

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

P.G.D.C.A. (Semester – 1 and Semester -2)
SAURASHTRA UNIVERSITY
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 $14 \times 5 = 70$ 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 $12 \times 5 = 60$.
4. Total marks of each practical and project-viva course are 100. No internal examination of marks in practical and project-viva courses.

P.G.D.C.A. (Semester – 1 and Semester -2)
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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		
<p>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.</p>		
<p>Prerequisites: Basic understanding of Computer programming terminologies, Basic mathematical and arithmetic knowledge</p>		
<p>Course Outcomes:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Test Condition • Conditional execution and selection • Iteration and Repetitive Executions • Nested Loops • Introduction to contiguous data types • One dimensional array, multidimensional arrays
3	String and Function	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Types of files• Working with files• Usage of file management functions.• fopen, fclose, fprintf, fscanf, fputc, fgetc, putw, getw, fread, fwrite, fgets, fputs, rewind, 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		
<p>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.</p>		
<p>Prerequisites: Basic knowledge of file, data and database terminologies.</p>		
<p>Course Outcomes:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Basic concepts: Introduction to Data, Information, Data Item or Fields, database and database systems, Records, Files, Metadata, System Catalog, Data Warehouse, Data dictionary, DBA and 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<p>Use of DDL Statements to Create and Manage Tables</p> <ul style="list-style-type: none"> • Categorize the main database objects • Review the table structure • List the data types available for columns

		<ul style="list-style-type: none"> • Create a simple table • Decipher how constraints can be created at table creation • Describe how schema objects work <p>Data Manipulation Statements</p> <ul style="list-style-type: none"> • 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 <p>Retrieve Data using the SQL SELECT Statement</p> <ul style="list-style-type: none"> • 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 <p>Restricting and Sorting Data</p> <ul style="list-style-type: none"> • 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	<p>Joining, Grouping and Subqueries</p>	<p>Aggregate Data Using the Group Functions</p> <ul style="list-style-type: none"> • 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 <p>Display Data from Multiple Tables Using Joins</p> <ul style="list-style-type: none"> • 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

		<p>Use Sub-queries to Solve Queries</p> <ul style="list-style-type: none">• 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
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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., Pearson Education, New Delhi, 2011
2. An introduction to Database Systems, C J Date, Addison-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. Jason 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:		
<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

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		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. Recharad 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

CS-04: FUNDAMENTAL OF WEB PROGRAMMING		
Objectives: To know some advance concept of web design and web Programming.		
Prerequisites: Basic computer literacy, basic software installed, basic knowledge of working with files		
Course Outcomes: <ul style="list-style-type: none"> • 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. 		
Unit No.	Topic	Detail
1	Introduction to Web and HTML 5	<p>History of internet and Web Key Terminology:</p> <ul style="list-style-type: none"> • Internet Protocols, The Client-server Model, Domain Name System, Uniform Resource Locator, Hyper Text Transfer protocol, Web Servers <p>Introduction to HTML5</p> <ul style="list-style-type: none"> • 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. <p>Grouping text level and redefined Semantics</p> <ul style="list-style-type: none"> • 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.
2	Introduction to CSS and Web Forms	<p>Styling HTML with CSS</p> <ul style="list-style-type: none"> • 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

		<p>to box element. Apply Position to box. Floating using CSS, enhancing a site with Transformation and Transition, creating animation with CSS.</p> <ul style="list-style-type: none"> • Creating a form to collect contact information, creating a slider with JQuery. <p>HTML5 & CSS Web Forms</p> <ul style="list-style-type: none"> • 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	<p>Concept of Bootstrap Layout and Media object</p> <ul style="list-style-type: none"> • 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. <p>Managing Content Using Bootstrap</p> <ul style="list-style-type: none"> • 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	<p>Advanced Bootstrap Components like: Badges, Buttons, Cards.</p> <ul style="list-style-type: none"> • 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. <p>Advanced Bootstrap Components like: Carousal, Form Controls, Navigation bar, Progress bar</p> <ul style="list-style-type: none"> • 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

		<p>navigation header, the navbar. Includes support for branding, navigation, and more.</p> <ul style="list-style-type: none"> • Examples for using Bootstrap custom progress bars featuring support for stacked bars, animated backgrounds, and text labels.
5	Introduction of Java Script	<p>Data Types and Variables</p> <ul style="list-style-type: none"> • Types of Data in JavaScript, Variables - Storing Data in Memory, Calculation and Basic String Manipulation. • Data Type Conversion and Array. <p>Decision and Loops and Function and Scope</p> <ul style="list-style-type: none"> • 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 <p>HTML Forms: Interacting with the User</p> <ul style="list-style-type: none"> • 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