Savitribai Phule Pune University

Second Year
M.Sc. (Computer Applications)

(Choice based Credit and Semester based Syllabus for affiliated colleges to be implemented from Academic Year 2020-21)

Savitribai Phule University of Pune
M.Sc (Computer Applications)
(with effect from June 2020-21)

Semester 3

Course Code	Course	Teaching Scheme / Week			Examination Scheme and Marks			Credit	
		Theory	Tutorial	Practical	IE	UE	Total	TH	PR
CA- CCTP -7	Mobile Application Development Using Android	04	--	--	30	70	100	04	--
CA- CCTP-8	Internet of Things	04	--	--	30	70	100	04	--
CA- CCTP-9	Artificial Intelligence	04	--	--	30	70	100	04	--
CA- CBOTP-3 A	Python Programming	02	--	--	15	35	50	02	--
CA- CBOPP-3A	Python Programming Laboratory	--	--	04	15	35	50	--	02
	OR								
CA- CBOTP-3 B	Big Data	02	--	--	15	35	50	02	--
CA- CBOPP-3B	Big Data Laboratory	--	--	04	15	35	50	--	02
	OR								
CA- CBOTP-3 C	DJango	02	--	--	15	35	50	02	--
CA- CBOPP-3C	DJango Laboratory	--	--	04	15	35	50	--	02
CA- CCPP-3	Android Programming Laboratory	--	--	08	30	70	100	--	4
							Total Credits	**14**	**06**
Total		**14**	**--**	**12**	**150**	**350**	**500**	**20**	

IE: Internal Evaluation **UE:** External Evaluation **TH:** Theory **PR**: Practical **CA:** M. Sc. (Computer Applications)

Semester IV

Savitribai Phule Pune University M.Sc (Computer Applications) Industrial Training/on-campus Projects		
Teaching Scheme: **2 Hrs/Week**	**Credit** **20**	**Examination Scheme:** **Practical:** **IE -150 Marks** **UE -350 Marks**

IE: Internal Evaluation **UE:** External Evaluation **CA:** M. Sc. (Computer Applications)

General Information:

I. Each credit will be equivalent to 15 clock hours of teaching
II. 75% of the credits (60) is compulsory from the core subject and 25% i.e. 20 credits from any other department than the one where he/she is registered. In case student wishes to take all courses from the department he/ she can also do so.
III. Credits: It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
IV. Refer detailed rules and regulations for credit and semester system in postgraduate department/centers of the university with effect from academic year 2018-19 which is displayed on the website of the university.
V. CA-CCUP-Core Compulsory University Project: Students must undergo full time industrial training/Institute-level project.
VI. According to university guidelines any Science, Technology, and Engineering graduates is eligible to take admission for M.Sc. (Computer Application). However, by considering the eligibility of the M.Sc. (Computer Application) course it is necessary to complete the bridge course to become familiar with technology concepts more clearly. Specifically, Non-IT graduates who are not familiar with programming languages, Database Technology need to undergo the bridge course to learn the various courses of M.Sc. (Computer Application).
VII. Each student will have attend lectures/laboratory sessions and appear for examinations for mandatory courses in Human rights, Cyber Security/Information security and skill development courses arranged by the Institution and earn required credits in each such courses. The grades obtained by the students will be communicated by the respective Institute to the University. However, these grades will not be considered for CGPA calculations. A degree will be only awarded to the students by the University only after completion of all such courses in addition to the courses mentioned for all the semesters.
VIII. For Industrial training in semester IV, One faculty member will be assigned maximum 05 students

SEM III

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II(2019 Course)
SEM-III

Course Type : CC **Course Code : CA- CCTP-7**

Course Title : - Mobile Application Development Using Android

Teaching Scheme	No. of Credits	Examination Scheme
Theory:4 hrs / week	04	IE : 30 marks UE: 70 marks

Course Prerequisite:

- Knowledge of JAVA programming language and OOP concept.
- Familiar with the network Protocol stack

Course Objectives:

- Gain knowledge about different mobile platform and application development
- To know the programming using Android on IOS and Windows platform
- To develop the mobile app.

Course Contents

UNIT I	**Android Fundamentals**	**09**

- Introduction to Android - Overview and evolution of Android ,
- Features of Android, Android architecture
- Components of an Android Application, Manifest file
- Android ActivityService Lifecycle

UNIT II	**Android UI Design**	**09**

- Basic UI Designing (Form widgets ,Text Fields , Layouts ,[dip, dp, sip, sp] versus px)
- Intent(in detail)
- All components (e.g Button , Slider, Image view, Toast) Event Handling
- Adapters and Widgets
- Menu

UNIT III	**Android Thread and Notification**	**10**

- Threads running on UI thread (runOnUiThread)
- Worker thread

- Handlers & Runnable
- Asyn Task (in detail)
- Broadcast Receivers
- Services and notifications
- Toast
- Alarms

UNIT IV	Advanced Android Programming	10

- Content Providers – SQLite Programming
- JSON Parsing
- Accessing Phone Service(Call, SMS, MMS)
- Location based services

UNIT V	PhoneGap Programming	12

- Why Use PhoneGap?
- How PhoneGap Works
- Designing for the Container
- Writing PhoneGap Applications
- Building PhoneGap Applications
- PhoneGap Limitations
- PhoneGap Plug-Ins
- Hello, World! Program
- PhoneGap APIs –1

Accelerometer:

- Querying Device Orientation,
- Watching a Device's Orientation,
- Creating a Contact, Searching for Contacts, Cloning Contacts, Removing Contacts.

UNIT VI	iOS Fundamentals	10

- **Introduction** - What is IOS ,IOS Architecture, Frameworks, Application Life Cycle, Features
- **Swift -** Introduction to Swift ,General Concepts of Swift
- **Xcode -** Introduction to Xcode , Navigator, Editor Utility, Tools, Console, Document, Simulator, Instruments

Startup - Application Templates, Introduction to Storyboard , Hello World Application, How 'Hello World' Working, Debugging Database, Plist, Preference, Sqlite Web Service, Restful Web Service (JSON & XML)

	Total	60

References:

Sr. No.	Title of the Book	Author/ s	Publication
1	IOS Apprentice	Matthijs Hollemans	
2	PhoneGap: Beginner's Guide	Giorgio Natili, Purusothaman Ramanujam	PACKT Publication
3	Beginning Android Application Development	Wei-Meng Lee Wiley	

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II(2019 Course)
SEM-III
Course Type : CC Course Code : CA- CCTP-8
Course Title : Internet of Things (IoT)

Teaching Scheme: **TH: 04** **Hours/Week**	**Credit 04**	**Examination Scheme:** **In-Sem : 30 Marks** **End-Sem : 70 Marks**

Prerequisite: Students Should have basic knowledge of Networking, Internet and Electronics.

Course Objectives:

- To Study Basic and Advanced Concepts of IoT with its Architecture
- To learn Technical aspects of IoT.

Course Outcomes:

On completion of the course, student will be able to–

- Develop small Microcontroller based IoT application
- Apply theoretical knowledge in real world scenario

Course Contents

Unit I	**Fundamentals of IoT**	**12 Hours**

Basic Concepts of IoT, Architecture, Interaction with the Internet, Major components of IoT devices, Control Units, Sensors, Communication Modules, Power Sources

Communication Technologies Wireless Communication Bluetooth, ZigBee, WiFi, RF Links, Mobile Internet, Wired Communication, Layered Protocol, Ethernet TCP/IP, Overview of each Layer, HTTP, IOT Protocol: MQTT, CoAP, XMPP, OSGi Architecture/Services.

Unit II	**Microcontroller Fundamental and Programming**	**14 Hours**

System on Chip, Microcontrollers, Programming Microcontrollers, Arduino Platform, The Boards, The Anatomy of an Arduino Board, The Development Environment

Arduino Software Setup the IDE, Writing Arduino Software, The Arduino Sketch, Some Basic Examples, Trying the code on an Arduino Emulator - Extending Arduino, Arduino Libraries 25 Programming & Interfacing. Programming Arduino for the Internet of Things, Using Timers, Threads, Adding Security to Sensor Readings, Authenticating and Encrypting Arduino Data

Introduction to Raspberry PI, Installation, GPIO, Interfacing, Programming. Features 0f Python.

Unit III	**Introduction to Cloud Computing**	**09 Hours**

Introduction to Cloud Computing, Cloud based Architecture, SaaS, PaaS and IaaS, Benefits risk and challenges of cloud computing platforms and services, Introduction to cloud based IoT Platforms like IBM, Bluemix, Carriots etc.

Unit IV	Sensor Fundamentals	09 Hours

Sensor Fundamentals: How Sensors Work, Classification of Sensors, Analog and Digital Sensors, Pull-Up/Down resistors and Examples of sensors and working principles, Sensor Networks, Actuators Types of Digital Sensors, Temperature, Humidity, LUX, Gas sensor, Water Level Sensors.

Unit V	Arduino Interface	08 Hours

Arduino-Ethernet Interface Connect Arduino using the Ethernet, Arduino Ethernet Library, Simple Ethernet Client Example, Simple Ethernet Server Example

Arduino using the WiFi : Connect Arduino using the WiFi, WiShield Library, WiFly Shield Library, Using the Arduino Library for Processing,

IoT Privacy, Security and governance, Security issues at different layers.

Unit VI	IoT Application and Case study	08 Hours

Application of IoT and Case studies: Home Automation, Smart Parking, Water Management, Agriculture, Citizen Safety, Waste Management, Intelligent Transport System, Smart city.

Total Lectures : 60

Books:

Reference Books:

- Waher, Peter. *Learning internet of things*. Packt Publishing Ltd, 2015.
- Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
- The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
- Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
- Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
- “Mobile Computing,” Tata McGraw Hill, Asoke K Talukder and Roopa R Yavagal, 2010.
- Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
- Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6th Edition
- “Fundamentals of Mobile and Pervasive Computing,” F. Adelstein and S.K.S. Gupta, McGraw Hill, 2009. 8. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
- Schwartz, M. (2016). Internet of Things with Arduino Cookbook. Packt Publishing Ltd.

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II(2019 Course)
SEM-III
Course Type : CC Course Code : CA- CCTP-9
Course Title : Artificial Intelligence

Teaching Scheme: TH: 04 Hours/Week	**Credit 04**	**Examination Scheme:** In-Sem : 30 Marks End-Sem : 70 Marks

Prerequisite Courses:

- Concepts of Mathematical logic, Data structures, and Design and Analysis of algorithms
- Strong will to learn machine learning concepts.

Course Objectives:

- To provide a strong foundation of fundamental concepts in Artificial Intelligence
- To provide a basic exposure to the goals and methods of Artificial Intelligence
- To enable the student to apply these techniques in applications which involve perception, reasoning, and learning

Course Outcomes:

On completion of the course, student will be able to–

- Discuss the core concepts and algorithms of advanced AI
- Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems.

Course Contents

Unit I	**Introduction to Artificial Intelligence**	**02 Hours**

- What is AI?
- AI and related fields
- AI Techniques

Unit II	**Problems, Problem Spaces, and Search**	**10 Hours**

- Defining AI problems as a State Space Search: example Production Systems
- Search and Control Strategies
- Problem Characteristics
- Additional Problems (Water Jug, 8 puzzle, Missionaries and Cannibles and Block words problem)

Unit III	**Heuristic Search Techniques**	**09 Hours**

- Hill Climbing
- Best First Search
- Problem Reduction
- Constraint Satisfaction
- Mean-Ends Analysis

Unit IV	Knowledge Representation	14 Hours

- Approaches to Knowledge Representation
- Knowledge representation using Propositional and Predicate logic

- Conversion to clause form
- Resolution in Propositional logic
- Unification algorithm
- Resolution in Predicate logic
- Question answering
- Procedural Vs Declarative knowledge
- Forward and Backward chaining

Unit V	Slot – and – Filler Structures	10 Hours

- Weak Structures
- Semantic Networks
- Frames
- Strong Structures
- Conceptual Dependencies
- Scripts

Unit VI	Game Playing	05 Hours

- Overview
- Minimax Search Procedures
- Adding alpha-beta cutoffs

Unit VII	Statistical Reasoning	05 Hours

- Probability and Bayes' theorem
- Certainty factor: Rule-based Systems
- Bayesian Network
- Dempster -Shafer Theory

Unit VIII	Learning	05 Hours

- What is learning?
- Rote Learning
- Learning by taking advice
- Learning in problem solving
- Learning from examples
- Explanation based learning

Books:

Text:

1. Computational Intelligence, Eberhart, Elsevier, ISBN 9788131217832
2. Artificial Intelligence: A New Synthesis, Nilsson, Elsevier, ISBN 9788181471901 .
3. Artificial Intelligence, Tata McGraw Hill, 2nd Edition, by Elaine Rich and Kevin Knight
4. Introduction to Artificial Intelligence and Expert System, Prentice Hall of India Pvt. Ltd., New Delhi, 1997, 2nd

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II(2019 Course)
SEM-III
Course Type : CBOTP Course Code : CA- CBOTP -3 A
Course Title : Python Programming

Teaching Scheme: TH: 02 Hours/Week	Credit 02	Examination Scheme: IE : 15 Marks UE: 35 Marks

Prerequisite Courses: Python Programming

Course Objectives:

- To introduce various concepts of programming to the students using Python.
- Students should be able to apply the problem solving skills using Python

Course Outcomes:

On completion of the course, student will be able to–

- Express proficiency in the handling of strings and functions.
- Determine the methods to create and manipulate **Python programs** by utilizing the data structures like lists, dictionaries, tuples and sets.
- Identify the commonly used operations involving file systems and regular expressions

Course Contents

Unit I	Introduction to Python Scripting	06 Hours

Introduction to python

- Why Scripting is Useful in Computational Science
- Why Python? Script or Program?
- Application of Python

Basics of python

- Python identifiers and reserved words
- Lines and indentation, multi-line statements and Comments
- Input/output with print and input functions,
- Command line arguments and processing command line arguments
- Standard data types - basic, none, Boolean (true & False), numbers
- Data type conversion
- Python basic operators (Arithmetic, comparison, assignment, bitwise logical)
- Python membership operators (in & not in)
- Python identity operators (is & is not)
- Operator precedence
- Control Statements, Python loops, Iterating by subsequence index, loop control statements (break, continue, pass)

Unit II	Python strings	04 Hours

- Concept, escape characters
- String special operations
- String formatting operator
- Single quotes, Double quotes, Triple quotes
- Raw String, Unicode strings, Built-in String methods

- Python Lists - concept, creating and accessing elements, updating & deleting lists, basic list operations, reverse
- Indexing, slicing and Matrices
- built-in List functions
- Functional programming tools - filter(), map(), and reduce()
- Using Lists as stacks and Queues, List comprehensions

Unit III	Python tuples, sets, Dictionary	05 Hours

- Creating & deleting tuples ,Updating tuples
- Accessing values in a tuple ,deleting tuple elements
- built- in tuple functions and operations
- Indexing, slicing and Matrices
- Sets - Concept, operations.

Dictionary

- Concept (mutable)
- Creating and accessing values in a dictionary
- Updating dictionary, delete dictionary elements
- Properties of dictionary keys
- built-in dictionary functions and methods.

Unit IV	Functions	05 Hours

- Defining a function (def) and Calling a function
- Function arguments - Pass by value, Keyword Arguments, default arguments
- Scope of variable - basic rules
- Documentation Strings
- Variable Number of Arguments
- Call by Reference
- Order of arguments (positional, extra & keyword)
- Anonymous functions
- Recursion
- Treatment of Input and Output Arguments
- Unpacking argument lists
- Lambda forms
- Function Objects
- function ducktyping & polymorphism
- Generators (functions and expressions) and iterators

Unit V	Files and Directories	03

- Creating files and Operations on files (open, close, read, write)
- File object attributes, file positions, Listing Files in a Directory
- Testing File Types
- Removing Files and Directories
- Copying and Renaming Files
- Splitting Pathnames
- Creating and Moving to Directories
- Traversing Directory Trees
- Illustrative programs: word count, copy file

Unit VI	**Python Classes and Objects**	**06**

- Object oriented programming and classes in Python
  creating classes, instance objects, accessing members
- Data hiding (the double underscore prefix)
- Built-in class attributes

- Garbage collection : the constructor
- Overloading methods and operators
- Inheritance - implementing a subclass, overriding methods
- Recursive calls to methods
- Class variables, class methods, and static methods

Unit VII	**Python Exceptions**	**02**

- Exception handling : assert statement
- Except clause - with no exceptions and multiple exceptions
- Try - finally, raising exceptions, user-defined exceptions.

Books:

1. Introducing Python- Modern Computing in Simple Packages – Bill Lubanovic, O„Reilly Publication
2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress
3. Practical Programming: An Introduction to Computer Science Using Python 3, Paul Gries, et al., Pragmatic Bookshelf, 2/E 2014
4. Introduction to Computer Science Using Python- Charles Dierbach, Wiley Publication Learning with Python “, Green Tea Press, 2002
5. E-Books: python_tutorial. pdf, python_book_01.pdf
6. Beginning Programming with Python for Dummies Paperback – 2015 by John Paul Mueller
7. A Beginner's Python Tutorial: http://en.wikibooks.org/wiki/A Beginner%27s Python Tutorial.

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II(2019 Course)
SEM-III
Course Type : CBOTP Course Code : CA- CBOPP -3 A
Course Title : Python programming Laboratory

Teaching Scheme: **TH: 02 Hours/Week**	**Credit 02**	**Examination Scheme:** **IE : 15 Marks** **UE: 35 Marks**

Sample Python Assignments:

Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old.

2. Write a program to check whether the number is even or odd, print out an appropriate message to the user.

3. Write a program which will find all such numbers which are divisible by 7.

4. Write a program which can compute the factorial of a given numbers.

5. Write a program that prints out all the elements of the list that are less than 10.

6. Write a program that returns a list that contains only the elements that are common between the lists (without duplicates). Make sure your program works on two lists of different sizes.

7. To determine whether the number is prime or not.

8. To check whether a number is palindrome or not. (using recursion and without recursion).

9. Write a program that asks the user how many Fibonnaci numbers to generate and then generates them.

10. Write a program (using functions!) that asks the user for a long string containing multiple words. Print back to the user the same string, except with the words in backwards order. E.g " I am Msc student" is :"student Msc am I"

11. Write a program to implement binary search to search the given element using function.

12. Given a .txt file that has a list of a bunch of names, count how many of each name there are in the file, and print out the results to the screen.

13. Write a program that takes a list of numbers (for example, a = [5, 10, 15, 20, 25]) and makes a new list of only the first and last elements of the given list.

14. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized.

15. Write a program that accepts a sentence and calculate the number of letters and digits.

16. Write a program that accepts a sentence and calculate the number of upper case letters and lower case letters.

17. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.

18. Write a Python program of recursion list sum.

19. Write a Python program to solve the Fibonacci sequence using recursion.

20. Write a Python program to get the sum of a non-negative integer.

21. Write a Python program to find the greatest common divisor (gcd) of two integers

22. Write a Python function that takes a list and returns a new list with unique elements of the first list.

23. Write a Python function to check whether a number is perfect or not

24. Write a Python program to read a file line by line store it into an array.
25. Write a Python program to count the number of lines in a text file.
26. Write a Python program to count the frequency of words in a file.
27. Write a Python program to copy the contents of a file to another file
28. Write a Python program to read a random line from a file
29. Write a Python class to reverse a string word by word.
Input string : 'hello.py' Expected Output : '.py hello'
30. Write a Python class named Rectangle constructed by a length and width and a method which will compute the area and perimeter of a rectangle. –
31. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II (2019 Course)
SEM-III
Course Type : CBOP Course Code : CA -CBOTP-3 B
Course Title : Big Data

Teaching Scheme: **TH: 02** **Hours/Week**	**Credit 02**	**Examination Scheme:** **In-Sem : 15 Marks** **End-Sem : 35 Marks**

Course Objectives:

1. To Understand the Big Data challenges & opportunities, its applications
2. To gain conceptual understanding of Hadoop Distributed File System.
3. To study use of Big data in real life applications

Course Outcomes: **Students will be able to**

- Describe Big data and its challenges and opportunities
- Compare and contrast NoSQL with RDBMS
- Define components of Hadoop Ecosystem

Course Contents

Unit I Introduction to Big data — 03 Hours

- Big Data :Definition & taxonomy
- Sources of Big Data
- 3V's of Big Data (need for Hadoop)
- Varying data structures
- Characteristics of Big Data
- Applications of Big Data
- Challenges in Big Data
- Introduction to Big Data Technology
- Industry applications of BIG Data

Unit II From SQL to NoSQL — 04 Hours

- Evolution of Databases, Scale-Out Architecture, RDBMS Vs Non-Relational Database
- NoSQL Data Store
- NoSQL Data Architectural Patterns
- Managing BIG Data using NOSQL
- Database Workload & its Characteristics

Unit III Big Data Warehouse and Analytics — 05 Hours

- Big Data Warehouse & Analytics
- Big data Warehouse System requirements & Hybrid Architectures
- Enterprise Data Platform Ecosystem

- Big Data and Master Data Management
- Understanding data integration Pattern
- Big Data Workload Design Approaches
- Map-Reduce patterns, Algorithms and Use Cases

Unit IV	The Hadoop Ecosystem	08 Hours

- Introduction to Hadoop
- Hadoop and its Ecosystems
- Hadoop Components :HDFS, Mapreduce Frame work and Programming model
- Hadoop Yarn
- Introduction to HBase, Hive, Pig and Mahout

Unit V	Spark and Big Data Analytics	5 Hours

- Introduction
- Data Analysis using Spark – Spark SQL, Using Python with Spark SQL, Operations
- Introduction to programming with RDDs
- Introduction to Machine learning with Mlib
- Introduction to ETL using Spark
- Introduction to Analytics, Reporting and Visualizing

Unit VI	Case Studies of Big Data Analytics	5 Hours

Business Case Studies: Netflix, Facebook, LinkedIn and Google
For each study – The problem to solve, how it was solved, results, what data was used, Technical details, challenges faced and learning lessons

	Total	30

Reference Books

1.Raj Kamal, Preeti Sexena, “Big Data Analytics”, McGraw Hill Education
2.Madhu Jagdeesh, Soumendra Mohanty, Harsha Srivatsa,”Big Data Imperatives: Enterprise Big Data Warehouse,BI Implementations and Analytics”,1st Edition, Apress(2013)
3. Cristian Molaro,Surekha Parekh,Terry Purcell,”DB2 11:The Database for Big Data & Analytics”,MC Press,(2013)
4. Tom White,”Hadoop-The Definitive Guide,Storage and analysis at internet scale”,SPD, O’Really.
5. DT Editorial Services,”Big Data, Black Book-Covers Hadoop2, MapReduce, Hive, YARN, Pig, R and Data Visualization” Dreamtech Press (2015).
6. Big Data Case Study by Bernard Marr –Willey Publications.

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II (2019 Course)
SEM-III
Course Type : CBOP Course Code : CA –CBOPP-3 B
Course Title : Big Data Laboratory

Teaching Scheme: TH: 04 Hours/Week	Credit 02	Examination Scheme: In-Sem : 15 Marks End-Sem : 35 Marks

1. Hadoop and its components
2. Case study on Sprint
3. Case Study on IBM Watson
4. Case Study on Terra Seismic
5. Case Study on Uber
6. Case study on Twitter
7. Case Study on Kaggle

Reference Book

Big Data Case Study by Bernard Marr –Willey Publications

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II (2019 Course)
SEM-III
Course Type : CBOP Course Code : CA- CBOTP -3 C
Course Title : DJango

Teaching Scheme: **TH: 02** **Hours/Week**	**Credit 02**	**Examination Scheme:** **IE : 15 Marks** **UE: 35 Marks**

Prerequisite Courses: Python Programming

Course Objectives:

- To Study Django Architecture
- Learn MVC (Models, Views & Templates)

Course Outcomes:

On completion of the course, student will be able to–

- Design Build and deploy robust Django web apps
- Integrate with RESTful web services

Course Contents

Unit I	**Introduction to Django**	**07 Hours**

- What is Django?
- Django and Python
- Django' s take on MVT: Model, View and Template
- DRY programming: Don't Repeat Yourself
- How to get and install Django

Unit II	**Getting started with Django**	**07 Hours**

- About the 3 Core Files: models.py, urls.py, views.py
- Setting up database connections with SQLite and MySQL
- Managing Users & the Django admin tool
- Installing and using 'out of the box' Django features

Unit III	**Django URL Patterns, Views and Forms**	**08 Hours**

- Designing a good URL scheme
- Generic Views
- Form classes

- Validation
- Authentication
- Advanced Forms processing techniques

Unit IV	REST APIs	08 Hours

- Django REST framework
- Requests and Responses
- Class Based Views
- Authentication and Permissions

Books:

1) Django for Beginners: Build websites with Python and Django Kindle Edition by William S. Vincent
2) Two Scoops of Django 1.11: Best Practices for the Django Web Framework

Savitribai Phule Pune University
M.Sc.(Computer Applications)-II (2019 Course)
SEM-III
Course Type : CBOP Course Code : CA- CBOPP -3 C
Course Title: Django Laboratory

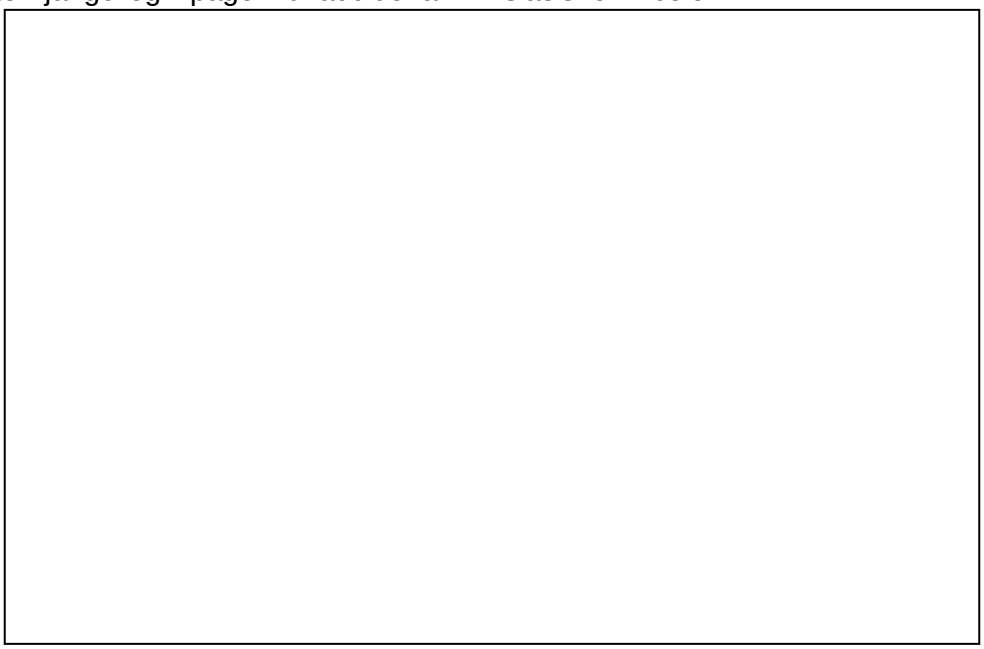
Teaching Scheme:	No. of Credit : 2	Examination Scheme:
Practical : 04 Hours/Week		IE: 15 Marks UE: 35 Marks

Assignments:

1) Create a web page that outputs “Hello Django”.
2) Create a Django built-in login form with password validation.
3) Design Django Admin App site in which, you can

- Add new user.
- Modify existing user.
- Search and filter users.
- Sort the user data by clicking on the column header.
- Delete user

4) Create Django login page with additional Links as shown below



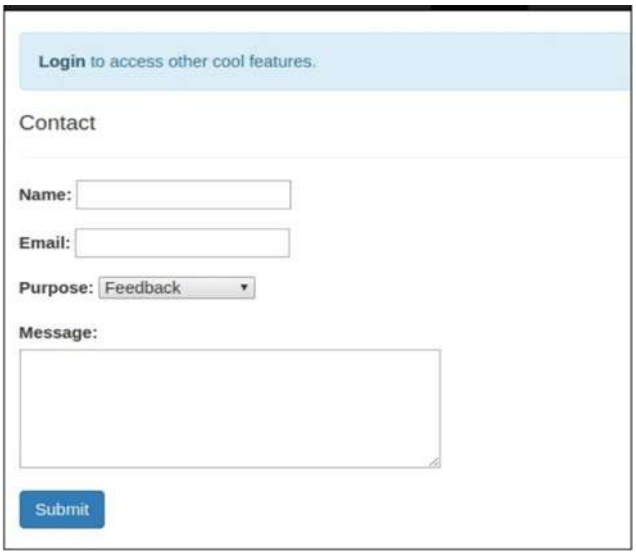
5) Create Django templates that represent the HTML GUI that the client can view.
6) Build Django application that illustrate template inheritance

7) Build, handle, submit & validate HTML forms in the Django way.
8)Write a Python program to connect a database and create SQLite table within the database.
9)Write a Python program to list the tables of given SQLite database file.

10) Write a Python program to create a table and insert some records in that table. Finally selects all rows from the table and display the records.

11)Write Python Django program to insert, update and delete record in to database table using GUI.
12)Create Django app that will print records of employee having attributes first name, last name and Designation from Django admin.

13) Build the Django form which will accept the name, email and address. Validate Name field. Name should start with 'A', else display error message.
14) Develop Django models and model relationships for customised application.
15) Query the created models & connect to MySQL database.
16) Using Object Relational Mapper (ORM), design Django app that can insert and access the data from the student's database
17) Create Django authentication (or auth) app that provides a wide array of tools for User management ranging from authenticating users to resetting passwords.
18) Design Django application that will create contact-us page as shown below



And after submitting information it displays Thank you message on the same page.

19) Build REST web services and mapping web URLs with view functions & perform complex routing.
20) Use the built-in HTTP session object parameters to control the session behaviours/patterns

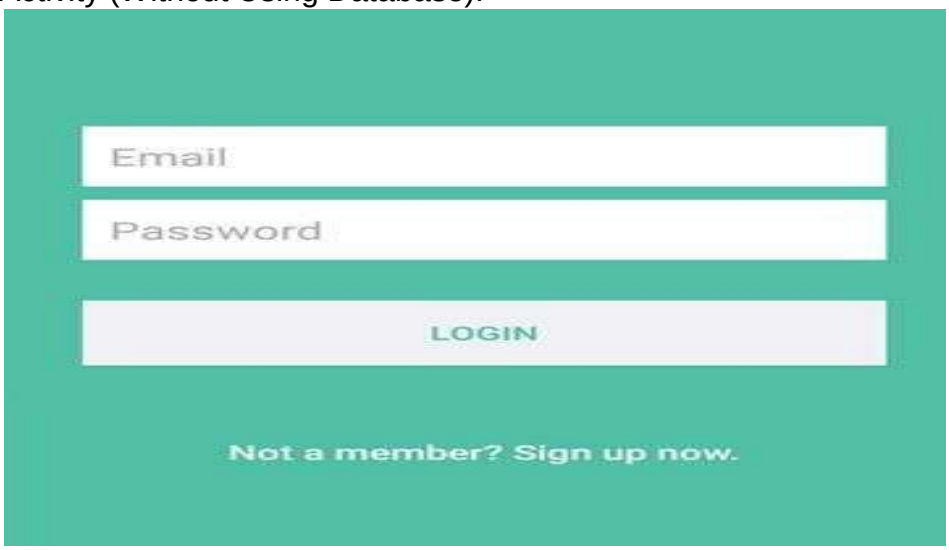
Savitribai Phule Pune University
M.Sc.(Computer Applications)-II (2019 Course)
SEM-III
Course Type : CC Course Code : CA- CCPP -3
Course Title: Android Laboratory

Teaching Scheme:	No. of Credit : 4	Examination Scheme:
Practical : 08 Hours/Week		IE: 30 Marks UE: 70 Marks

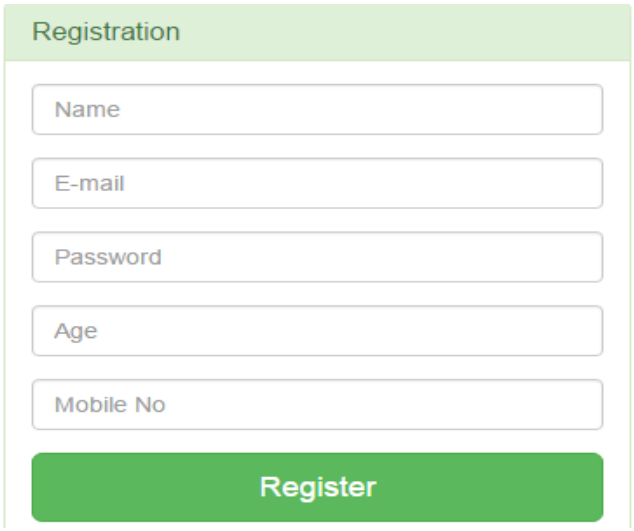
Assignments:

Assignment 1:

1. Create a Application Which will Send —Hello message from one activity to another with help of Button (Use Intent).
2. Create application with Login Screen. On successful login, gives message go to next Activity (Without Using Database).



3. Create First Activity to accept information like Student First Name, Middle Name, Last Name, Date of birth, Address, Email ID and display all information on Second Activity when user click on Submit button.
4. Create a "Contact" layout to hold multiple pieces of information, including: Photo, Name, Contact Number, E-mail id.
5. Create registration form given below. Also perform appropriate validation.



Assignment 2 :

1. Construct an app to display the image.
2. Construct a bank app to display different menu like withdraw, deposit etc.
3. Construct a register app to display different menu like add, delete, edit etc.

Assignment 3 :

Create sample application with login module (Check username and password). On successful login, pass username to next screen And on failing login, alert user using Toast (Hint :Use Login(username, password) Table.)

2. Create Table project (pno, p_name, ptype, duration) and employee (id, e_name, qulification, joindate)

Project – employee have many to many relationship.

Using database perform following operation.

1) Add new record into table.

2) Accept a project name from user and display information of employees working on the project.

Assignment 4:

1. Create application to send and receive messages using SMS Manager.
2. Create application to send email.
3. Create application to design login form, validate it. Write and send email with appropriate message.
4. Write a program to search a specific location on Google Map
5. Write a program to calculate distance between two locations on Google Map.

Assignment 5:

1. Create application using JSON which gives us list of contacts where each node contains contact information like name, email, address, gender and phone numbers.
2. Create application using JSON which gives the Employee information.

Semester IV

Savitribai Phule Pune University
M.Sc (Computer Applications)
Industrial Training/on-campus Projects

Teaching Scheme: **02 Hrs/Week**	**Credit** **20**	**Examination Scheme:** **Practical:** **IE -150 Marks** **UE -350 Marks**

Course Objectives:

- To develop skills in the application of theory to practical work situations
- To provide students the opportunity to test their interest in a particular career
- To expose students to real work environment experience, gain knowledge in writing report in technical works/projects.
- To build strength, teamwork spirits and self-confidence in student.

Course Outcomes:

On completion of the Industrial Training Period, student will be able to–

- Apply fundamental principles of the subjects to solve real world problems.
- Become master in at least one specialized area
- Able to communicate efficiently
- Ability to identify, formulate and model problems and find solutions .

Guidelines

- Each student will take up either training at an industry/research institute or will work on campus on a project idea.
- The institute will appoint faculty members to work as coordinators/mentors to supervise this activity. **However, One faculty member will be assigned maximum 05 students**
- Students will meet the coordinator/mentor at least once in a week and will also submit synopsis and 2 copies of reports during the period of Industrial training (ITP) to the faculty mentor
- Continuous assessment will be carried out by the faculty mentor for 150 marks on the basis of weekly attendance, performance, progress, report, presentations given by the student.
- After Completion of the ITP, a student will have to submit the project completion certificate from the respective industry/research institute.
- A student will produce two hard copies (Hard Black Bound with Golden Embossing -one student copy and one Department copy) and a soft copy of the report in the format given below.
- End semester examination will be of 300 marks and will be conducted by three examiners: faculty mentor, expert from industry (appointed by the college) and one external examiner from affiliated college appointed by the University.
- Students are advised to take online foreign language courses during the period

5.Index for Project Report