# SAURASHTRA UNIVERSITY

# RAJKOT – INDIA

## CURRICULAM

## FOR

## B.C.A.

## Bachelor of Computer Application

## (Semester V and Semester VI)

## Effective from June – 2021

**Bachelor of Computer Application**
**(Semester – V and Semester - VI)**
**Saurashtra University**
**Effective from June - 2021**

| B.C.A. (Semester – V) | | | |
|---|---|---|---|
| **SR.NO** | **SUBJECT** | **NO. OF THEORY LECT. PER WEEK** | **NO. OF PRACTICAL PER WEEK** |
| 1 | **CS – 25**<br>Advance Java Programming (J2EE) | 5 | 6 |
| 2 | **CS – 26**<br>Programming with ASP.NET | 5 | 6 |
| 3 | **CS – 27**<br>Web Searching Technology and Search Engine Optimization | 5 | 3 |
| 4 | **CS –28**<br>Practical - 1<br>(based on CS-25) | - | 6 |
| 5 | **CS – 29**<br>Practical – 2<br>(based On CS-26 and CS-27) | - | 6 |
| 6 | **CS – 30**<br>Project Viva | - | 6 |

Note:

1. Credit of each subject is 5. Total credit of semester is 36.
2. Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
3. Total marks of each practical and project-viva paper are 100. No internal examination marks in practical and project-viva papers.

| **Course Outcomes** |
|---|
| 1. Understand and implements RMI, JSP & JDBC applications. |
| 2. Understand and apply the concept of servlet for developments. |
| 3. Understand different listeners and interface which used for servlet programming. |
| 4. Understand and apply the concept of jsp program for developments. |
| 5. Understand and apply concept of MVC and tag Libraries. |

| **CS-25 Advanced Java Programming (J2EE)** | | | | |
|---|---|---|---|---|
| **Sr. No** | **Topics** | **Details** | **Weightage in %** | **Approx Lectures** |
| **1** | **The J2EE Platform, JDBC (Java Database Connectivity)** | • Introduction to J2EE<br>• Enterprise Architecture Styles:<br>▪ Two-Tier Architecture<br>▪ Three-Tier Architecture<br>▪ N-Tier Architecture<br>• Enterprise Architecture<br>• The J2EE Platform<br>• Introduction to J2EE APIs (Servlet, JSP, EJB, JMS, JavaMail, JSF, JNDI)<br>• Introduction to Containers<br>• Tomcat as a Web Container<br>• Introduction of JDBC<br>• JDBC Architecture<br>• Data types in JDBC<br>• Processing Queries<br>• Database Exception Handling<br>• Discuss types of drivers<br>• JDBC Introduction and Need for JDBC<br>• JDBC Architecture<br>• Types of JDBC Drivers<br>• JDBC API for Database Connectivity (java.sql package)<br>• Statement, PreparedStatement<br>• CallableStatement<br>• ResultSetMetaData<br>• DatabaseMetaData<br>• Other JDBC APIs<br>• Connecting with Databases (MySQL, Access, Oracle) | **20** | **12** |

| | | | | |
|---|---|---|---|---|
| **2** | **RMI**<br>**Servlet** | • RMI overview<br>• RMI architecture<br>• Stub and Skeleton<br>• Developing and Executing RMI application<br>• Servlet Introduction<br>• Architecture of a Servlet<br>• Servlet API (Javax.servlet and avax.servlet.http)<br>• Servlet Life Cycle<br>• Developing and Deploying Servlets<br>• Handling Servlet Requests and Responses<br>• Reading Initialization Parameters<br>• Session Tracking Approaches (URL Rewriting, Hidden Form Fields, Cookies, Session API)<br>• Servlet Collaboration<br>• Servlet with JDBC | **20** | **12** |
| **3** | **JSP,**<br>**Java Beans** | • Introduction to JSP and JSP Basics<br>• JSP vs. Servlet<br>• JSP Architecture<br>• Life cycle of JSP<br>• JSP Elements: Directive Elements, Scripting Elements, Action Elements<br>▪ Directives Elements (page, include, taglib)<br>▪ Scripting Elements (Declaration, scriptlet, expression)<br>▪ Action Elements (JSP:param, JSP:include, JSP:Forward, JSP:plugin)<br>• JSP Implicit Objects<br>• JSP Scope<br>• Including and Forwarding from JSP Pages<br>• include Action<br>• forward Action<br>• Working with Session & Cookie in JSP<br>• Error Handling and Exception Handling with JSP<br>• JDBC with JSP<br>• JavaBean Properties<br>• JavaBean Methods<br>• Common JavaBean packaging | **20** | **12** |

| | | | | |
|---|---|---|---|---|
| **4** | **MVC Architecture, EJB, Hibernate** | • Introduction to MVC<br>• Implementation of MVC Architecture<br>• Introduction<br>• Benefits of EJB<br>• Restriction on EJB<br>• Types of EJB<br>• Session Beans<br>• Entity Beans<br>• Message-driven beans<br>• Timer service<br>• Introduction to Hibernate<br>• Need for hibernate<br>• Features of hibernate<br>• Disadvantages of Hibernate<br>• Exploring Hibernate Architecture<br>• Downloading and Configuring and necessary files to Hibernate in Eclipse<br>• Jars files of hibernate.<br>• Hibernate Configuration file<br>• Hibernate Mapping file<br>• Basic Example of Hibernate<br>• Annotation<br>• Hibernate Inheritance<br>• Inheritance Annotations<br>• Hibernate Sessions | **20** | **12** |
| **5** | **Spring, Struts** | • Introduction of Spring Framework<br>• Spring Architecture<br>• Spring Framework definition<br>• Spring & MVC<br>• Spring Context definition<br>• Inversion of Control (IoC) in Spring<br>• Aspect Oriented programming in Spring (AOP)<br>• Understanding Struts Framework<br>• Comparision with MVC using RequestDispatcher and the EL<br>• Struts Flow of Control<br>• Processing Requests with Action Objects<br>• Handling Request Parameters with FormBeans<br>• Prepopulating and Redisplaying Input Forms<br>• Using Properties Files | **20** | **12** |
| | | Total | **100** | **60** |

**Reference Books:**

(1) Java Complete Reference 11th Edition - Herbert Schildt, Oracle Press
(2) Java Server Programming For Professionals, Ivan Bayross, Sharanam Shah – Shroff publication
(3) Developing Java Servlets – Techmedia
(4) JSP Beginner's Guide – Tata McGraw Hill by Gary Bolling, Bharathi Nataragan
(5) Spring and Hibernate, K. Santosh Kumar, - Tata McGraw-Hill
(6) Hibernate Made Easy: Simplified Data Persistence with Hibernate and JPA (Java Persistence API) Annotations by Cameron Wallace McKenzie, Kerri Sheehan
(7) Spring Framework: A Step by Step Approach for Learning Spring Framework - CreateSpace Independent Publishing Platform
(8) Beginning Hibernate Second Edition By Jeff Linwood, Dave Minte - APress

**Bachelor of Computer Application**
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| **Course Outcomes** |
|---|
| 1. Understand the ASP.NET framework and different controls. |
| 2. Understand form validation, apply form validation control also understand state management. |
| 3. Understand ADO.Net architecture and developing application with LINQ. |
| 4. Understand and apply concept of MasterPage, CSS & Theme |
| 5. Understand application configuration with XML |

| **CS-26 Programming With ASP.NET** | | | | |
|---|---|---|---|---|
| **Sr. No** | **Topic** | **Detail** | **Weightage In %** | **Approx. Lectures** |
| **1** | **Framework And Web Contents Validation Controls** | • Overview of Asp.NET Framework<br>• Client Server Architecture<br>• Application Web Servers<br>• Installation of IIS server<br>• Types of Files in Asp.NET<br>• Types of controls in Asp.NET<br>• Page Architecture, Adding Controls to a Webpage<br>• The Page Class<br>• Webfor<br>• Introduction to standard Controls ( Buttons, Textbox, Checkbox, Lable, Panel, Listbox, Dropdownlist etc.)<br>• Running an Asp.Net Application, File Upload Control<br>• What is Validation?<br>• Client Side Validation<br>• Server Side Validation<br>• Types ( RequieredField Validator, Range Validator, CompareField Validator, RegularExpression Validator, Custom Validator, ValidationSummery Control) | **20** | **12** |
| **2** | **State Management** | • What is State?<br>• Why is it Required in Asp.Net?<br>• Client Side State Management<br>• Server Side State Management<br>• Various State Management Techniques (View State, Query String, Cookie, Session State, Application State) | **20** | **12** |
| **3** | **ADO.NET And Database** | • Architecture of ADO.NET<br>• Connected Architecture<br>• DisConnected Architecture | **20** | **12** |

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|---|---|---|---|---|
| | | • ADO.NET Classes ( Connection, Command,<br>• DataReader, DataAdapter, DataSet, DataColumn, DataRow, DataConstraints, DataView etc.)<br>• The Gridview Control, The Repeater Control<br>• Binding Data to DataBound Controls,<br>• Diplaying Data in a webpage using SQLDataSource Control<br>• DataBinding Expressions | | |
| **4** | **Master Pages and Theme Caching, Application Pages And Data** | • What is Master Page ?<br>• Requirement Of a Master Page in an Asp.NET application<br>• Designing Website with Master Page, Theme and CSS<br>• Overview<br>• Page Output Caching<br>• Partial Page Caching, Absolute Cache Expiration<br>• Sliding Cache Expiration<br>• Data Caching | **20** | **12** |
| **5** | **Working With XML Asp.NET Application Configuration and Deployment of Application** | • Reading Datasets From XML<br>• Writing DataSets With XML<br>• WebServices (Introduction, HTTP, SOAP, UDDI,XML, Creating a Web Servic, Consuming a Web Service)<br>• Introduction To Web.Config<br>• Common Configuration Sections<br>• AppSettings<br>• Tracing<br>• Custom Errors<br>• Authentication And Authorization<br>• Deployment of Application in web server | **20** | **12** |
| | | **Total** | **100** | **60** |

**Reference Books :**

(1) Asp.Net – Unleashed
(2) Asp.Net – Wrox Publication
(3) Pro ASP.NET Core MVC 2 Book by Adam Freeman
(4) Introduction to ASP.NET Web Programming Using the Razor Syntax (C#) by Tom FitzMacken

| **Course Outcomes** |
|---|
| 1. Understand basic of search engines and reflecting |
| 2. Understand SEO objectives and defining site audience. |
| 3. Apply and Implement SEO friendly website with all SEO concept. |
| 4. Understand keyword research and apply it for website developments. |
| 5. To track the results and measuring the success to SEO process |

| **CS-27 Web Searching Technology and Search Engine Optimization** | | | | |
|---|---|---|---|---|
| **Sr. No** | **Topic** | **Detail** | **Weightage In %** | **Approx. Lectures** |
| **1** | **The Search Engines: Reflecting Consciousness and Connecting Commerce Search Engine Basics** | • The Mission of Search Engines<br>• The Market Share of Search Engines<br>• The Human Goals of Searching<br>• Determining Searcher Intent: A Challenge for Both Marketers and Search Engines<br>• How People Search?<br>• How Search Engines Drive Commerce on the Web?<br>• Eye Tracking: How Users Scan Results Pages?<br>• Click Tracking: How Users Click on Results? Natural Versus Paid<br>• Understanding Search Engine Results<br>• Algorithm-Based Ranking Systems: Crawling, Indexing, and Ranking<br>• Determining Searcher Intent and Delivering Relevant<br>• Fresh Content<br>• Analyzing Ranking Factors<br>• Using Advanced Search Techniques<br>• Vertical Search Engines<br>• Country-Specific Search Engines | **20** | **12** |

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|---|---|---|---|---|
| **2** | **Determining SEO Objectives and Defining Site's Audience First Stages of SEO** | • Setting SEO Goals and Objectives<br>• Developing an SEO Plan Prior to Site Development<br>• Understanding Audience and Finding Niche<br>• SEO for Raw Traffic<br>• SEO for E-Commerce Sales<br>• SEO for Mindshare/Branding<br>• SEO for Lead Generation and Direct Marketing<br>• SEO for Reputation Management<br>• SEO for Ideological Influence<br>• The Major Elements of Planning<br>• Identifying the Site Development Process and Players<br>• Defining Site's Information Architecture<br>• Auditing an Existing Site to Identify SEO Problems<br>• Identifying Current Server Statistics Software and Gaining Access<br>• Determining Top Competitors<br>• Assessing Historical Progress<br>• Benchmarking Current Indexing Status<br>• Benchmarking Current Rankings<br>• Benchmarking Current Traffic Sources and Volume<br>• Leveraging Business Assets for SEO<br>• Combining Business Assets and Historical Data to Conduct SEO/Website SWOT Analysis | **20** | **12** |

| | | | | |
|---|---|---|---|---|
| **3** | **Developing an SEO-Friendly Website** | • Making Site Accessible to Search Engines<br>• Creating an Optimal Information Architecture<br>• Root Domains, Subdomains, and Microsites<br>• Optimization of Domain Names/URLs<br>• Keyword Targeting<br>• Content Optimization<br>• Duplicate Content Issues Controlling Content with Cookies and Session IDs<br>• Content Delivery and Search Spider Control<br>• Redirects, Content Management System (CMS) Issues<br>• Optimizing Flash<br>• Best Practices for Multilanguage/Country Targeting | **20** | **12** |
| **4** | **Keyword Research, Optimizing for Vertical Search** | • The Theory Behind Keyword Research<br>• Traditional Approaches: Domain Expertise<br>• Site Content Analysis<br>• Keyword Research Tools<br>• Determining Keyword Value/Potential ROI, Leveraging the Long Tail of Keyword Demand, Trending, Seasonality, and Seasonal Fluctuations in Keyword Demand<br>• The Opportunities in Vertical Search<br>• Optimizing for Local Search<br>• Optimizing for Image Search<br>• Optimizing for Product Search<br>• Optimizing for News, Blog, and Feed Search<br>• Others: Mobile, Video/Multimedia Search | **20** | **12** |

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|---|---|---|---|---|
| **5** | **Tracking Results and Measuring Success An Evolving Art Form: The Future of SEO** | • Why Measuring Success Is Essential to the SEO Process<br>• Measuring Search Traffic<br>• Tying SEO to Conversion and ROI<br>• Competitive and Diagnostic Search Metrics Key Performance<br>• Indicators for Long Tail SEO<br>• The Ongoing Evolution of Search<br>• More Searchable Content and Content Types, Search becoming More Personalized and User-Influenced<br>• Increasing Importance of Local, Mobile, and Voice<br>• Recognition Search<br>• Increased Market Saturation and Competition<br>• SEO As an Enduring Art Form<br>• | **20** | **12** |
| | | **Total** | **100** | **60** |

**Reference Books:**

(1) The Art of SEO : Mastering Search Engine Optimization By Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola, O'Reilly Media, 3rd Edition October, 2015
(2) Google SEO Bible, Beginner's Guide to SEO, ISBN-978-1700098733, moaml mohmmed, 2019
(3) SEO Warrior: Essential Techniques for Increasing Web Visibility By John I Jerkovic, O'Reilly Media, November, 2009

| **CS-28 : Practical And Viva Based On CS – 25** | |
|---|---|
| Topics | Marks |
| CS – 25 | 100 |

| **CS-29 : Practical And Viva Based On CS – 26 and CS-27** | |
|---|---|
| Topics | Marks |
| CS – 26 and CS - 27 | 100 |

**Note :**

- Practical examination may be arranged before or after theory exam.

| **CS-30 : Project Viva** | **Total 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 all the Workouts, 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.

**Bachelor of Computer Application**
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| B.C.A. (Semester – VI) | | | |
|---|---|---|---|
| **SR.NO** | **SUBJECT** | **NO. OF THEORY LECT. PER WEEK** | **NO. OF PRACTICAL PER WEEK** |
| 1 | **CS – 31**<br>Mobile Application Development in Android using Kotlin | 5 | - |
| 2 | **CS – 32**<br>Data Warehousing with SQL Server 2012 | 5 | - |
| 3 | **CS – 33**<br>Programming in Python | 5 | - |
| 4 | **CS –34**<br>Practical - 1<br>(based on CS-31) | - | 6 |
| 5 | **CS – 35**<br>Practical – 2<br>(based On CS-32 and CS-33) | - | 6 |
| 6 | **CS – 36**<br>Project Viva | - | 6 |

Note:

(1) Credit of each subject is 5. Total credit of semester is 36.
(2) Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
(3) Total marks of each practical and project-viva paper are 100. No internal examination marks in practical and project-viva papers.

| **Course Outcomes** |
|---|
| 1. Understand basic of kotlin programming. |
| 2. Understand the basic of android and android application design. |
| 3. Understand the different user interface elements and develop application with those widgets. |
| 4. Understand, apply and develop application with SQLite and Content Providers. |
| 5. Understand, apply and develop application with Location based services, notification services. |

| **CS-31 Mobile Application Development in Android using Kotlin** | | | | |
|---|---|---|---|---|
| **Sr. No** | **Topic** | **Detail** | **Weightage In %** | **Approx. Lectures** |
| **1** | **Introduction to Kotlin Programming** | • Basics of Kotlin, Operations and Priorities,<br>• Decision Making<br>• Loop Control, Data Structures(Collections),<br>• Functions<br>• Object Oriented Programming: Inheritance abstract, interface, super and this, visibility modifiers. | **20** | **12** |
| **2** | **Introduction to Android & Android Application Design** | • The Open Handset Alliance<br>• The Android Platform, Android SDK<br>• Building a sample Android application<br>• Anatomy of an Android applications<br>• Android terminologies<br>• Application Context, Activities, Services, Intents<br>• Receiving and Broadcasting Intents<br>• Android Manifest File and its common settings<br>• Using Intent Filter, Permissions<br>• Managing Application resources in a hierarchy<br>Working with different types of resources | **20** | **12** |
| **3** | **Android User Interface Design** | • User Interface Screen elements<br>  ○ Button, EditText, TextView, DatePicker, TimePicker, ProgressBar, ListView, GridView, RadioGroup, ImageButton, Fragement<br>• Designing User Interfaces with Layouts<br>  ○ Relative Layout, Linear Layout, Table Layout etc<br>• Dialogs<br>• Drawing and Working with Animation<br>  ○ Frame By Frame Animation<br>• Twined Animation | **20** | **12** |

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|---|---|---|---|---|
| **4** | **Database Connectivity Using SQLite and Content Provider** | • Using Android Data and Storage APIs<br>• Managing data using SQLite<br>• Sharing Data Between Applications with Content Providers | **20** | **12** |
| **5** | **Location Based Services (LBS), Common Android API, Notifications, Services, Deployment of applications** | • Using Global Positioning Services (GPS)<br>• Geocoding Locations<br>• Mapping Locations<br>• Many more with location based services<br>• Android networking API<br>• Android web API<br>• Android telephony API<br>• Notifying the user, Notifying with the status bar<br>• Vibrating the phone<br>• Blinking the lights<br>• Customizing the notifications Services<br>• Application development using JSON in MySQL<br>• Publish android application | **20** | **12** |
| | | **TOTAL** | **100** | **60** |

**Notes: Android application must be developed using ANDROID STUDIO 4.0**

**Reference Books:**

(1) Learn Android Studio 3 with Kotlin – Teg Hagos – Apress – 2019
(2) Headfirst Kotlin, A Brain Friendly Guide – Dawn Griffiths, David Griffiths – Orilly – 2019
(3) Professional Android 2 Application Development Reto Meier, Wiley India Pvt Ltd (2011)
(4) Beginning Android Mark L Murphy, Wiley India Pvt Ltd
(5) Android Developer Fundamental Course – Practical Book – 2018

| **Course Outcomes** |
|---|
| 1. Understand basic of data warehousing. |
| 2. Understand and apply the concept of data warehousing designing and implements. |
| 3. Understand and creating ETL Solutions with SSIS, Implementing Control Flow in SSIS |
| 4. Understand and apply Enforcing Data Quality, Extending SQL Server Integration Services concept. |
| 5. Understand and deploying and Configuring SSIS Packages, Consuming Data in Data Warehouse |

| **CS –32 Data Warehousing with SQL Server 2012** | | | | |
|---|---|---|---|---|
| **No.** | **Topic** | **Detail** | **Weightage in %** | **Min. Lect.** |
| 1 | Introduction to Data Warehousing | • What Is a Data Warehouse?<br>• Data Warehousing Today<br>• Future Trends in Data Warehousing.<br>• Data Warehouse Architecture<br>• Data Flow Architecture | 20 | 12 |
| 2 | Designing and Implementation of Data Warehousing | • Logical Design for data warehouse<br>• Physical Design for data warehouse<br>• Design dimension table, fact table for data warehouse<br>• Design and implement effective physical data structure for data warehouse | 20 | 12 |
| 3 | Creating ETL Solutions with SSIS, Implementing Control Flow in SSIS | • Introduction to ETL with SSIS<br>• Exploring data sources<br>• Implementing data flow using SSIS<br>• Introduction to Control Flow<br>• Creating Dynamic Packages<br>• Using Containers | 20 | 12 |

| | | | | |
|---|---|---|---|---|
| 4 | Enforcing Data Quality, Extending SQL Server Integration Services | • Introduction to Data Quality<br>• Using Data Quality Service to Cleanse data<br>• Using Data Quality Service to match data<br>• Using Scripts in SSIS<br>• Using Custom components in SSIS | 20 | 12 |
| 5 | Deploying and Configuring SSIS Packages, Consuming Data in Data Warehouse | • Overview of SSIS Development<br>• Deploying SSIS Projects<br>• Planning SSIS Package Execution<br>• Introduction to Business Intelligence<br>• Introduction to Reporting<br>• Introduction to Data Analysis | 20 | 12 |
| | | | **100** | **60** |

**Notes: For Lab Practice : Microsoft SQL Server 2012 or Higher version**

## Reference Books:

(1) Implementing a Data Warehouse with Microsoft® SQL Server® 2012 Dejan Sarka Matija Lah Grega Jerkič
(2) Building a Data Warehouse: With Examples in SQL Server – Vincent Rainardi-Apress (2014)
(3) Data mining Explained A manager's guide to customer centric business intelligence by
(4) Data mining by Pieter Adriaans, Dolf Zantinge
(5) Data warehousing in the real world A practical guide for business DSS by Sam Anahory,

| **Course Outcomes** |
|---|
| 1. Understand concept of programming with python |
| 2. Understand the OOP using python |
| 3. Implementing the plotting using pylab |
| 4. Understand the Network programming and GUI |
| 5. Understand & Implement the connecting with the database |

| **CS-33: Programming in Python** | | | | |
|---|---|---|---|---|
| **Sr. No.** | **Topic** | **Detail** | **Weightage In %** | **Approx. Lectures** |
| **1** | **Introduction to Python** | • The basic elements of Python,<br>• Branching programs,<br>• Strings and Input,<br>• Iteration,<br>• Functions and Scoping, Specifications, Recursion,<br>• Global variables, Modules, Files,<br>• Tuples, Lists and Mutability,<br>• Functions as Objects, Strings,<br>• Tuples and Lists, Dictionaries | 20 | 12 |
| **2** | **OOP using Python** | • Handling exceptions,<br>• Exceptions as a control flow mechanism,<br>• Assertions, Abstract Data Types and Classes,<br>• Inheritance,<br>• Encapsulation and information hiding,<br>• Search Algorithms, Sorting Algorithms,<br>• Hashtables | 20 | 12 |
| **3** | **Plotting using PyLab** | • Plotting using PyLab,<br>• Plotting mortgages and extended examples,<br>• Fibonacci sequence revisited, Dynamic<br>• programming and the 0/1 Knapsack algorithm,<br>• Dynamic programming and divide and conquer | 20 | 12 |
| **4** | **Network Programming and GUI using Python** | • Network Programming:<br>o Protocol, Sockets,<br>o Knowing IP Address,<br>o URL, Reading the Source Code of a Web Page,<br>o Downloading a Web Page from Internet,<br>o Downloading an Image from Internet,<br>o A TCP/IP Server, A TCP/IP Client,<br>o A UDP Server, A UDP Client,<br>o File Server, File Client,<br>o Two-Way Communication between Server and Client, | 20 | 12 |

| | | | | |
|---|---|---|---|---|
| | | ○ Sending a Simple Mail.<br>• GUI Programming:<br>○ Event-driven programming paradigm;<br>○ creating simple GUI;<br>○ buttons, labels, entry fields, dialogs;<br>○ widget attributes - sizes, fonts, colors layouts, nested frames | | |
| **5** | **Connecting with Database** | • Verifying the MySQL dB Interface Installation,<br>• Working with MySQL Database,<br>• Using MySQL from Python,<br>• Retrieving All Rows from a Table,<br>• Inserting Rows into a Table,<br>• Deleting Rows from a Table,<br>• Updating Rows in a Table,<br>• Creating Database Tables through Python | 20 | 12 |
| | | **Total** | **100** | **60** |

**Reference Books:**

**1)** "Core Python Programming" by Dr. R. Nageswara Rao – 2017 Edition, Dreamtech Press
**2)** John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
**3)** Robert Sedgewick, Kevin Wayne, Robert Dondero, Introduction to Programming in Python, Pearson
**4)** Wesley J Chun, Core Python Applications Programming, 3rd Edition.Pearson
**5)** Michael Bowles, Machine Leaning in Python, Esssential techniques for predictive analysis, Wiley

| **CS-34: Practical and Viva Based on CS – 31** | |
|---|---|
| Topics | Marks |
| CS – 31 | 100 |

| **CS-35: Practical and Viva Based on CS – 32 and CS-33** | |
|---|---|
| Topics | Marks |
| CS – 32 and CS – 33 | 100 |

**Note:**

- Practical examination may be arranged before or after theory exam.

| **CS-36: Project Viva** | **Total 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 semester-V or semester-VI. **(At the time of Project-Viva examination student must show all the Workouts, 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.