HAMIRPUR(H.P.)****Lesson Planning****Branch:** Computer Engineering**Semester:**5<sup>th</sup>**Subject:** Software Engineering**Session:** Aug2025**Laboratory:**No

Teacher:VirenderThakur

<b>Sr.No.</b>	<b>No of Lectures</b>	<b>Chapter/Unit Description</b>	<b>Detailedcontents</b>	<b>Reference Resources</b>	<b>Remarks</b>
1	10 Hours	Introduction to Software Engineering	<b>Unit1:</b> . Software Definition, Software Characteristics, Software Crisis, Attributes of Good Software, Program Versus Product, Exploratory Style of Software Development, Shortcomings, Software Engineering, Software Development Life Cycle, Software Process Framework, Framework Activities - Communication, Planning, Modeling, Construction, and Deployment; Software Application Domains - System Software, Application Software, Scientific/ Engineering Software, Embedded Software, Web Applications.	R1,R2,R3	
2	10 Hours	Software Life Cycle Models	<b>Unit2:</b> Classical Models - Waterfall Model, Iterative Waterfall Model, V-Model, Prototyping Model, Incremental Model, Evolutionary Model; Rapid Application Development (RAD), Agile Development Models - Extreme Programming, Scrum, Lean; Spiral Model.	R1,R2,R3	
3	12 Hours	Software Project Management	<b>Unit3:</b> : Software Project Manager - Skills and Responsibilities; Project Planning – Sliding Window Planning, SPMP Project Planning; Project Size Estimation - Lines of Code, Function Point, Project Estimation Techniques - Empirical, Heuristic and Analytical Estimation Techniques; Expert Judgment, P	R1,R2,R3	

4	10 Hours	: Requirement Analysis and Specifications	<b>Unit4:</b> Requirements Gathering, Requirement Elicitation Techniques: Interviews, Surveys, Questionnaires, Brainstorming; Requirements Analysis, Software Requirements Specification (SRS) - Role of SRS Characteristics of SRS Document, Functional and Non-functional Requirements, Traceability.	R1,R2,R4	
5	10 Hours	Software Design ...	<b>Unit5:</b> Overview of the Design Process, Outcome of the Design Process, Abstraction, Design Pattern, Refactoring, Classification of Design Methodologies, Cohesion and Coupling, Software Design Approaches - Function-oriented, Object-oriented; User Interface Design, User Experience.	R1,R2,R4	
6	10 Hours	Coding and Testing...	<b>Unit6:</b> Software Coding, Coding Standards, Code Review - Code Walkthrough, Code Inspection, Software Documentation, Internal and External Documentation, Software Testing : Testing activities, Unit, Integration, System and Acceptance Testing, Black Box and White Box Testing.	R1,R2,R4	

### Reference Books:

1. "1. Fundamentals of Software Engineering , By Rajib Mall, PHI. 2. Software Engineering by Pankaj Jalote, Narosa, Publication. 3. Software Engineering, Schaum's Outline Series, TMH Publication. 4. Software Engineering : A Practitioner's Approach, By Roger Pressman. 5. NPTEL course on Software Engineering.(www.nptel.ac.in).

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**GOVT. POLYTECHNIC, HAMIRPUR (H.P.)**  
**Lesson Planning and Coverage**

**Branch:** Computer Engineering

**Semester:** 4<sup>th</sup>

**Subject:** Web Programming

**Session:** Aug 2025

**Teacher:** Vikas Soni

**Laboratory:** Yes

Sr. No.	No of Lectures	Chapter/Unit Description	Detailed contents	Reference Resources	Remarks
1	08	Unit-1: Dynamic Websites	Review of HTML5, CSS and JavaScript; HTTP, HTTP Request, HTTP Response, Working of a Web Server, Static Websites, Dynamic Websites, Web Applications, Form Data Submission Methods - GET and POST, HTTP Sessions, HTTP Cookies.	R1, R2	
2	10	Unit-2 : : Introduction to PHP	Origin of PHP, Advantages of PHP, Embedding PHP Code in Webpages, LAMP Stack, Install and Configure PHP Environment, PHP Syntax, Comments, Variables, Naming Variables, Variable Scope, Constants, echo statement, PHP Data Types, String Literals - Single and Double Quoted Strings, PHP Operators, PHP Control Statements, PHP Arrays.	R1, R2	
3	08	Unit-3 : PHP Functions	PHP Standard Library Functions: String Functions - htmlspecialchars(), ltrim(), rtrim(), trim(), strtoupper(), strtolower(), explode(), implode(), strlen(), strcmp(), strpos(); Math Functions – sqrt(), ceil(), floor(), log(), pow(), sin(), cos(), tan(); User-defined Functions.	R1, R2	
4	10	Unit-4 : : PHP Form Processing	HTML Form Element, action and method Attributes, submit and clear Buttons, Form Elements, name and id attributes, Hidden Input, Client-side Form Validation, PHP Superglobals - \$_GLOBALS, \$_SERVER, \$_REQUEST, \$_POST, \$_GET, \$_FILES, \$_ENV, \$_COOKIE, \$_SESSION; Serverside Validation, Handling Uploaded Files.	R1, R2	
5	12	Unit-5 : Using MySQL Database with PHP	Basic Database Concepts - Database, Table, Column, keys & Constraints, Connecting PHP to MySQL, Executing Simple SQL Statements -INSERT, UPDATE, DELETE and SELECT, Retrieving and Processing Query Results, mysqli_real_escape_string() function, Handling MySQL errors.	R1, R2	

**References:**

R1: PHP & MySQL by Joel Murach and Ray Harris, Mike Murach & Asso. Inc.

R2: PHP and MySQL Web Development by Luke Welling and Laura Thomson, Addison-Wesley Books.

**COURSE OUTCOMES:**

**After completing this course students will be able to:**

CO 1 Analyze the basic structure of a web application.

CO 2 Distinguish between static and dynamic websites.

CO 3 Understand the components of the LAMP stack.

CO 4 Develop dynamic websites using LAMP stack.

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**Govt. Polytechnic Hamirpur (H.P.)**  
**Practical Planning & Coverage**

Branch : **Computer Engg.**

Semester: **5th**

Subject : **Web Programming**

Session: **Aug-2025**

Teacher : **Vikas Soni**

<b>Pract. No.</b>	<b>Description of Practical</b>	<b>Reference for Procedure/ Writeup</b>	<b>Likely Dates</b>	<b>Actual Dates</b>	<b>Signature</b>
1.	1 To setup PHP development environment: To Install and Configure PHP Environment (LAMP/XAMP server) on Windows/ Linux. To embed PHP code into a web page.	Lab Manual			
2.	To implement basics of PHP: To demonstrate the use of php operators To demonstrate the use of php control statements. To demonstrate the use of php in-built functions. To demonstrate the use of php user defined functions.	Lab Manual			
3.	To implement basics of PHP: To demonstrate the use of php operators To demonstrate the use of php control statements. To demonstrate the use of php in-built functions. To demonstrate the use of php user defined functions.	Lab Manual			
4.	To implement session and cookie management in PHP.	Lab Manual			
5.	To demonstrate database access through PHP.	Lab Manual			
6.	Implement a PHP Project.	Lab Manual			

Signature of Teacher

Signature of H.O.D.