

**Government Polytechnic, Pune**  
(An Autonomous Institute of Government of Maharashtra)

**Department of Computer Engineering**

# **Level V - A Curriculum**

## **Diversified Courses**



# Government Polytechnic, Pune

## '180OB' – Scheme

Programme Name	<b>Diploma in Computer Engineering, Diploma in Information Technology</b>
Programme Code	01/02/03/04/05/06/07/08/16/17/21/22/23/24/26
Course Title	<b>Programming with PYTHON</b>
Course Code	<b>CM5101</b>
Prerequisite course code and name	NA
Class Declaration	<b>YES</b>

### 1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)				Total Credits (L+T+P)	Examination Scheme				Total Marks	
					Theory Marks		Practical Marks			
L	T	P	C		#ESE	PA	*ESE	PA		
					Marks	40	10	50	50	150
02	00	04	06		Exam Duration	2 Hrs.	1/2Hr.			

*Legends: L- Lecture, P- Practical, T- Tutorial, C- Credit, ESE-End Semester Examination, PA- Progressive Assessment (Test I, II/Term Work), \*- Practical Exam, \$- Oral Exam, #- Online Examination each Lecture/Practical period is of one clock hour.*

### 2. RATIONALE

Python is powerful programming language. It has efficient high level data structures and a simple but effective approach to object-oriented programming. Python code is simple, short, readable, intuitive and powerful and thus it is effective for introducing computing and problem solving for beginners. Its elegant syntax and dynamic typing together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.

### 3. COMPETENCY

The aim of this course is to attend following industry identified competency through various teaching learning experiences:

- **Develop applications using Python programming to solve given problems.**

### 4. COURSE OUTCOMES(COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

1. Develop simple Python programs using Python IDE.
2. Execute programs using operators and control flow statements.
3. Perform Operations using Python Data structures.
4. Develop applications using Functions, Modules and Packages.
5. Develop applications using object-oriented concepts in python.
6. Write Python code for File and Exception Handling.

## 5. SUGGESTED PRACTICALS/ EXERCISES

Sr. No	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
1.	1	Install and configure python IDE.	1	01
2.	1	Write simple Python Program to display message on screen.	1	01
3.	2	Write simple Python Program using operators: <ul style="list-style-type: none"> <li>• Arithmetic Operators</li> <li>• Logical Operators</li> <li>• Bitwise Operators</li> </ul>	2	02
4.	2	Write simple Python Program to demonstrate use of conditional statements: <ul style="list-style-type: none"> <li>• 'if' Statement</li> <li>• 'if...else' Statement</li> <li>• Nested 'if' Statement</li> </ul>	2	02
5.	2	Write Python Program to demonstrate use of looping statements: <ul style="list-style-type: none"> <li>• 'while' loop</li> <li>• 'for' loop</li> <li>• Nested loops</li> </ul>	2	04
6.	2	Write Python Program to demonstrate use of looping statements: <ul style="list-style-type: none"> <li>• continue</li> <li>• pass</li> <li>• break</li> </ul>	2	04
7.	3	Write Python Program to perform following operations on Lists: <ul style="list-style-type: none"> <li>• Create List</li> <li>• Access List</li> <li>• Update List (Add Item, Remove Item)</li> <li>• Delete List</li> </ul>	3	04
8.	3	Write Python Program to perform following operations on Tuples: <ul style="list-style-type: none"> <li>• Create Tuple</li> <li>• Access Tuple</li> <li>• Update Tuple</li> <li>• Delete Tuple</li> </ul>	3	04
9.	3	Write Python Program to perform following operations on Set: <ul style="list-style-type: none"> <li>• Create Set</li> <li>• Access Set elements</li> <li>• Update Set</li> <li>• Delete Set</li> </ul>	3	04

Sr. No	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
10.	3	Write Python Program to perform following operations on Dictionaries: <ul style="list-style-type: none"> <li>• Create Dictionary</li> <li>• Access Dictionary elements</li> <li>• Update Dictionary</li> <li>• Delete Dictionary</li> <li>• Looping through Dictionary</li> </ul>	3	04
11.	4	i. Write Python Program to demonstrate math built-in functions (Any 2 Programs) ii. Write Python Program to demonstrate string built-in functions (Any 2 Programs)	4	04
12.	4	Develop user defined python function for given problem: <ul style="list-style-type: none"> <li>• Function with minimum 2 arguments</li> <li>• Function returning values</li> </ul>	4	04
13.	4	Write Python Program to demonstrate use of: <ul style="list-style-type: none"> <li>• Built-in module (e.g., Keyword, math, number, operator)</li> <li>• User defined module</li> </ul>	4	04
14.	4	Write Python Program to demonstrate use of: <ul style="list-style-type: none"> <li>• Built-in packages (e.g., NumPy, Pandas)</li> <li>• User defined packages</li> </ul>	4	04
15.	5	Write Python Program to demonstrate following operations: <ul style="list-style-type: none"> <li>• Method overloading</li> <li>• Method overriding</li> </ul>	5	02
16.	5	Write Python Program to demonstrate following operations: <ul style="list-style-type: none"> <li>• Simple Inheritance</li> <li>• Multiple Inheritance</li> </ul>	5	04
17.		Write Python Program to demonstrate File Handling through: <ul style="list-style-type: none"> <li>• Opening file in different modes</li> <li>• Accessing file</li> <li>• Reading and Writing file</li> <li>• Closing file</li> <li>• Renaming and Deleting file</li> </ul>	6	04
18.	6	Write Python Program to handle user defined exception for given problem.	6	04
19	All	Micro-project (Refer point 11 for micro project list)	All COs	04
		<b>Total Hours</b>		<b>64</b>

Sr. No.	Performance Indicators	Weightage in %
a.	Use of Appropriate tool to solve the problem (Process)	40
b.	Quality of output achieved (Product)	30
c.	Complete the practical in stipulated time	10
d.	Observations and Recording	10
e.	Answer to sample questions	10
<b>Total</b>		<b>100</b>

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practical, as well as aid to procure equipment by authorities concerned.

Sr. No.	Equipment Name / Instruments required	Experiment Sr. No.
1	Hardware: Personal computer Pentium IV, 2 GHz minimum (i3-i5 preferable), RAM minimum 2 GB.	For all experiments
2	Any open-source tool (SPYDER / Eclipse IDE), Python Interpreter	

## 7. THEORY COMPONENTS

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
<b>SECTION I</b>	
<b>UNIT 1. Introduction to Python Programming (Weightage-04, Hrs.- 04)</b>	
1a. Explain features of Python. 1b. Identify the given variables, keywords and constants in python.	1.1 Features of Python-Interactive, Object Oriented, Interpreted, Platform independent. 1.2 Python Building blocks- Identifiers, Keywords, Indention, variables, comments. 1.3 Python Environment Setup- Installation and working of IDE.
1c. Use Indention, Comments in the given program. 1d. Install the Python IDE and editor. 1e. Write the python program to display the given text.	1.4 Running Simple Python scripts to display message. 1.5 Python Data Types: Numbers, Strings, Tuples, Lists, Dictionary, Declaration and use of data types.
<b>UNIT 2. Python Operators and Control Flow (Weightage-06, Hrs.- 04)</b>	

<b>Unit Outcomes (UOs)</b> (in cognitive domain)	<b>Topics and Sub-topics</b>
2a. Write simple Python program for the given arithmetic expressions. 2b. Write a Python program using decision making structure for two- way/multi-way branching to solve the given problem.	2.1 Basic Operators: Arithmetic, Comparison/ Relational, Assignment, Logical, Bitwise, Membership, Identity Operators. Python Operator precedence. 2.2 Control Flow. 2.3 Conditional Statements (if, if...else, nested if). 2.4 Looping in Python (While loop, for loop, nested loops). 2.5 Loop manipulation using continue, pass, break, else.
<b>UNIT 3. Data Structures in Python (Weightage-10, Hrs.- 08)</b>	
3a. Write python program to use and manipulate lists for the given problem. 3b. Write python program to use and manipulate Tuples for the given problem. 3c. Write python program to use and manipulate Sets for the given problem. 3d. Write python program to use and manipulate Dictionaries for the given problem.	3.1 Lists: Defining Lists, accessing values in list, deleting values from list, updating lists. Basic List Operations, Built-in List Functions. 3.2 Tuples: Accessing values in Tuples, deleting values from. Tuple and updating Tuples. Basic Tuple operations, Built- in Tuple Functions. 3.3 Sets: Accessing values in Set, deleting values from Set and updating Sets. Basic Set operations, Built-in Set Functions. 3.4 Dictionaries: Accessing values in Dictionary, deleting Values from Dictionary and updating Dictionary. Basic Dictionary operations, Built-in Dictionary Functions.
<b>SECTION II</b>	
<b>UNIT 4. Python Functions, Modules and Packages (Weightage-08, Hrs.- 06)</b>	
4a. Use the Python standard functions for the given problem. 4b. Develop relevant user defined functions for the given problem. 4c. Write Python module for the given problem. 4d. Write Python Package for the given problem.	4.1 Use of Python built-in functions (e.g., type/data conversion functions, math function setc.). 4.2 User defined functions: Function definition, Function calling, function arguments and parameter passing, return statement, scope of variable: Global variable and Local variable. 4.3 Modules: Writing modules, importing modules, importing objects from modules, python built-in modules, (e.g. Numeric and mathematical module, Functional programming module), Namespace and Scoping. 4.4 Python Packages: Introduction, Writing Python Packages, using standard (e.g., math, scipy, Numpy, matplotlib, pantalets.) and user defined Packages.
<b>UNIT 5. Object Oriented Programming in Python (Weightage-06, Hrs.- 04)</b>	
5a. Create Classes and Objects to solve the given problem. 5b. Write Python code for data hiding for the given problem.	5.1 Creating Classes and Objects. 5.2 Method Overloading and Overriding. 5.3 Data Hiding. 5.4 Data Abstraction.

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
5c. Write Python code using data abstraction for the given problem. 5d. Write Python program using inheritance for the given problem.	5.5 Inheritance and Composition Classes. 5.6 Customization vi inheritance specializing inherited methods.
<b>UNIT 6. File and Exception Handling (Weightage-06, Hrs.- 06)</b>	
6a. Write Python code for the given reading values from keyboard. 6b. Read data from the given file. 6c. Write the given data to a file. 6d. Handle the given exceptions through python program.	6.1 I/O operations: Reading keyboard input, printing to screen. 6.2 File Handling: Opening file in different modes, accessing file contents using standard library functions, reading and writing files, closing files renaming and deleting files. 6.3 Exception Handling: Introduction, 'try: except:' statement, 'raise' statement, user defined exceptions.

### 8. SUGGESTED SPECIFICATION TABLE FORQUESTION PAPERDESIGN

Unit No	Unit Title	Teaching Hrs.	Distribution of Theory Marks			
			R Level	U Level	A Levels	Total Marks
<b>Section I</b>						
I	Introduction to Python Programming	04	02	02	00	<b>04</b>
II	Python Operators and Control Flow	04	00	02	04	<b>06</b>
III	Data Structures in Python	08	02	04	04	<b>10</b>
<b>Total</b>		<b>16</b>	<b>04</b>	<b>08</b>	<b>08</b>	<b>20</b>
<b>Section II</b>						
IV	Python Functions, Modules and Packages	06	02	02	04	<b>08</b>
V	Object Oriented Programming in Python	04	00	02	04	<b>06</b>
VI	File and Exception Handling	06	00	02	04	<b>06</b>
<b>Total</b>		<b>16</b>	<b>02</b>	<b>06</b>	<b>12</b>	<b>20</b>
<b>Grand Total</b>		<b>32</b>	<b>06</b>	<b>14</b>	<b>20</b>	<b>40</b>



## 9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Prepare journal based on practical performed in laboratory.
- b. Follow Coding Standards.
- c. Undertake micro-projects.
- d. Develop variety of programs to improve logical skills.
- e. Develop Application oriented real world programs.

## 10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- b. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- c. With respect to item No.9, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- d. Use different Audio-Visual media for Concept understanding.
- e. Guide student(s) in undertaking micro-projects.
- f. Demonstrate students thoroughly before they start doing the practice.
- g. Observe continuously and monitor the performance of students in Lab.

## 11. SUGGESTED MICRO-PROJECTS

**Only one micro-project** is planned to be undertaken by a student that needs to be assigned to him/her. In special situations where groups have to be formed for micro-projects, the number of students in the group should **not exceed three**. The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. (Affective Domain Outcomes). Each student will have to maintain activity chart consisting of individual contribution in the project work and give a seminar presentation of it before submission. The student ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

- a. Create an English Dictionary which is able to perform following function
  - Add a word and its meaning.
  - Delete a word and its meaning.
  - Update a word and its meaning.
  - Print list of word and its meaning.
- b. Create Finance Currency calculator using classes and objects.
- c. Develop a game (Hangman, Tick Toe, Snake etc.) using Python data structure,

- functions and packages.
- d. Develop Calculator.
  - e. Develop Alarm clock.
  - f. Develop Music player.

## 12. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publisher, Edition, Year of publication, ISBN Number
1	Python Programming	K. Nageswara Rao, Shaikh Akbar	Scitech Publications (India) Pvt. Ltd. • ISBN:9789385983450
2	Learning Python	Mark Lutz	O'Reilly Publication, 5 <sup>th</sup> Edition • ISBN13:9781449355739
3	Python Essential Reference	David Beazley	Addison-Wesley Professional 4 <sup>th</sup> Edition • ISBN:9780672329784
4	Head First Python	Paul, Barry	O'Reilly Publication, 2 <sup>nd</sup> Edition • ISBN: 1491919531

## 13. SOFTWARE/LEARNING WEBSITES

- a. <https://www.tutorialspoint.com/python/index.htm>
- b. [nptel.ac.in/courses/117106113/34](https://nptel.ac.in/courses/117106113/34)
- c. <https://www.w3schools.com/python/default.asp>
- d. <https://www.programiz.com/python-programming>
- e. <http://spoken-tutorial.org/>
- f. <https://docs.python.org/3/tutorial/>
- g. <https://www.w3resource.com/python-exercises/>
- h. <https://anandology.com/python-practice-book/>

## 14. PO – COMPETENCY CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	2	-	-	1
CO2	2	2	2	3	-	-	1
CO3	2	2	3	3	-	-	2
CO4	2	2	3	3	-	1	3
CO5	2	2	3	3	-	2	2
CO6	2	2	3	2	-	2	3

	PSO1	PSO2
CO1	-	3
CO2	-	3
CO3	-	3
CO4	-	3
CO5	-	3
CO6	-	3

Sign:  Name: 1. Smt S.P.Panchakshari 2. Smt H F Khan 3. Smt A M Galshetwar 4. Smt A B Bhusagare 5. Smt S.A.Ade (CourseExperts)	Sign:  Name: Mr. U.V. Kokate Dr. S.B.Nikam (Head of Department) ( Department of Computer Engineering)
Sign:  Name: Mr. U.V. Kokate Dr. S.B.Nikam (Programme Head) (Department of Computer Engineering)	Sign:  Name: Mr. A.S. Zanpure (CDC In-charge)



# Government Polytechnic, Pune

'180 OB' – Scheme

Programme	<b>Diploma in Computer Engineering, Diploma in Information Technology</b>
Programme code	01/02/03/04/05/ <b>06/07</b> /08/15/16/17/18/19/21/22/23/24/ <b>26</b>
Name of Course	<b>Server-Side Scripting Using JSP</b>
Course Code	<b>CM5102</b>
Prerequisite course code and name	NA
Class Declaration	YES

## 1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)		Examination Scheme				Total Marks
L	T	P	C		Theory		Practical		
					#ESE	PA	*ESE	PA	
				<b>Marks</b>	40	10	50	50	150
02	00	04	06	<b>Exam Duration</b>	2 Hrs	1/2 Hr			

**Legends:** L- Lecture, P- Practical, T- Tutorial, C- Credit, ESE-End Semester Examination, PA- Progressive Assessment (Test I, II/Term Work), \*- Practical Exam, \$- Oral Exam, #- Online Examination each Lecture/Practical period is of one clock hour.

## 2. RATIONALE

In current trends of web world, dynamic and platform independent web applications are required. Java Server Page is an important scripting technology for computer engineering and Information Technology diploma graduates to develop dynamic and platform independent web-based applications. JSP is widely used server-side scripting technology as it allows designing web – based applications using java APIs, JDBC APIs.

## 3. COMPETENCY

The aim of this course is to attend following industry identified competency through various teaching learning experiences:

- **Build WebPages using Java Server Page.**

## 4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following *industry-oriented* COs associated with the above-mentioned competency:

1. Handle HTTP request- response using Servlet.
2. Design simple JSP page using JSP elements.
3. Managing threads, sessions, events, and filters.
4. Perform database operations using JDBC.
5. Deploy web applications.

## 5. SUGGESTED PRACTICALS/ EXERCISES

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
1.	1	Install Web Server and database tool	1	02
2.		Write a program for demonstration of HTTP request and response using Servlet	1	02
3.		Develop a program to demonstrate use of all basic elements of JSP (Any 4 programs)	2	04
4.	2	Write a simple JSP program for Demonstrating use of expressions, declarations (Any 2 programs)	2	04
5.	3	Write a JSP program for Demonstrating use of request dispatching	1	04
6.		Write programs to demonstrate attributes of Page Directives	1	04
7.		Write a JSP programs for session management using Session tracking	3	04
8.		Write a JSP programs for session management using: URL re-writing Hidden Form Field	3	04
9.		Write program to insert records using JDBC	4	04
10.		Write program to display specific records using JDBC	4	04
11.		Write program to search and update records using JDBC	4	04
12.		Write program to remove specific records using JDBC	4	02
13.	4	Write a program to demonstrate use of JSP Filters	3	04
14.		Write a JSP program for Demonstration of Event Listeners	3	04
15.	5	Write program to demonstrate use of JSP Standard Tag Library (JSTL)	5	10
16.	All	Deploy a mini project in web server. (Refer point 11 for micro project list)	All COs	04
TOTAL				64

S.No.	Performance Indicators	Weightage in %
a.	Arrangement of available equipment / test rig or model	20
b.	Setting and operation	20
c.	Safety measures	10
d.	Observations and Recording	10
e.	Interpretation of result and Conclusion	20
f.	Answer to sample questions	10
g.	Submission of report in time	10
<b>Total</b>		<b>100</b>

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practical, as well as aid to procure equipment by authorities concerned.

Sr. No.	Equipment Name / Instruments required	Experiment Sr.No.
1	Computer system	ALL
2	Any compatible open-source tools (e.g., NetBeans IDE/ Eclipse IDE/ Any equivalent IDE, Any compatible web server, Any compatible database tool e.g., MySQL or any equivalent tool)	ALL

## 7. THEORY COMPONENTS

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
<b>Section – I</b>	
<b>UNIT -I Web programming Environment – Introduction</b> (Weightage-06, Hours-04)	
1a. Select use of Servlet or JSP for the given problem 1b. Maintain HTTP sessions 1c. Use Servlet for request and response	1.1 Servlet and JSP overview: Servlet Life cycle, Servlet Classes, Threading Models, JSP life-cycle 1.2 Overview of the Hypertext Transfer Protocol (HTTP): The HTTP Specification, HTTP Request-Response Model, HTTP sessions 1.3 The Servlet API, The Javax.Servlet Package, Reading Servlet Parameters, Reading Initialization Parameter
<b>UNIT- II Introduction to JSP</b> (Weightage-06, Hours- 06)	
2a Design page using JSP elements and declarations for the given problem 2b Develop web logic using JSP expressions and Scriptlets and declarations for the given problem	2.1 Overview of JSP 2.2 JSP Syntax and semantics: Components of JSP page, JSP Development Model, and complete example. 2.3 Expressions 2.4 Scriptlets 2.5 Declarations
<b>UNIT- III Request Dispatching and Session and JDBC</b> (Weightage-08, Hours- 06)	
3a. Apply the given validation rule. 3b. Use relevant page directive(s) to create page instructions for the given problem 3c. Use relevant session API to manage the session 3d. Use relevant JDBC driver for connecting the given database	3.1 Request dispatching and Form validation 3.2 Page directives 3.3 Session Management: Session tracking, Session API 3.4 JDBC: Overview of JDBC, JDBC Drivers, Result Set, Statement, Prepared Statement, Connecting to a Database with Driver Manager

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
3e. Write statements to perform primitive database operations using JDBC	
<b>Section – II</b>	
<b>UNIT- IV Application Event Listeners and Filters (Weightage- 06, Hours- 04)</b>	
4a. Write function to handle given event using event listener 4b. Use the relevant JSP Filter to solve the given problem	4.1 Application Event Listeners 4.2 Filters: Filter overview, Developing and deploying a Filter
<b>UNIT- V JSP Tag Extensions (Weightage- 08, Hours- 08)</b>	
5a Select relevant custom tags to design web page for the given problem. 5b. Develop business logic using expression language for the given situation	5.1 Custom Tags: Introduction and how it works 5.2 Tag Handlers and Tag Libraries 5.3 Expression Language 5.4 The JSP Standard Tag Library (JSTL) 5.5 Tag Extensions, Tag Files, and JSP Fragments
<b>UNIT- VI Testing and Deploying web application (Weightage- 06, Hours- 04)</b>	
6a. Test and Debug the Web application model. 6b. Deploying Web application.	6.1 JSP Testing and Debugging: Building a Mental Model. 6.2 Testing in Isolation. 6.3 Debugging Tools. 6.4 The web application environment. 6.5 The web archive (war) file. 6.6 The deployment Descriptor.

## 8. SUGGESTED SPECIFICATION TABLE FORQUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
<b>Session-I</b>						
I	Web programming Environment – Introduction	04	02	01	03	06
II	Introduction to JSP	06	01	02	03	06
III	Request Dispatching and Session and JDBC	06	04	01	03	08
<b>Total</b>		<b>16</b>	<b>07</b>	<b>04</b>	<b>09</b>	<b>20</b>
<b>Session-II</b>						
IV	Application Event Listeners and Filters	04	01	02	03	06
V	JSP Tag Extensions	08	02	02	04	08
VI	Testing and Deploying web application	04	01	02	03	06
<b>Total</b>		<b>16</b>	<b>04</b>	<b>06</b>	<b>10</b>	<b>20</b>
<b>Grand Total</b>		<b>32</b>	<b>11</b>	<b>10</b>	<b>19</b>	<b>40</b>



## 9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Drawing flowchart and writing algorithms for the given problem statements.
- b. Prepare practical files with write-ups, programs and its outputs.

## 10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- b. About *15-20% of the topics/sub-topics* which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- c. With respect to item No.8, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- d. Guide student(s) in undertaking micro-projects.
- e. Use Flash/Animations to explain various components, operation and
- f. Teacher should ask the students to go through instruction and Technical manuals

## 11. SUGGESTED MICRO-PROJECTS

*Only one micro-project* is planned to be undertaken by a student that needs to be assigned to him/her. In special situations where groups have to be formed for micro-projects, the number of students in the group should *not exceed three*. The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. (Affective Domain Outcomes). Each student will have to maintain activity chart consisting of individual contribution in the project work and give a seminar presentation of it before submission. The student ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

- a. Develop a sample application using JSP to generate invoice for selected items for any commercial web site
- b. Develop and deploy a sample application using JDBC to maintain and manipulate records of students of an institute
- c. Develop JSP application for e-learning portal with the help of JDBC, filters, and Event Listeners.
- d. Develop sample messaging application using JSP

## 12. SUGGESTED LEARNING RESOURCES

S. No.	Title	Author	Publisher, Edition, and Year of publication, ISBN Number
1	The Complete Reference JSP	Phillip Hanna	McGraw Hill Education ,1st edition,2017 • ISBN-10: 0070531412

S. No.	Title	Author	Publisher, Edition, and Year of publication, ISBN Number
			<ul style="list-style-type: none"> <li>ISBN-13: 978-0070531413</li> </ul>
2	Head First Servlets and JSP	Bert Bates, Kathy Sierra, Bryan Basham	O'Reilly Media, 2 <sup>nd</sup> Edition, 2008 <ul style="list-style-type: none"> <li>ISBN: 9780596516680</li> </ul>
3	Java Server Programming Black Book Paperback	Dreamtech Software Team	Dreamtech Press, Platinum edition 2007 <ul style="list-style-type: none"> <li>ISBN-10: 8177227211</li> <li>ISBN-13: 978-8177227215</li> </ul>

### 13. SOFTWARE/LEARNING WEBSITES

1. <https://www.javatpoint.com/jsp-tutorial>
2. <http://www.jsptut.com/>
3. <https://beginnersbook.com/jsp-tutorial-for-beginners/>
4. <https://www.studytonight.com/jsp/>
5. <https://onlinecourses.nptel.ac.in>

### 14. PO - COMPETENCY- CO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	3	3	-	-	2
CO2	3	2	3	2	-	-	2
CO3	3	2	3	2	-	-	2
CO4	3	2	3	3	-	-	2
CO5	2	2	3	3	-	1	3

	PSO1	PSO2
CO1	1	2
CO2	1	3
CO3	-	3
CO4	-	3
CO5	1	3

Sign:  Name: Smt.A.S.Paike Smt.M.G.Yawalkar Smt.K.S.Gaikwad smt P.K.Zade (Course Expert /s)	Sign:  Name: Mr. U. V. Kokate Mr.Dr.S.B.Nikam (Head of Department) (Department of Computer Engineering)
Sign:-  Name: Mr. U .V. Kokate Mr.Dr.S.B.Nikam (Program Head ) (Department of Computer Engineering)	Sign:  Name: Mr. A.S. Zanpure (CDC In-charge)

# Government Polytechnic, Pune

## '180 OB' – Scheme

Programme	<b>Diploma in Computer Engineering Diploma in Information Technology</b>
Programme code	01/02/03/04/05/06/07/08/16/17/21/22/23/24/26
Name of Course	<b>Programming using PHP</b>
Course Code	<b>CM5103</b>
Prerequisite course code and name	<b>NA</b>
Class Declaration	<b>Yes</b>

### 1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory		Practical		Total Marks
L	T	P	C	#ESE	PA	*ESE	PA	
02	00	04	06	Marks	40	10	50	50
				Exam Duration	2 Hrs	1/2 Hr		

**Legends:** L- Lecture, P- Practical, T- Tutorial, C- Credit, ESE-End Semester Examination, PA- Progressive Assessment (Test I, II/Term Work), \*- Practical Exam, #- Oral Exam, #- Online Examination each Lecture/Practical period is of one clock hour.

### 2. RATIONALE

In the growing field of Web technology it is essential for every Diploma Engineers to learn PHP Language to help them build large and complex web applications. PHP can be used in three Primary ways: for server side scripting, for command line scripting and to develop client side GUI applications.

### 3. COMPETENCY

The aim of this course is to attend following industry identified competency through various teaching learning experiences:

- **Develop simple web-based application using PHP language.**

### 4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

1. Write program in PHP for interactive web development.
2. Implement different functions and use type conversion methods.
3. Write programs using arrays and graphics concepts.
4. Apply object-oriented concepts in programming.
5. Develop web pages with validations.
6. Create and manipulate database in PHP programming

**5. SUGGESTED PRACTICALS/ EXERCISES**

<b>Sr. No.</b>	<b>Unit No.</b>	<b>Practical Exercises (Outcomes in Psychomotor Domain)</b>	<b>Relevant CO</b>	<b>Approximate Hours Required</b>
1.	1	Installation & Sample PHP program.	1	2
2.	1	WAP for different Decision making control structure	1	4
3.	1	Write a PHP program to demonstrate the use of Looping structures using a) While statement b) Do-while statement c) For statement d) For each statement	1	4
4.	2	WAP for on different functions.	2	6
5.	3	WAP for array and different function with array.	3	4
6.	3	Program using basic drawing functions and on scaling	3	4
7.	3	Program on converting an image to text and to create sample PDF document	3	4
8.	4	Creating an Object, Accessing Properties and Methods, Declaring a class in PHP program.	4	2
9.	4	Create an Overloading and Overriding class using Inheritance.	4	4
10.	4	Program on introspection	4	4
11.	4	Program on serialization	4	2
12.	5	Design a simple web page using following form controls (Text box, Radio button, Check box, Buttons, List box, Combo box, Hidden field box)	5	4
13.	5	Write a PHP program for sending and receiving plain text message (email).	5	4
14.	6	Develop web page with data validation.	5	4
15.	6	To build a sample PHP-database application using database connectivity and displaying database	6	4
16.	ALL	Micro-Project (Refer point 11 for micro project list)	All COs	8
<b>Total</b>				<b>64</b>

<b>Sr. No.</b>	<b>Performance Indicators</b>	<b>Weightage in %</b>
a.	Problem Selection and its feasibility study	20
b.	Logical thinking to decompose problem into modules	30
c.	Ability to estimates size and cost of software	30
d.	Presentation and Technical documentation skills	10
e.	Submission of reports within time	10
<b>Total</b>		<b>100</b>

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practical, as well as aid to procure equipment by authorities concerned.

Sr. No.	Major Equipment/ Instruments Required	Experiment Sr. No.
1	Hardware: Computer system (i3 - i5 preferable) (Any computer system with basic configuration)	For All Experiments
2	Operating system: Windows / Linux	
3	Any compatible open-source tools (Any compatible web server, Any compatible database tool e.g. MySQL or any equivalent tool)	

## 7. THEORY COMPONENTS

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
<b>Section I</b>	
<b>Unit – I Introduction to PHP and Basics</b> (Weightage-04, Hrs.- 04)	
1a. Write programs in PHP using basic syntactical constructs. 1b. Write PHP program using flow control statements.	1. 1 History of PHP, Advantages of PHP, Syntax of PHP 1.2 Variables, Data types, Expressions and operators. 1.3 Flow control statements
<b>Unit - II Functions and Strings</b> (Weightage-08, Hrs.- 04)	
2a. Write program using parameter passing to call a function. 2b. Use type conversion methods in programs.	2.1 Calling a function, Defining a function, function parameters, Return values and errors from function, Including code. 2.2 Variable Functions, Anonymous Functions 2.3 String functions, Type Conversion
<b>Unit – III Arrays and Graphics</b> (Weightage-08, Hrs-08)	
3a. Write programs using arrays. 3b. Create and scale images using graphics concepts. 3c. Write program to create PDF document.	3.1 Creating & Manipulating Array, and Types of Arrays. 3.2 Extracting data from arrays, implode, explode, array flip 3.3 Storing data& comparing arrays 3.4 Extracting Multiple Values, arithmetic array function 3.5 Basics Graphics Concepts, Creating Images, Images with text, Scaling Images, Using PDF extensions.
<b>Section II</b>	
<b>Unit - IV Object Oriented Concepts</b> (Weightage-8, Hrs-6)	
4a. Apply object-oriented concepts in programming: Inheritance, Cloning 4b. Write programs using Introspection, Serialization.	4.1 Declaring a class & object, Accessing Properties and Methods, Static Class, Abstract Class, Interfaces 4.2 Inheritance, Overloading and Overriding, Cloning Object. 4.3 Introspection, Serialization
<b>Unit - V Browser Handling</b> (Weightage-06, Hrs.- 04)	
5a. Develop web pages using GUI components 5b. Implement validation of web page on client and server side 5c. Describe use and storage of cookies.	5.1 Creating a webpage using GUI Components, Reading data from web page 5.2 Web page validation (Client-Server side) 5.3 Session, Cookies & Sending Email
<b>Unit -VI Databases</b> (Weightage-06, Hrs.- 06)	

6a. Use database techniques for creating and manipulating databases through PHP.	6.1 Relational Database and SQL using MySQL 6.2 PEAR DB basics, Advanced Database Techniques 6.3 Sample Application for PHP-MySQL Connectivity
6b. Write programs for MySQL connectivity.	

## 8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
<b>Section I</b>						
I	Introduction to PHP & Basics	04	02	01	01	04
II	Functions and Strings	04	02	02	04	08
III	Arrays and Graphics	08	02	02	04	08
<b>Total</b>		<b>16</b>	<b>6</b>	<b>5</b>	<b>9</b>	<b>20</b>
<b>Section II</b>						
IV	Oops Concepts	06	02	02	04	08
V	Browser: Handling	04	01	02	03	06
VI	Databases	06	01	02	03	06
<b>Total</b>		<b>16</b>	<b>04</b>	<b>06</b>	<b>10</b>	<b>20</b>
<b>Grand Total</b>		<b>32</b>	<b>10</b>	<b>11</b>	<b>19</b>	<b>40</b>

## 9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Prepare journals based on practical's performed in laboratory.
- b. Undertake micro-projects.

## 10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for **self-directed learning** and assess the development of the COs through classroom presentations (see implementation guideline for details).
- c. With respect to item No.8, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- d. Guide student(s) in undertaking micro-projects.
- e. Correlate subtopics with power plant system and equipments.
- f. Use proper equivalent analogy to explain different concepts.
- g. Use Flash/Animations to explain various components, operation and
- h. Teacher should ask the students to go through instruction and technical manuals

## 11. SUGGESTED MICRO-PROJECTS

*Only one micro-project* is planned to be undertaken by a student that needs to be assigned to him/her. In special situations where groups have to be formed for micro-projects, the number of students in the group should *not exceed three*. The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. (Affective Domain Outcomes). Each student will have to maintain activity chart consisting of individual contribution in the project work and give a seminar presentation of it before submission. The student ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

- a. Develop web application for student attendance management system.
- b. Develop web application for-
  - i. sending plain text email.
  - ii. sending HTML message.
  - iii. sending emails with attachment
- c. Develop web application for Library Management system.
- d. Develop web application for Student feedback system.

## 12. SUGGESTED LEARNING RESOURCES

Sr. No	Title	Author	Publisher, Edition and Year of publication ISBN Number
1	Programming PHP	Rasmus Lerdorf, Kevin.T & Peter M.	O'Reilly 2013 ISBN: 9781449392772
2	The Complete Reference PHP	Steven Holzner	Tata - McGraw hill Third Edition, ISBN-13: 978-0070223622

## 13. SOFTWARE/LEARNING WEBSITES

1. <https://www.w3schools.com/php/default.asp>
2. <http://www.tizag.com/phpT/>
3. <https://www.tutorialspoint.com/php/index.htm>
4. <https://www.geeksforgeeks.org/php/>

## 14. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	-	-	1	-	-	1
CO2	2	1	1	2	-	-	2
CO3	2	1	1	1	-	-	2
CO4	1	2	3	3	2	1	2
CO5	1	2	3	3	2	1	2
CO6	1	2	3	3	2	1	2

	PSO1	PSO2
CO1	-	3
CO2	-	3
CO3	-	3
CO4	-	3
CO5	-	3

Sign:  Name: 1. Mrs. R. J. Chavan 2. Mrs. S.B. Gosavi 3. Mrs. L.S. Korade (Course Expert /s)	Sign:  Name: 1.Mr. U.V. Kokate 2.Dr. S.B. Nikam (Head of Department) (Department of Computer Engineering)
Sign:  Name: 1.Mr. U.V. Kokate 2.Dr.S.B. Nikam (Programme Head) (Department of Computer Engineering)	Sign:  Name: 1.Mr. A.S. Zanpure (CDC In-charge)



# Government Polytechnic, Pune

## '180OB' – Scheme

Programme	Diploma in Computer Engineering
Programme code	01/02/03/04/05/06/07/08/15/16/17/18/19/21/22/23/24/26
Name of Course	Android Application Programming
Course Code	CM5104
Prerequisite course code and name	NA
Class Declaration	Yes

### 1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory		Practical		Total Marks
L	T	P	C	ESE	PA	*ESE	PA	
02	00	04	06	Marks #40	10	50	50	150
				Exam Duration	2 Hrs	1/2 Hr		

*Legends: L- Lecture, P- Practical, T- Tutorial, C- Credit, ESE-End Semester Examination, PA- Progressive Assessment (Test I, II/Term Work), \*- Practical Exam, \$- Oral Exam, #- Online Examination each Lecture/Practical period is of one clock hour*

### 2. RATIONALE

The use of mobile communication and android based applications are increasing day by day. It is therefore necessary for students to know how to build mobile applications for android operating system. This course covers the necessary concepts which are required to develop Android applications. After completing this course students will be able to design and built various applications using android framework.

### 3. COMPETENCY

The aim of this course is to attend following industry identified competency through various teaching learning experiences:

- **Develop android applications.**

### 4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Describe Android architecture and features.
2. Configure android environment and development tools.
3. Design graphical user interface layouts.
4. Develop android application using user interface components.
5. Create android application to perform database operations.
6. Deploy android application including security parameters.

## 5. SUGGESTED PRACTICALS/ EXERCISES

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
1.	2	Install and configure java development kit (JDK), android studio and android SDK with android virtual device	1,2	2
2.	2	Develop a program to display Hello World on screen	1,2	2
3.	3	Develop a program to implement Linear Layout, Frame Layout, Relative Layout, Table Layout	3	4
4.	4	Develop a program to implement Text View and Auto Complete Text view and Edit Text.	4	4
5.	4	Develop a program to implement Button, Image Button and Toggle Button.	4	2
6.	4	Develop a program to implement Checkbox.	4	2
7.	4	Develop a program to implement Radio Button and Radio Group.	4	2
8.	4	Develop a program to implement Progress Bar.	4	2
9.	4	Develop a program to implement List View, Grid View, Image View and Scroll View.	4	4
10.	4	Develop a program to implement Custom Toast Alert.	4	2
11.	4	Develop a program to implement Date and Time Picker.	4	4
12.	5	Develop a program to implement new activity using explicit intent and implicit intent.	4	4
13.	5	Develop a program to implement horizontal and vertical fragments.	4	2
14.	5	Develop a program to implement service.	4	2
15.	5	Develop a program to implement Broadcast receiver.	4	2
16.	3,4,5	Create a login form with all necessary validations (On success or unsuccessful login, display appropriate toast Message )	3,4	4
17.	5	Develop a program to perform (Insert and delete) database operations using SQLite Database.	5	4
18.	5	Develop a program to perform (Search and Update) database operations using SQLite Database.	5	4
19.	6	Develop a program to send SMS.	6	2
20.	All	Micro-project (Refer point 11 for micro project list)	1 to 6	10
		<b>Total Hrs</b>		<b>64</b>

S.No.	Performance Indicators	Weightage in %
a.	Correctness of user interface design	20
b.	Correctness of programming logic applied	30
c.	Debugging ability	20
d.	Answer to questions	20
e.	Submission of assignment with in time	10
<b>Total</b>		<b>100</b>

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practical, as well as aid to procure equipment by authorities concerned.

Sr. No.	Major Equipment/ Instruments Required	Experiment Sr. No.
1	Computer System with minimum 4 GB RAM	All
2	Any open source tool (Android Studio / Eclipse IDE), JDK, SQLite or any other equivalent database	All

## 7. THEORY COMPONENTS

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
<b>Section - I</b>	
<b>UNIT I Introduction to Android Operating System (Weightage-6 marks, Hrs-4)</b>	
<b>1a.</b> Compare various android versions. <b>1b.</b> List needs of android Operating system. <b>1c.</b> Explain android architecture with its features.	1.1 Introduction to Android Operating System, Android Ecosystem, Android versions. 1.2 Need of Android, Android Activity. 1.3 Features Of Android, Android Architecture.
<b>UNIT II Installation and configuration of Android Environment (Weightage-6 marks, Hrs-6)</b>	
<b>2a.</b> Installation of application development environment and its configuration. <b>2b.</b> Explain android lifecycle. <b>2c.</b> Develop a simple android application.	2.1 Java JDK, Android SDK. 2.2 Android Development Tools (ADT), Android Virtual Devices (AVDs), Emulators. 2.3 Dalvik Virtual Machine, Difference between JVM and DVM. 2.4 Steps to install and configure Android Studio and SDK. 2.5 Android lifecycle: Introduction and lifecycle phases.
<b>UNIT III Fundamental of UI Components and Layouts (Weightage-8 marks, Hrs-6)</b>	

<b>Unit Outcomes (UOs)</b> (in cognitive domain)	<b>Topics and Sub-topics</b>
<b>3a.</b> Describe android directory structure. <b>3b.</b> Identify various screen components. <b>3c.</b> Design GUI using layouts.	3.1 Directory Structure and understanding components of a screen. 3.2 Fundamental UI Design. 3.3 Linear Layout. 3.4 Absolute Layout. 3.5 Frame Layout. 3.6 Relative Layout. 3.7 Table Layout.
<b>Section - II</b>	
<b>UNIT IV Designing User Interface(Weightage-6 marks, Hrs-6)</b>	
<b>4a.</b> Describe various user interface components. <b>4b.</b> Develop android application using various user interface components.	4.1 Text View, Edit Text and Auto complete Text View. 4.2 Button, Image Button and Toggle Button. 4.4 Radio Button and Radio Group. 4.5 Checkbox. 4.6 Progress Bar. 4.7 List View. 4.8 Grid View. 4.9 Image View. 4.10 Scroll View. 4.11 Custom Toast Alert. 4.12 Time and Date Picker.
<b>UNIT V Activity, Multimedia and Databases(Weightage-8 marks, Hrs-6)</b>	
<b>5a.</b> Explain Intents and its use while developing android application. <b>5b.</b> Develop application using activities, fragments, intents and services. <b>5c.</b> Perform database transactions.	5.1 Intent, its types and Intent. Filter. 5.2 Activity Lifecycle. 5.3 Broadcast Lifecycle. 5.4 Content Provider. 5.5 Fragments and Service. 5.6 Play audio and video, text to speech and speech to text. 5.7 SQLite Database, necessity of SQLite, Creation and connection of the database, extracting values from cursors and transactions.
<b>UNIT VI Security and Application Deployment(Weightage-6 marks, Hrs-4)</b>	
<b>6a.</b> Develop application to send SMS. <b>6b.</b> Explain android permissions and security model. <b>6c.</b> Deploy android application.	6.1 SMS Telephony. 6.2 Understanding the android Security Model, declaring and using Permissions, understanding and using Custom Permission. 6.3 Application Deployment: Creating small application, signing of application and steps of deploying app on Google Play Store.

## 8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
<b>Section - I</b>						
I	Introduction to Android Operating System	4	4	2	--	6
II	Installation and configuration of Android Environment	6	2	4	--	6
III	Fundamental of UI Components and Layouts	6	2	2	4	8
<b>Total (A)</b>		<b>16</b>	<b>8</b>	<b>8</b>	<b>4</b>	<b>20</b>
<b>Section - II</b>						
IV	Designing User Interface	6	2	2	2	6
V	Activity, Multimedia and Databases	6	2	2	4	8
VI	Security and Application Deployment	4	2	2	2	6
<b>Total (B)</b>		<b>16</b>	<b>6</b>	<b>6</b>	<b>8</b>	<b>20</b>
<b>Total (A+B)</b>		<b>32</b>	<b>14</b>	<b>14</b>	<b>12</b>	<b>40</b>

## 9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Prepare journal of practical.
- b. Undertake micro-projects.
- c. Develop applications based on real world scenario.

## 10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (MOOCs) may be used to teach various topics / sub topics.
- b. About 15-20% of the topics/sub-topics which is relatively simpler or descriptive in nature is to be given to the students for self-directed learning and assess the development of the COs through classroom presentations.
- c. With respect to item No.09, teachers need to ensure to create opportunities and provisions for co-curricular activities.
- d. Use different Audio/Video media for understanding of concepts.
- e. Guide students in undertaking micro-projects.
- f. Ensure tools used are of latest version.

- g. Encourage students to refer various web sites / Mobile applications to have detail understanding of advanced concepts.
- h. Observe continuously the performance of students in laboratory.

## 11. SUGGESTED MICRO-PROJECTS

*Only one micro-project* is planned to be undertaken by a student that needs to be assigned to him/her. In special situations where groups have to be formed for micro-projects, the number of students in the group should *not exceed three*.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. (Affective Domain Outcomes). Each student will have to maintain activity chart consisting of individual contribution in the project work and give a seminar presentation of it before submission.. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

- a. Develop an android application on Housing Societies Management System.
- b. Develop an android application on file converters.
- c. Develop an android application for scientific calculator.
- d. Develop an android application for simple game.

## 12. SUGGESTED LEARNING RESOURCES

Sr.No.	Title	Author	Publisher, Edition and Year of publication, ISBN Number
1	ANDROID	Prasanna Kumar Dixit	Vikas Publications, First Edition, 2014 • 9789325977884
2	Android Programming for Beginners	John Hortan	Packet Publication, First Edition • 2015978-1-78588-326-2

## 13. SOFTWARE/LEARNING WEBSITES

1. <https://www.tutorialspoint.com/android>
2. [https://www.tutorialspoint.com/android/android\\_advanced\\_tutorial.pdf](https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf)
3. <http://developer.android.com>

**14. PO - COMPETENCY- CO MAPPING**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	1	3	1	1	2
CO2	2	2	1	3	1	1	2
CO3	2	3	3	3	1	1	2
CO4	2	3	3	3	1	1	2
CO5	2	3	3	3	3	3	2
CO6	2	3	3	3	3	3	2

	PSO1	PSO2
CO1	-	2
CO2	-	2
CO3	-	2
CO4	-	2
CO5	-	3
CO6	-	3

<p>Sign:</p> <p>Name: Shri T.P. Sharma Smt S.P. Panchakshari (Course Expert /s)</p>	<p>Sign:</p> <p>Name: Mr. U.V. Kokate Dr. S.B.Nikam (Head of Department) (Department of Computer Engineering)</p>
<p>Sign:</p> <p>Name: Mr. U.V. Kokate Dr. S.B.Nikam (Programme Head) (Department of Computer Engineering)</p>	<p>Sign:</p> <p>Name: Mr. A.S. Zanpure (CDC In-charge)</p>





# Government Polytechnic, Pune

## '180 OB' – Scheme

Programme	<b>Diploma in Computer Engineering</b>
Programme code	01/02/03/04/05/ <b>06</b> /07/08/16/17/21/22/23/24/ <b>26</b>
Name of Course	<b>Network Management and Administration</b>
Course Code	<b>CM5105</b>
Prerequisite course code and name	NA
Class Declaration	<b>YES</b>

### 1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)		Examination Scheme				Total Marks
					Theory		Practical		
L	T	P	C		ESE	PA	SESE	PA	
				<b>Marks</b>	#40	10	50	50	150
02	00	04	06	<b>Exam Duration</b>	2 Hrs.	1/2 Hr			

**Legends:** L- Lecture, P- Practical, T- Tutorial, C- Credit, ESE-End Semester Examination, PA- Progressive Assessment (Test I, II/Term Work), \*- Practical Exam, \$- Oral Exam, #- Online Examination each Lecture/Practical period is of one clock hour.

### 2. RATIONALE

This course is aimed at providing the students with conceptual understanding of network management and apply the principles of design, configuration and operation of network and service management systems, Architecture and standards for network management will be presented.

### 3. COMPETENCY

The aim of this course is to attend following industry identified competency through various teaching learning experiences:

- **Operation, administration, maintenance, and provisioning of networked systems and Maintain the networking environment**

### 4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Deploy the network management center.
2. Classify different network management functional areas, and related tasks.
3. Categorize existing network management models.
4. Apply the integrated network management concepts.
5. Analyze Internet network management framework.
6. Apply existing technologies and trends in the network management arena.

## 5. SUGGESTED PRACTICALS/ EXERCISES

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
1.	1	Study of NOC(Network Operation center), GNOC(Global NOC), SOC(security Operation center)	1	04
2.	2	Study of network management of software(network performance monitor, PRTG Network Monitor)	1,2	04
3.	3	Implementation of SNMP protocol	3	08
4.		Managing Operations and monitoring using SNMP	3	08
5.	4	Study of IN-BAND and OUT OF BAND network Management.	5	08
6.		Detail study of FCAPS for PRTG network monitor(fault management, Configuration, Accounting, Performance, Security) framework	5,6	08
7.	5	Study of ticketing system and incident management in SolarWinds.	4	08
8.	6	A] Study of automation of Network monitoring B] Implementation of MPLS using Cisco Network tool.	5,6	08
9.		Micro-project (Refer point 11 for micro project list)	All	08
<b>Total Hrs.</b>				<b>64</b>

Sr. No.	Performance Indicators	weightage in %
a.	Learn network management and organization aspects.	20
b.	Learn the policy control and different protocol architecture	10
c.	Learn operational support system	10
d.	Understand different management issue	10
e.	Understand network management architecture	20
f.	Understand different network monitoring tools	10
g.	Understand key aspects of MPLs	10
h.	Submission of report in time	10
<b>Total</b>		<b>100</b>

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practical, as well as aid to procure equipment by authorities concerned.

Sr. No.	Major Equipment/ Instruments Required	Experiment Sr. No.
1	Computers	ALL
2	Networking (Internet )	ALL

## 7. THEORY COMPONENTS

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
<b>Section I</b>	
<b>UNIT I Requirements for the Management of Network (Weightage-06 , Hrs.- 06)</b>	
1a. Define network management 1b. Explain Organizational Aspects of Management 1c. Explain Time Aspects of Management	1.1 Management Scenarios 1.2 Management Functions 1.3 Organizational Aspects of Management 1.4 Time Aspects of Management
<b>UNIT II IP Network Management (Weightage-08, Hrs.- 06)</b>	
2a. Choose Configuration Method, 2b. Discover architecture for SNMP 2c. Choose configuration protocol 2d. Explain policy control	2.1 Choosing to Manage Your Network 2.2 Choosing a Configuration Method 2.3 Management Information Base 2.4 Simple Network Management Protocol 2.5 Extensible Markup Language 2.6 Common Object Request Broker Architecture 2.7 Choosing a Configuration Protocol 2.8 Choosing to Collect Statistics Policy Control
<b>UNIT III IP-Based Service Implementation and Network (Weightage-06, Hrs.- 04)</b>	
3a. Define OSS (Operation Support System) 3b. Explain OSS architecture 3c. Discover Network Management Issues .	3.1 IP-Based Service Implementation—OSS (Operation Support System) 3.2 Provisioning Issues 3.3 Network Management Issues 3.4 OSS Architecture
<b>Section II</b>	
<b>UNIT IV Network Management Architecture (Weightage-08, Hrs.- 06)</b>	
4a. Define Network Management 4b. Demonstrate Network Management Architecture	4.1 Background 4.2 Defining Network Management 4.3 Network Management Mechanisms 4.4 Architectural Considerations
<b>UNIT V SLA Network Monitoring (Weightage- 06, Hrs.- 04)</b>	
5a. Demonstrate Passive Network Monitoring 5b. Demonstrate Active Network Monitoring	5.1 Passive and Active Network Monitoring: Passive Network Monitoring, Active Network Monitoring
<b>UNIT VI MPLS Network Monitoring (Weightage- 06 , Hrs.- 06)</b>	
6a. Describe MPLS 6b. Demonstrate Management Information Base Modules for MPLS	6.1A Brief Introduction to MPLS: MPLS Applications, Key Aspects of MPLS Network Management Management Information Base Modules for MPLS

## 8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
<b>Section I</b>						
I	Requirements for the Management of Network	06	04	01	01	06
II	IP Network Management	06	06	01	01	08
III	IP-Based Service Implementation and Network	04	01	04	01	06
Total		16	11	6	3	20
<b>Section II</b>						
IV	Network Management Architecture	06	02	04	02	08
V	SLA Network Monitoring	04	04	01	01	06
VI	MPLS Network Monitoring	06	04	01	01	06
Total		16	10	6	4	20
<b>Total</b>		<b>32</b>	<b>21</b>	<b>12</b>	<b>07</b>	<b>40</b>

## 9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Prepare journals based on practical performed in laboratory.
- b. Analysis of real time networking laboratories and organizations (cyber café)

## 10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- b. About *15-20% of the topics/sub-topics* which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- c. With respect to item No.8, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- d. Use proper equivalent analogy to explain different concepts.  
Use Flash/**Animations** to explain various components, operation and
- e. Teacher should ask the students to go through instruction and Technical manuals

**11. SUGGESTED MICRO-PROJECTS**

*Only one micro-project* is planned to be undertaken by a student that needs to be assigned to him/her. In special situations where groups have to be formed for micro-projects, the number of students in the group should *not exceed three*. The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. (Affective Domain Outcomes). Each student will have to maintain activity chart consisting of individual contribution in the project work and give a seminar presentation of it before submission. The student ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

- a. Web Server monitoring techniques (example TCP, HTTP) any one.
- b. Network design with Single DHCP Server for any organization.
- c. Case study for OSS Architecture.

**12. SUGGESTED LEARNING RESOURCES**

S.N.	Title	Author	Publisher, Edition and Year of publication
01	Network management: know it all	Adrian Farrel.	Morgan Kaufmann Publishers is an imprint of Elsevier.30 Corporate Drive, Suite 400,Burlington, MA 01803 ISBN : 978-0-12-374598-9

**13. SOFTWARE/LEARNING WEBSITES**

- 1 [www.nptel.com](http://www.nptel.com)
- 2 [https://www.tutorialspoint.com/data\\_communication\\_computer\\_network/](https://www.tutorialspoint.com/data_communication_computer_network/)
- 3 <http://en.citizendium.org/wiki/Cryptography>
- 4 <http://www.tutorialspoint.com/cryptography/>

**14. PO - COMPETENCY- CO MAPPING**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	-	2	2	-	2	2
CO2	1	2	3	2	-	2	3
CO3	1	3	2	3	-	-	2
CO4	1	-	3	2	-	2	2
CO5	1	2	3	2	1	2	2
CO6	-	-	3	2	3	2	3

	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	2	3
CO5	2	3
CO6	2	3

<p>Sign:</p> <p>Name: 1. Smt.B.K.Vyas 2. Smt.A.A.Shaikh (CourseExperts)</p>	<p>Sign:</p> <p>Name: Mr. U.V. Kokate Dr.S.B.Nikam (Head of Department) (Department of Computer Engineering)</p>
<p>Sign:</p> <p>Name: Mr. U.V. Kokate Dr.S.B.Nikam (Programme Head) (Department of Computer Engineering)</p>	<p>Sign:</p> <p>Name: Mr. A.S. Zanpure (CDC In-charge)</p>