

P.G.D.C.A. (Semester – 1 and Semester -2)
SAURASHTRA UNIVERSITY
Effective From June – 2022
P.G.D.C.A. (Semester – 2)

SR. NO	COURSE	No. OF LECT./Lab. PER WEEK	CREDIT
1.	CS – 07 OBJECT -ORIENTED PROGRAMMING USING JAVA	5	5
2.	CS – 08 CORE PYTHON PROGRAMMING	5	5
3.	CS – 09 WEB DEVELOPMENT USING LARAVEL	5	5
4.	CS - 10 PRACTICALS -1 (BASED ON CS-07 & CS-08)	5	5
5.	CS – 11 PRACTICALS-2 (BASED ON CS-09)	5	5
6.	CS – 12 PROJECT DEVELOPMENT (IN HOUSE)	5	5
Total Credits of Semester – 2			30

CS – 07: OBJECT -ORIENTED PROGRAMMING USING JAVA		
Objectives: The aim of this course is that students will be understanding Object oriented concept with respect to Java programming language. Also, student will learn core java fundamental which help them in future to learn any object-oriented programming language and android mobile application development.		
Prerequisites: Knowledge of Programming in C		
Course Outcomes:		
<ul style="list-style-type: none"> • Able to understand the concept of Object-oriented programming with class and object • Able to understand Inheritance and common classes of lang package • Able to understand Exception Handling, Nested class and collection framework • Able to understand File Handling and Multithreading • Able to understand Database connectivity concepts 		
Unit No.	Topics	Details
1.	Introduction to OOP's, Understanding and defining of Classes and Objects	<ul style="list-style-type: none"> • What is OOP, Difference between Procedural and Object-oriented programming, Basic OOP concept - Object, classes, abstraction, encapsulation, inheritance, polymorphism, History of Java, Features of Java, JDK Environment, Java Virtual Machine • Define class with instance variables and methods, Object creation of class, accessing member of class, Argument passing, Constructors, Method overloading, static data, static methods, static blocks, this keyword
2	Inheritance, Packages & Access Specifier, Understanding commonly used classes of java.lang package.	<ul style="list-style-type: none"> • Super class & subclass, Abstract method and classes, Method overriding, final keyword, super keyword, implementing interfaces, User defined interfaces • Importing classes, User defined packages, Modifiers & Access control (Default, public, private, protected) • Object class & String class, Wrapper classes, understanding pass by value and pass of reference, Comparable and Comparator interface
3	Exception Handling, Nested Classes, Collection Framework and Regular expression	<ul style="list-style-type: none"> • Discuss the purpose of Exception Handling in Java, Explain the types of exception in Java, Describe the use of try and catch, Explain the use of throws and throw, Describe the finally keyword • Member Inner class, Local Inner class, Nested Interface, Nested Class: What and Why? Anonymous Inner class, static nested class, enum • Collection, Set & List Interface with sub classes and interfaces, Map interface, Generic Collection framework, Pattern and Matcher, Varargs
4	File	<ul style="list-style-type: none"> • Read and Write data into file with OutputStream,

	Handling, Multithreading	<p>InputStream, Reader and Writer classes and its sub classes, Bridge classes</p> <ul style="list-style-type: none"> Describe Multithreading, Creating and Managing Threads, Discuss the life cycle of threads, Understand the concept of synchronization, explain how to set the priorities of thread, understand what a daemon thread does
5	Java Database Connectivity	<ul style="list-style-type: none"> JDBC Drivers, Connectivity with different database, Connection interface, Result Set interface, Result Set Meta Data, steps to connect to the database, Driver Manager, Statement interface, Prepared Statement

Seminar - 5 Lectures

Expert Talk - 5 Lectures

Test - 5 Lectures

TOTAL LECTURES 60+15=75

Reference Books:

1. Pravin Jain, “The class of Java” Pearson Education, (2010).

CS – 08: CORE PYTHON PROGRAMMING		
Objectives: Python programming knowledge is intended to be useful to data analyst, data scientist, data visualization, machine learning, deep learning, computer vision, natural language processing and many other computer science fields. Goal of this course is to provide core aspects of programming with Python.		
Prerequisites: Basic knowledge of any programming language		
Course Outcomes:		
<ul style="list-style-type: none"> • Able to list various features of python, data types and operators in Python. • Able to explain indexing and slicing on array and string. • Able to be able to differentiate list, tuple and dictionary by performing various operations on it and determine which data structure best suits the real-life scenario. • Able to test any program for its correctness and be able to use exception handling and prepare outline and convert program into structured form using UDF. • Able to Select any real-life situation, deconstruct it and solve it using Object-oriented principles. 		
Unit No.	Topics	Details
1	Introduction to Python	<ul style="list-style-type: none"> • Introduction to Python- features, executing program, memory management, garbage collection, installing python. • Data types - comments, built-in data types, sequences, sets, literals, user-defined data types, constants, identifiers, reserved words, naming convention. • Operators, Input and Output statements, Command line arguments
2	Looping and Control Structure, Arrays, Strings	<ul style="list-style-type: none"> • Condition Statements: if, if-else, nested if-else • Looping: for, while, nested loops • Control Structure: break, continue, pass • Array: Creating, importing, index, processing, types of array, different ways of creating array, operations on array, attributes of an array, Multi-dimensional arrays and operations on it – indexing, slicing. • String: Creating Strings and operations with strings, Characters
3	List, Tuple, Dictionary	<ul style="list-style-type: none"> • Lists and Tuples: Creating List and Tuples, Operations on list and tuples • Dictionaries: Operation on dictionaries, dictionary methods, Sorting elements, Conversion of list and strings to dictionary, passing to function, ordered dictionary
4	Function, Exception Handling, Modules, File Handling	<ul style="list-style-type: none"> • Functions: Defining, Calling, returning result, pass by object, formal and actual arguments, default argument, variable length argument, passing group of elements, anonymous functions, functional decorators, generators. • Modules: Importing module, Math module, Random module, packages, composition • Exception: Errors, Exceptions handling, types of exception, assert statement, except block, user-defined exception • Files: types of files, opening and closing, working with text

		files, various operations with files, random accessing of binary files, zipping and unzipping files
5	Object Oriented Programming	<ul style="list-style-type: none"> • OOP: Introduction to OOPs, problems in procedure-oriented approach, Classes and objects • Inheritance & Polymorphism: Constructors in Inheritance, Overriding Super Class Constructors and Methods, The super () Method, Types of Inheritance, Single Inheritance, Multiple Inheritance, Method Resolution Order (MRO), Polymorphism, Duck Typing Philosophy of Python, Operator Overloading, Method Overloading, Method Overriding • Abstract classes and interfaces: Abstract Method and Abstract Class, Interfaces in Python, Abstract Classes vs. Interfaces

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures

Reference Books:

1. “Core Python Programming” by Dr. R. Nageswara Rao – 2017 Edition, Dreamtech Press
2. “Learn Data Analysis with Python” by A.J.Henley, Dave Wolf, APress
3. “Fundamentals of Python – First Programs”, Kenneth A. Lambert, CENGAGE publication.
4. “Introduction to Computation and Programming Using Python” by John V Guttag, PHI publication
5. “Python Projects” by Laura Cassell, WROX
6. “Beginning Python from Novice to Professional” by Magnus Lie Hetland- APress

CS – 09: WEB DEVELOPMENT USING LARAVEL		
Objectives: This course is actually working on various attributes of web development. The students would learn various web development techniques of this PHP framework and thus fulfil the industrial requirements.		
Prerequisites: Knowledge of PHP, Basics of Object Oriented Programming		
Course Outcomes: <ul style="list-style-type: none"> • Able to Understand the Actual Implementation of Object-Oriented Programming with Application. • Able to Compute the functions in desired manner which is often supported by in-built functions of the framework. • Able to Creating database structure which is smartly built and do not need to re-create or modify DB settings. • Able to Construct a model to produce high-quality and customized applications in quick time. • Able to Implement authentication by Bcrypt hashing algorithm for generating an encrypted representation of a password. • Able to Understand the Actual Implementation of Object-Oriented Programming with Application. • Able to execute and determine the functions in desired manner which is often supported by in-built functions of the framework. 		
Unit No.	Topics	Details
1	Object Oriented Programming in PHP, Introduction of Laravel, Installation, Configuration, Project Structure, Composer	<ul style="list-style-type: none"> • Object Oriented Programming in PHP • Namespace, Predefined Variables, Exceptions, Autoloading Classes, Anonymous Classes • Object Iteration, Magic Methods, Object Cloning, Comparing Objects, Type Hinting, Objects and References, Chaining methods • Introduction: What is Laravel, Features, MVC Architecture • Installation: Basic Requirements for Laravel, Use of Composer, Laravel Install Using Composer, Finding and installing new Packages • Configuration: Introduction, Environment Configuration, Protecting Sensitive Configuration, Maintenance Mode, Database Configuration. • Structure of Laravel application: Root Directory structure, Application Directory Structure.
2	Artisan, Route and Controllers	<ul style="list-style-type: none"> • Artisan Console: Artisan Command Line Tool, Generating Commands, Artisan Migration, Command Structure. • Routing in Laravel: Types of Route files, Route Basics, Route Parameters, Restricting the route parameters, Named Routes, Route Groups, Route Model Binding, Rate Limiting, Accessing the Current Route, Routing Controllers, Passing Parameters, Advance Routing,

		<p>Handling HTTP exceptions, performing redirections, Returning views.</p> <ul style="list-style-type: none"> • Controllers: Introduction, Basic Controllers, Using View, Request Parameters, Controller Middleware, Resource Controller.
3	Blade Template, Form and Validation	<ul style="list-style-type: none"> • Blade Template: Introduction, Components & Slots, Displaying Data, Control Structures, Including Sub-Views, Stacks, Service Injection, Extending Blade, Blade Operators, Creating a master view. • Forms: Creating Forms, Adding Labels, Generating Inputs, Generating Buttons, Secret Inputs, CSRF Token, Form Macros • Validation: Defining the Routes, Creating The Controller, Writing The Validation Logic, Displaying The Validation Errors, Array Validations, Creating New Validators, Error Messages & Custom Errors • Available Validators: Accepted, After (Date), Alpha, Alpha Dash, Alpha Numeric, Array, Before (Date), Between, Boolean, Date, DateFormat, Different, Digits, Digits Between, E-Mail, Exists (Database), Image (File), In, Integer, Max, Min, Not In, Numeric, Regular Expression, Required, String Custom Validation Rules.
4	Migrations, SQL Interaction and Query Builder	<ul style="list-style-type: none"> • Migrations: Database Connections, Generating Migrations, Migration Structure, Creating Tables & Columns, Rolling Back Migrations, Column Modifiers, Writing Seeders • SQL Interaction: Introduction, Running Raw SQL Queries, Database Transactions • Query Builder: Retrieving Results, Chunking Results, Aggregates, Selects, Raw Expressions, Joins, Sub-Query Joins, Where Clauses • Query Builder – Secure: Cross-site request forgery, escaping content to prevent cross-site scripting, Avoid SQL injection
5	Eloquent ORM and API, Authentication and Security	<ul style="list-style-type: none"> • Eloquent ORM Models: Defining Models, Table Name & Primary Keys, Timestamps, Retrieving Models, Mass assignment, Inserting, Updating Models & Deleting Models, Relationships, Collections, Mutators, Soft deletion, Query Scopes • Relationships: One to One, Many to Many, Has many through, Polymorphic relations, Many to Many polymorphic relations • API Resources: Introduction, Generating Resources, Writing Resources • API Authentication: Passport Tokens • Authenticating users: Creating the user model, Creating the necessary database schema, Authentication routes

		and views, Middleware, validating user input i.e. Form requests.
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Seminar - 5 Lectures

Expert Talk - 5 Lectures

Test - 5 Lectures

Total Lectures: 60 + 15 = 75

Reference Books:

1. Laravel 5 Essentials, Martin Bean, Packet Publishing, ISBN 978-1-78528-301-7. (UNIT 2 to 5)
2. Laravel: Code Happy 2012, Dayle Rees published by Packt Publishing (UNIT 2 to 5)
3. Object-Oriented Programming with PHP5, December 2007, HasinHayder, Published by Packt Publishing.(UNIT 1)
4. Learning Laravel's Eloquent, 2015 by Francesco Malatesta published by Packt Publishing (Unit 5)
5. Online Laravel 5.x Documentation (<https://laravel.com/docs/5.x>)

CS-10: PRACTICALS-1 (Based on CS - 07 and CS - 08)	
Topics	Marks
JAVA and Python	100

CS – 11: PRACTICALS-2(BASED ON CS-09 and CS - 10)	
Topics	Marks
Laravel	100

Note:

- Each session is of 3 hours for the purpose of practical Examination.
- Practical examination may be arranged before or after theory exam

CS – 12: PROJECT DEVELOPMENT (In House) Marks: 100
Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of previous semester or current semester. <u>(At the time of Project-Viva examination student must show Project Report (in hard copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)</u>

Note:

- Project must be submitted before two weeks of commencement of theory exam.
- Project viva examination may be arranged before or after theory exam.
- During the project viva examination project must be run.