SAURASHTRA UNIVERSITY

RAJKOT – INDIA

Accredited Grade A by NAAC (CGPA 3.05)

CURRICULAM

FOR

P.G.D.C.A.

(1 Years Full Time: 2 Semester Program)

Post Graduate Diploma in Computer Science and Application

(Semester - 1 and Semester - 2)

Effective From June – 2022

POST GRADUATE DIPLOMA IN COMPUTER SCIENCE AND APPLICATIONS (PGDCA)

(1 year full time: 2 Semester Programme)

Ordinance:

O.P.G.D.C.A. 1 Candidate seeking admission to the Post Graduate Diploma in Computer Science and Application must have a Bachelor degree of minimum three years duration or equivalent from any recognized university.

O.P.G.D.C.A. 2 The duration of the course will be full time one academic year. The examination for the post graduate diploma in computer science and applications will be conducted under the semester system. For this purpose, the academic year will be divided into two semesters. No candidate will allowed joining any other course simultaneously.

O.P.G.D.C.A. 3 No candidates will be admitted to any semester examination for PGDCA unless it is certified by the head, computer center that he has attended courses of study to the satisfaction of the head of the institute recognized for teaching courses of study in post graduate diploma in computer science and applications.

O.P.G.D.C.A. 4 Candidate desirous of appearing at any semester examination of the post graduate diploma in computer science and applications must forward their applications in the prescribed form to the controller of examination, through the head of institute on or before the date prescribed for the purposes under the relevant ordinance.

O.P.G.D.C.A. 5 After successful passing semester - 1 candidate awarded CCC certificate, after passing semester - 1 and semester - 2 candidates will be awarded CCC+ certificate.

Regulations:

R.P.G.D.C.A. 1 A candidate fails in any number of subjects in the first semester examination will be permitted to continue his studies at a subsequent semester

R.P.G.D.C.A. 2

The standard of passing the P.G.D.C.A. degree examination will be as under:

(1) To pass any semester examination of the P.G.D.C.A. degree, a candidate must obtain at least 40% marks in the university examination separately in each course of theory and practical.

(2) Class will be awarded based on Earned Grade Point, SGPA and CGPA as per rules of University.

R.S.B.C.A. – 2. Marks and credit hours of each course

Marks of Internal examination, university examination and credit hours will be as under:

1. Total marks of each theory course are 100 (university examination of 70 marks + internal examination of 30 marks).
2. Marks of each unit in the course are equal (i.e. 14 Marks). Total marks of each course are 14x5=70 for university examination.
3. Credit hours (lectures) for each unit in the course are equal (i.e. 12 hours). Total credit hours (lectures) of each course are 12x5=60.
4. Total marks of each practical and project-viva course are 100. No internal examination of marks in practical and project-viva courses.

R.S.B.C.A. – 3. Structure of Question Paper

Question Paper contains 5 questions (each of 14 marks). Every question will be asked from corresponding unit as specified in the syllabus of each course. (i.e. Question-1 from Unit No.1 and remaining questions from their corresponding units)

Every question is divided in four parts like (a), (b), (c) and (d). Part (a) contains four objective type questions (not MCQ) like definition, reason, answer in one line, answer in one word etc., each of one marks and no internal option. Part (b) contains two questions each of two marks and student will attempt any one out of two. Part (c) contains two questions each of three marks and student will attempt any one out of two. Part (d) contains two questions each of five marks and student will attempt any one out of two.

R.P.G.D.C.A. 4

The following is the syllabus of various courses to be studied for the Post-graduate Diploma in Computer Science and Applications.

P.G.D.C.A. (Semester – 1)

SR. NO.	COURSE	No. of LECT./Lab. PER WEEK	CREDIT
1.	**CS – 01** FUNDAMENTAL OF PROGRAMMING USING C	5	5
2.	**CS – 02** DATABASE MANAGEMENT SYSTEM	5	5
3.	**CS – 03** WEB DEVELOPMENT USING PHP	5	5
4.	**CS – 04** FUNDAMENTAL OF WEB PROGRAMMING	5	5
5.	**CS – 05** PRACTICALS -1 (BASED ON CS- 01 &CS 2)	5	5
6.	**CS – 06** PRACTICALS-2 (BASED ON CS-03 & CS-04)	5	5
Total Credits of Semester – 1			**30**

CS-01: FUNDAMENTAL OF PROGRAMMING USING C

Objectives: The aim of this course is to introduce to the students the rudiments of structured programming using C language. Students will become familiar with problem solving techniques and algorithm development.

Prerequisites: Basic understanding of Computer programming terminologies, Basic mathematical and arithmetic knowledge

Course Outcomes:

- Able to illustrate and explain basic concepts of programming
- Able to understand the concept of control statements.
- Able to translate the real-life situations in programming form and solve them using some fundamentals of Programming.
- Able to translate the real-life situations in programming form and solve them by storing data into files and analysed user defined data types and test and detect that it is optimized applications.
- Able to understand the real-life situation in programming and solve it using concepts of linked list bitwise operators and c preprocessor statements.

Unit No.	Topics	Details
1	**Introduction to Programming & Basics of C**	• Concepts of Algorithm & Flowcharts • Process of Compilations • Generic of Language, Basic features of C Language like indenter, keyword, variable, data types, operators and expression, Basic Screen and Keyboard I/O.
2	**Control Statements, Arrays & String**	• Test Condition • Conditional execution and selection • Iteration and Repetitive Executions • Nested Loops • Introduction to contiguous data types • One dimensional array, multidimensional arrays
3	**String andFunction**	• Array as strings • Multidimensional character arrays • Operations on strings • Concept of modular programming • Using functions • Scope of data • Recursive functions • Command line arguments

4	**Pointer and User Defined Data Types**	• Need of pointer • Types and uses of pointer • Array and Pointers • Pointers and strings • Pointer to Pointer • Pointers and functions • Other aspect of pointers. • Introduction to structures • Usage of structure • Nested structures • Union and its usage • Enumeration types • Bit fields.
5	**File Handling**	• Types of files • Working with files • Usage of file management functions. • fopen, fclose, fprintf, fscanf, fputc, fgetc, putw, getw, fread, fwrite, fgets, fputs, rewing, fseek, ftell, ferror, feof • Binary File & Text File

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

Total Lectures 60 + 15 = 75

Reference Books:

1. Programming in C, by Pradip Dey & Manas Ghosh, Publisher – Oxford
2. C: The Complete Reference, by Herbert Schildt, Publisher – Tata McGraw Hill.
3. Let us C, by Yashwant Kanitkar, Publisher – BPB Publication
4. Schaum's Outline of Programming with C, By: Byron Gottfried, Publisher Shaum Series
5. Programming with ANSI and Turbo C, by Ashok N Kamthane, Publisher – Pearson Education

CS-02: DATABASE MANAGEMENT SYSTEM

Objectives: Database Management System (DBMS) aims to present an introduction with a prominence on how to organize, maintain and retrieve data proficiently and effectively from the Database system. We also aim to create a strong foundation for application database design based on the concepts related to database, database models and database operations.

Prerequisites: Basic knowledge of file, data and database terminologies.

Course Outcomes:

- Able to recall basic concepts of database systems and its architecture.
- Able to recall and Extrapolate types of data models and database systems.
- Able to draw an Entity-Relationship diagram. Extrapolate the concept of Normalization.
- Able to distinguish between the DDL, DCL, TCL, DML, DQL.
- Able to extrapolate the restricting and sorting the data.
- Able to extrapolate the concepts of joining, grouping and subquery.

Unit No.	Topic	Detail
1	**Basic concepts & Database system Architecture**	● Basic concepts: Introduction to Data, Information, Data Item or Fields, database and database systems,Records, Files, Metadata, System Catalog, Data Warehouse, Data dictionary, DBAand File oriented System versus database system. ● Database system Architecture ● Schemas, Sub-schemas, Instances; ● Three-level ANSI SPARC Database Architecture (Internal Level, Conceptual Level, External Level) ● Advantages of three-tier Architecture; ● Functions of DBMS.
2	**Data Models & Types of Database System**	• Types of Data models (Physical Data Models, Hierarchical Data Model, Network Data Model, Relation Data Model, Entity – Relationship (E-R) Data Model, Object – oriented Data Model). • Types of Database Systems (Centralized Database System, Parallel Database System, Parallel Database System, Client / Server Database System, Distributed Database System.
3	**Entity-Relationship (ER) Model& Normalization**	● Basic Entity – Relationship Concepts; ● Entities, Relationship, Attributes, E – R Diagram symbols, Examples; ● Specialization and Generalization. ● Introduction to Normalization ● Normal forms (1 NF, 2 NF, 3 NF, BCNF)
4	**SQL Statements DDL, DML, DCL, TCL**	**Use of DDL Statements to Create and Manage Tables** • Categorize the main database objects • Review the table structure • List the data types available for columns

		• Create a simple table • Decipher how constraints can be created at table creation • Describe how schema objects work **Data Manipulation Statements** • Describe each DML statement • Insert rows into a table • Change rows in a table by the UPDATE statement • Delete rows from a table with the DELETE statement • Save and discard changes with the COMMIT and ROLLBACK statements **Retrieve Data using the SQL SELECT Statement** • List the capabilities of SQL SELECT statements • Generate a report of data from the output of a basic SELECT statement • Select All Columns • Select Specific Columns • Use Column Heading Defaults • Use Arithmetic Operators • Understand Operator Precedence • Learn the DESCRIBE command to display the table structure **Restricting and Sorting Data** • Write queries that contain a WHERE clause to limit the output retrieved • List the comparison operators and logical operators that are used in a WHERE clause • Describe the rules of precedence for comparison and logical operators • Use character string literals in the WHERE clause • Write queries that contain an ORDER BY clause to sort the output of a SELECT statement • Sort output in descending and ascending order
5	**Joining, Grouping and Subqueries**	**Aggregate Data Using the Group Functions** • Use the aggregation functions to produce meaningful reports • Divide the retrieved data in groups by using the GROUP BY clause • Exclude groups of data by using the HAVING clause **Display Data from Multiple Tables Using Joins** • Write SELECT statements to access data from more than one table • View data that generally does not meet a join condition by using outer joins • Join a table to itself by using a self-join

		Use Sub-queries to Solve Queries • Describe the types of problem that sub-queries can solve • Define sub-queries • List the types of sub-queries • Write single-row and multiple-row sub-queries • Multiple-Column Subqueries • Pairwise and Non-pairwise Comparison • Scalar Subquery Expressions • Solve problems with Correlated Subqueries • Update and Delete Rows Using Correlated Subqueries • The EXISTS and NOT EXISTS operators • Invoke the WITH clause

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

Total Lectures 60 + 15 = 75

Reference Books:

1. Database Systems Concepts, design and Applications 2/e Singh, S. K., PearsonEducation, New Delhi, 2011
2. An introduction to Database Systems, C J Date, Addition-Wesley.
3. Silberschatz, Korth, "Data base System Concepts"., McGraw hill, 2008.
4. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems (3/e), McGraw Hill, 2003
5. Sommerville, "Software Engineering", 8th Edition, Pearson Education
6. Peter Rob and Carlos Coronel, Database System- Design, Implementation and Management (7/e), Cengage Learning, 2007.
7. Json Price, Oracle Database 12c SQL, Master SQL, Oracle Press
8. "Oracle Database SQL Language Reference 12c" Release 1

CS-03: WEB DEVELOPMENT USING PHP

Objectives: The aim of this course is that students will be understanding web development concept using PHP programming language.

Prerequisites: Basic knowledge of HTML

Course Outcomes:

- Able to remember the installation of PHP and basic of PHP
- Able to understand the functions and object-oriented PHP
- Able to understand JavaScript and JSON
- Able to understand Forms and MYSQL database
- Able to understand Cookies, session, file with PHP and MYSQL Connectivity

Unit No.	Topic	Detail
1	**Installation and Basics of PHP**	• Installing and Setting up Environment: what is Wamp, mamp, lamp, Installing Xampp on windows and Linux, Setting permissions on linux, Important configuration files. • Basics: HTTP & HTML, Request and Response procedure • PHP Overview: The basics of PHP scripts, Beginning and Ending block of PHP, The echo statement and print (), Combining HTML and PHP, Comments in PHP • Variables: Rules for defining variable in PHP, Super Global • Data Types: Standard Data Types, Special Data Types, Data Type related Functions - gettype(), settype() Type casting • Operators & Expressions, PHP Operators: Assignment, Arithmetic, Increment/Decrement, Comparison, logical, Ternary, string. • Constants, variable variables, checking variable assignment, unset, predefined constants • Switching flow: if, if…else, elseif, switch • Loops: while, do-while, for, foreach, Break, continue
2	**Functions and Object-Oriented PHP**	• Functions: intro, calling function, defining function, returning values from UDF, variable scope, global statement, static statement, formal and actual parameters, default value argument, passing reference, checking function existence before calling, variable function, variable length argument function. • Arrays: creating array, types of array, array related functions.

		• String: formatting strings, argument swapping, storing formatted string, string functions • Date and Time functions • JSON: encode – decode • Object Oriented PHP: basics of oop, defining class, creating object instance, magic class methods – mutator, accessor, constructor, destructor, copying objects, displaying objects, extending classes
3	**JavaScript and JSON**	• JavaScript: a brief history, Advantages, comments, hiding javascript from older browsers, using js in different ways, datatypes, datatype conversion, dialog boxes • Control structures & loops, user defined functions, basic javascript events – form events, mouse events, text events, keyboard events, text events • Javascript functions: string, math, date & time, array functions. • Validating form fields – login form validations, password matching, length validation, email field, date validation, (use of basic regular expressions). • JSON: Overview, uses, syntax, datatypes
4	**Forms and MySQL**	• Forms: creating form, accessing form input with user-defined array, combining html &php, hidden fields, redirecting user, Working with file uploads • MySQL - mysql datatypes, interacting mysql: database, table creation, CRUD, Replace Join • Functions: string, date & time, formatting date & time, date arithmetic, special date-time functions.
5	**Cookies, Files and Directories with PHP and MySQL**	• PHP & MySQL Interaction: database support in php, using mysqli library, connecting database, closing connection, submitting queries, retrieving data, being prepared, checking for errors • Cookies: Accessing cookie, setting cookie, deleting cookie Sessions: Starting session, working with session, storing multiple values in session, destroying session. • Files: including files, Include & require, file related functions, creating & deleting files, file opening modes, reading & writing / appending files • Directories: create, remove, read, close

Seminar – 5 Lectures
Expert Talk – 5 Lectures
Test – 5 Lectures
Total Lectures: 60 + 15 = 75

Reference Books:

1. Julie C. Meloni, "Sams Teach Yourself PHP, MySQL, Apache and All in One", Sams Publication, 5h Edition.
2. Rechard Blum, "PHP, MySQL & JavaScript All-in-One for Dummies", Wiley
3. Robin Nixon, "Learning PHP, MySQL & JavaScript" O'Reilly Media
4. Paul Wilton, Jeremy McPeak, "Beginning JavaScript", Wrox

<table>
<tr><th colspan="3">CS-04: FUNDAMENTAL OF WEB PROGRAMMING</th></tr>
<tr><td colspan="3">Objectives:To know some advance concept of web design and web Programming.</td></tr>
<tr><td colspan="3">Prerequisites:Basic computer literacy, basic software installed, basic knowledge of working with files</td></tr>
<tr><td colspan="3">Course Outcomes:
Able to clarify critical thinking and problem-solving skills required to successfully design and implement a web site.
Able to state the ability to analyze, identify and define the technology required to build and implement a web site.
Able to determine knowledge of artistic and design components that are used in the creation of a web site.
Able to analyze HTML elements, CSS Style Rules, Bootstrap and JavaScript code using a WYSIWYG web development tool such as.
Able to represent HTML elements, CSS Styles, Bootstrap Layouts and JavaScript in code views.
Able to design & develop web pages including: CSS Style Rules, Typography, Hyperlinks, Lists, Tables, Frames, Forms, Images, Behaviors, CSS Layouts and Bootstrap Concepts.</td></tr>
<tr><th>Unit No.</th><th>Topic</th><th>Detail</th></tr>
<tr><td>1</td><td>Introduction to Web and HTML 5</td><td>History of internet and Web Key Terminology:
Internet Protocols, The Client-server Model, Domain Name System, Uniform Resource Locator, Hyper Text Transfer protocol, Web Servers
Introduction to HTML5
New structural elements of HTML5 (Building an HTML5 Starter document, using header element to create a site Header.
Using the hgroup element to group headings, creating navigation with nav element, using the new article element, grouping content with section element, creating a side bar with the aside element, using the footer element, using the HTML5 outliner to ensure the correct structure.
Grouping text level and redefined Semantics
making up figures and Captions with the figure and figcaption element, Using the address element for contact information, Highlighting the text with mark element, Changes to existing element, Wrapping links around element.</td></tr>
<tr><td>2</td><td>Introduction to CSS and Web Forms</td><td>Styling HTML with CSS
Creating selector using property and value, Creative a Responsive Design with CSS3 media query, making buttons with CSS Gradients.
Apply border to box element, Set Padding and Margin</td></tr>
</table>

		to box element. Apply Position to box. Floating using CSS, enhancing a site with Transformation and Transition, creating animation with CSS. • Creating a form to collect contact information, creating a slider with JQuery. **HTML5 & CSS Web Forms** • Styling input Fields like Textbox, Bordered inputs, Colored Inputs, Focused Inputs, Input with Icons. • Create Animated Search Input, Styling Text areas, Styling Select Menus, Styling Input Buttons, Creating Responsive Form.
3	**Introduction to Bootstrap**	**Concept of Bootstrap Layout and Media object** • Uses of powerful mobile-first flex box grid to build layouts of all shapes and sizes twelve column systems. • Examples for Bootstrap's media object to construct highly repetitive components like blog comments, tweets, etc. **Managing Content Using Bootstrap** • Examples for Bootstrap typography, including global settings, headings, body text, lists, and more. • Examples for displaying inline and multiline blocks of code with Bootstrap. • Examples of images into responsive behavior (so they never become larger than their parent elements) and add lightweight styles to them—all via classes. • Examples for opt-in styling of tables with Bootstrap.
4	**Advance concept of Bootstrap**	**Advanced Bootstrap Components like: Badges, Buttons, Cards.** • Provide contextual feedback messages for typical user actions with the handful of available and flexible alert messages. • Documentation and examples for badges, our small count and labeling component. • Group a series of buttons together on a single line with the button group, and super-power them with JavaScript. • Bootstrap's cards provide a flexible and extensible content container with multiple variants and options. **Advanced Bootstrap Components like: Carousal, Form Controls, Navigation bar, Progress bar** • A slideshow component for cycling through elements—images or slides of text—like a carousel. • Examples and usage guidelines for form control styles, layout options, and custom components for creating a wide variety of forms. • Examples for Bootstrap's powerful, responsive

		navigation header, the navbar. Includes support for branding, navigation, and more. • Examples for using Bootstrap custom progress bars featuring support for stacked bars,animated backgrounds, and text labels.
5	**Introduction of Java Script**	**Data Types and Variables** • Types of Data in JavaScript, Variables - Storing Data in Memory, Calculation and Basic String Manipulation. • Data Type Conversion and Array. **Decision and Loops and Function and Scope** • Decision Making - The if and switch Statements, Logical Operators, Looping- The for and while Statements. • Creating your own functions, Scope and Lifetime, Functions as Values **HTML Forms: Interacting with the User** • Html Element in Forms, Common Properties and Methods, Button Element, Text Element, Check Boxes and Radio Buttons, Selection Boxes.

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures
Total Lectures: 60+15=75

Reference Books:

1. Modern PHP: New Features and Good Practices by Josh Lockhart (ORELLY)
2. PHP Cookbook: Solutions & Examples for PHP Programmers by David Sklar and Adam Trachtenberg (ORELLY)
3. Programming PHP by Kevin Tatroe and Peter MacIntyre ORELLY)
4. PHP for the Web: Visual QuickStart Guide (4th Edition) by Larry Ullman (Peachpit Press)

CS – 05: PRACTICALS-1 (BASED ON CS-01&CS-01)	
Topics	**Marks**
C Language and SQL	**100**

CS – 06: PRACTICALS-2 (BASED ON CS-03 & CS-04)	
Topics	**Marks**
PHP and HTML, Bootstrap, Java Script, CSS	**100**

Note:

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

Additional Topics should be taught during the semester-1 (Not to be asked in examination):

Student should be aware of followings

- To Format Hard Disk
- Installation of OS and other packages
- Use of DOS commands
- Operating of Popular Accounting Software

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:

- 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**	• 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.**	• 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**	• Discuss the purpose of Exception Handing 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**	• Read and Write data into file with OutputStream,

	Handling, Multithreading	InputStream, Reader and Writer classes and its sub classes, Bridge classes • 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**	• 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:

- 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**	• 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**	• 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**	• 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**	• 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**	• 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:

- 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**	• 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**	• 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,

		Handling HTTP exceptions, performing redirections, Returning views. • Controllers: Introduction, Basic Controllers, Using View, Request Parameters, Controller Middleware, Resource Controller.
3	**Blade Template, Form and Validation**	• 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**	• 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**	• 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.

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. **(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)**

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.