

# **SHREE GOVIND GURU UNIVERSITY**



## **CURRICULUM AND CREDIT FRAMEWORK FOR BACHELOR OF COMPUTER APPLICATION SEMESTER V & VI**

**AS PER  
NATIONAL EDUCATION POLICY 2020**



**SHRI GOVIND GURU UNIVERSITY**

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# SHRI GOVIND GURU UNIVERSITY

**Course Structure under NEP-2020**  
**BCA – Semester-V**

| Subject                                 | Code     | Subject Title                      | Theory | Practical | Credits   | Marking Scheme |          |       |
|---|----------|------------------------------------|--------|-----------|-----------|----------------|----------|-------|
|   |          |                                    |        |           |           | Internal       | External | Total |
| Discipline Specific Course Core (Major) | Major-11 | Programming using Python           | 2      | 2         | 4         | 50             | 50       | 100   |
|   | Major-12 | Advanced Java                      | 2      | 2         | 4         | 50             | 50       | 100   |
|   | Major-13 | Software Engineering-II            | 4      | 0         | 4         | 50             | 50       | 100   |
| Minor                                   | Minor-4  | Artificial Intelligence            | 4      | 0         | 4         | 50             | 50       | 100   |
|   | Minor-5  | Cyber Security                     | 4      | 0         | 4         | 50             | 50       | 100   |
| Skill Enhancement Course                | SEC-5    | Enterprise Resource Planning (ERP) | 2      | 0         | 2         | 25             | 25       | 50    |
|   |          | <b>Total</b>                       |        |           | <b>22</b> |                |          |       |

**BCA (Bachelor of Computer Applications)**  
**BCA (Semester–V)**

**TITLE OF THE COURSE: PROGRAMMING USING PYTHON**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MAJOR-11        | 2+2    | 30             | 60              | 50                  | 50                  | 100         |

| Course Content |   |          |
|----------------|---|----------|
| Unit           | Description   | Lectures |
| 1.             | <p><b>Python Introduction</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Python overview</li> <li>• Getting stated with python</li> </ul> <p>Installing on Linux OS</p> <p>Installing on windows OS</p> <ul style="list-style-type: none"> <li>• Comments</li> <li>• Python identifiers</li> <li>• Reserved keywords</li> </ul>   | 7+12     |
| 2.             | <p><b>Variables, expressions and statements:</b></p> <ul style="list-style-type: none"> <li>• Variables</li> <li>• Declaring a Variable</li> <li>• Initializing a Variable</li> <li>• Standard data types</li> <li>• Operators</li> <li>• Statement and expression</li> <li>• String operations</li> <li>• Boolean Expressions</li> <li>• Control statements</li> <li>• If elif else statement</li> <li>• Match Case</li> <li>• for ...loop</li> <li>• While loop</li> <li>• Alternative executions</li> <li>• Conditional Execution</li> <li>• Iteration – while statement</li> <li>• Input from keyboard</li> </ul> | 8+16     |
| 3.             | <p><b>Functions</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Built-in functions</li> <li>• User defined Functions</li> </ul>  | 8+18     |

|    |   |       |
|----|---|-------|
|    | <ul style="list-style-type: none"> <li>• Parameters and arguments</li> <li>• Function calls</li> <li>• return statement</li> <li>• Python recursive functions</li> </ul>  |       |
| 4. | <p><b>Strings and Lists</b></p> <ul style="list-style-type: none"> <li>• Strings</li> <li>• Compound Data Type</li> <li>• Len function</li> <li>• String slices</li> <li>• Strings are Immutable</li> <li>• String Traversal</li> <li>• Escape character</li> <li>• String formatting operators</li> <li>• String formatting functions</li> </ul> <p><b>Lists</b></p> <ul style="list-style-type: none"> <li>• Values and accessing elements</li> <li>• Lists are mutable</li> <li>• Traversing a List</li> <li>• Deleting elements from List</li> <li>• Built –in List Operators</li> <li>• Built – in List Methods.</li> </ul> <p><b>Tuple</b></p> <ul style="list-style-type: none"> <li>• Values and accessing elements</li> <li>• Traversing a Tuple</li> <li>• Built – in Tuple Methods</li> </ul> <p><b>Set</b></p> <ul style="list-style-type: none"> <li>• Values and accessing elements</li> <li>• Traversing a Set</li> <li>• Built – in Set Methods</li> </ul> <p><b>Dictionaries</b></p> <ul style="list-style-type: none"> <li>• Values and accessing elements</li> <li>• Traversing a Dictionaries</li> <li>• Built – in Dictionaries Methods</li> </ul> | 7+14  |
|    | <b>Total Lectures/Hours</b>   | 30+60 |

### Reference Books:

- 1) Charles Severance, Python for informatics: [www.pythonlearn.com](http://www.pythonlearn.com)
- 2) Swaroop C H. "A Byte of Python", <http://www.swaroopch.com/notes/python>
- 3) "Python Programming", [http://en.wikibooks.org/wiki/Python\\_Programming](http://en.wikibooks.org/wiki/Python_Programming)
- 4) "The Python Tutorial", <http://docs.python.org/release/3.0.1/tutorial/>
- 5) "Learn Python the Hard way", <http://learnpythonthehardway.org/>
- 6) Dive into Python 3: <http://www.diveintopython.net/>

## PRACTICAL OF - PYTHON

|    |  |
|----|--|
| 1  | Write a Python Program to Convert Celsius to Fahrenheit and vice –a-versa.   |
| 2  | Write a program in python to swap two variables without using temporary variable.  |
| 3  | Write a Python Program to Convert Decimal to Binary, Octal and Hexadecimal   |
| 4  | Write a program to make a simple calculator (using functions).   |
| 5  | Write a program in python to find out maximum and minimum number out of three user entered number.   |
| 6  | Write a program which will allow user to enter 10 numbers and display largest odd number from them. It will display appropriate message in case if no odd number is found.   |
| 7  | Write a Python program to check if the number provided by the user is an Armstrong number.   |
| 8  | Write a Python program to check if the number provided by the user is a palindrome or not.   |
| 9  | Write a Python program to perform following operation on given string input:<br>a) Count Number of Vowel in given string<br>b) Count Length of string (do not use Len ())<br>c) Reverse string<br>d) Find and replace operation<br>check whether string entered is a palindrome or not |
| 10 | Define a procedure histogram () that takes a list of integers and prints a histogram to the screen. For example, histogram ([4, 9, 7]) should print the following:<br>****<br>*****<br>*****   |
| 11 | Write a program in python to implement Fibonacci series up to user entered number. (Use recursive Function)  |
| 12 | Write a program in python to implement Factorial series up to user entered number. (Use recursive Function)  |
| 13 | Write a program in Python to implement readline, readlines, write line and writelines file handling mechanisms.  |

**TITLE OF THE COURSE: ADVANCED JAVA**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MAJOR-12        | 2+2    | 30             | 60              | 50                  | 50                  | 100         |

| Course Content |  |          |
|----------------|--|----------|
| Unit           | Description  | Lectures |
| 1.             | <b>Input and Output Classes</b> <ul style="list-style-type: none"> <li>• IO Stream</li> <li>• File class</li> <li>• Byte Stream</li> <li>• Input Stream</li> <li>• Output Stream</li> <li>• Disk File Handling</li> <li>• FileInputStream</li> <li>• FileOutputStream</li> <li>• Filtered Byte Stream</li> <li>• DataInputStream</li> <li>• DataOutputStream</li> <li>• ObjectOutputStream</li> <li>• ObjectInputStream</li> <li>• Random Access File</li> <li>• Character Stream</li> <li>• Reader</li> <li>• Writer</li> </ul> | 7+12     |
| 2.             | <b>Swing and GUI Components</b> <ul style="list-style-type: none"> <li>• The Origin of Swing</li> <li>• Creating windows in Swing</li> <li>• JButton</li> <li>• Creating JButtons</li> <li>• Creating JButtons on JFrame</li> <li>• JLabel</li> <li>• Creating JLabel</li> <li>• Creating JLabel on JFrame</li> <li>• JCheckBox</li> <li>• Creating JCheckBox</li> <li>• Creating JCheckBox on JFrame</li> <li>• Creating JCheckBox on JPanel</li> <li>• Using JCheckBox</li> </ul>  | 8+16     |

|    |   |       |
|----|---|-------|
|    | <ul style="list-style-type: none"> <li>• JRadioButton</li> <li>• Creating JRadioButton</li> <li>• Creating JRadioButton on JFrame</li> <li>• Using JRadioButton Layout Managers</li> <li>• BorderLayout</li> <li>• FlowLayout</li> <li>• GridLayout</li> <li>• CardLayout</li> </ul>  |       |
| 3. | <p><b>Event Handling Delegation Event Model Events</b></p> <ul style="list-style-type: none"> <li>• ActionEvent class</li> <li>• ItemEvent Class</li> <li>• KeyEvent class</li> <li>• TextEvent Class Event Listeners</li> </ul> <p><b>Registering Listener with source Networking</b></p> <ul style="list-style-type: none"> <li>• Overview of java.net package</li> <li>• InetAddress</li> <li>• Socket Programming (ServerSocket and Client Socket)</li> <li>• Datagram ( DatagramPacket and DatagramSocket)</li> <li>• URL (URL class)</li> </ul> | 8+18  |
| 4  | <p><b>Overview of JDBC and ODBC</b></p> <ul style="list-style-type: none"> <li>• Types of Drivers</li> <li>• Using a JDBC</li> <li>• DriverManager- Creating Connection</li> <li>• Connection Interface- Creating Statement</li> <li>• Statement Interface -Executing Statements (insert, update ,delete, select to/from table)</li> </ul> <p><b>Note: Database should be any version of MS-Access</b></p>  | 7+14  |
|    | <b>Total Lectures/Hours</b>   | 30+60 |

#### **Reference Books:**

1. Programming in Java Oxford Publication by Sachin Malhotra and Saurabh Choudhary
2. The Complete Reference Java2 TMH Publication by Herbert Schildt

## PRACTICAL OF -ADVANCED JAVA

|    |  |
|----|--|
| 1  | <p>Write a Java program that:</p> <ul style="list-style-type: none"><li>• Checks if a file exists.</li><li>• Creates a new file.</li></ul> <p>Retrieves file name, path, and size.</p>                     |
| 2  | <p>Write a Java program using FileInputStream and FileOutputStream to copy the contents of one file to another.</p>  |
| 3  | <p>Create a program that:\Writes user-entered data to a file using BufferedWriter.<br/>Reads the data back using BufferedReader</p>  |
| 4  | <p>Create a student class with name, rollno and marks<br/>Write a program to serialize and deserialize student object to/from a file.</p>  |
| 5  | <p>Create a JApplet with the following:</p> <ul style="list-style-type: none"><li>• A JLabel to show a message.</li><li>• A JTextField to accept user input.</li><li>• A JButton to submit data.</li></ul> |
| 6  | <p>Design a Swing form:<br/>Accept username(JTextField) and password (JPasswordField)</p>  |
| 7  | <p>Create a JFrame containing a JPanel with:<br/>JCheckBox for selecting skills (e.g., Java, Python).<br/>A submit JButton that displays selected skills in a label.</p>                                   |
| 8  | <p>Write a GUI that includes:<br/>A JComboBox of countries.<br/>A JTextArea inside a JScrollPane to show details based on the selected country.</p>  |
| 9  | <p>Write a Java program with multiple buttons.<br/>Use ActionListener to detect which button was clicked and display a message accordingly.</p>  |
| 10 | <p>Write a program that:</p> <ul style="list-style-type: none"><li>• Executes a SELECT * FROM students.</li><li>• Displays each student's details using ResultSet.</li></ul>                               |
| 11 | <p>Create a Java program that deletes a record from the students table where the student's name is 'John'</p>  |
| 12 | <p>Create a Java program that:<br/>Connects to a database.<br/>Inserts a new record into table student with columns id, name, and marks.</p>   |
| 13 | <p>Create a Java Program to create table:<br/>Table Name: Employee<br/>Fields are: id, fname, lname, email, contact, gender<br/>Operations are: Create, Retrieve, Update and Delete.</p>                   |

**TITLE OF THE COURSE: SOFTWARE ENGINEERING**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MAJOR-13        | 4      | 60             | 0               | 50                  | 50                  | 100         |

| <b>Course Content</b>       |   |                 |
|-----------------------------|---|-----------------|
| <b>Unit</b>                 | <b>Description</b>  | <b>Lectures</b> |
| 1.                          | <b>Software Architecture and Design Concepts</b> <ul style="list-style-type: none"> <li>• Introduction to Software Architecture</li> <li>• Importance of Architecture in Software Development</li> <li>• Common Architectural Styles: Layered, Client-Server, MVC</li> <li>• Software Design Principles: Modularity, Abstraction, Encapsulation</li> <li>• Introduction to Architectural Documentation</li> </ul>         | 15              |
| 2.                          | <b>Software Quality Assurance and Reliability</b> <ul style="list-style-type: none"> <li>• Concept of Software Quality</li> <li>• McCall's Quality Model and ISO 9126 Standard (overview only)</li> <li>• Software Reliability: Meaning and Importance</li> <li>• Quality Assurance Activities</li> <li>• Software Standards: Basic idea of CMMI levels</li> </ul>  | 15              |
| 3.                          | <b>Software Testing Techniques</b> <ul style="list-style-type: none"> <li>• Purpose and Importance of Testing</li> <li>• Types of Testing: Functional, Non-Functional</li> <li>• Black-Box and White-Box Testing (only concept)</li> <li>• Levels of Testing: Unit, Integration, System, Acceptance</li> <li>• Overview of Test Planning and Documentation</li> </ul>   | 15              |
| 4.                          | <b>Modern Software Development Approaches</b> <ul style="list-style-type: none"> <li>• Introduction to Agile Software Development</li> <li>• Scrum Framework Basics: Roles, Events, Artifacts</li> <li>• Difference between Waterfall and Agile (theoretical)</li> <li>• Concept of Continuous Integration and Continuous Delivery (concept only)</li> <li>• Importance of Teamwork and Communication in Agile</li> </ul> | 15              |
| <b>Total Lectures/Hours</b> |   | 60              |

**Reference Books:**

1. Pressman, Roger S. (2019), Software Engineering: A Practitioner's Approach, McGraw Hill Education.
2. Ian Sommerville (2016), Software Engineering, 10th Edition, Pearson Education.
3. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publishing House.

## TITLE OF THE COURSE: ARTIFICIAL INTELLIGENCE

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MINOR-4         | 4      | 60             | 0               | 50                  | 50                  | 100         |

| Course Content |  |          |
|----------------|--|----------|
| Unit           | Description  | Lectures |
| 1.             | <p><b>Fundamentals of Artificial intelligence and Intelligent Agent</b></p> <p><b>What is AI?</b></p> <ul style="list-style-type: none"> <li>Acting humanly: The Turing Test approach,</li> <li>Thinking humanly: The cognitive modeling approach,</li> <li>Thinking rationally: The “laws of thought” approach,</li> </ul> <p>Acting rationally: The rational agent approach</p> <p>State of Art (Applications of AI)</p> <p>Agents and Environments</p> <p>The Concept of Rationality</p> <p>The Nature of Environment</p> <p>The Structure of Agents</p> <p>Case Study: Create a new health care market with AI</p>   | 15       |
| 2.             | <p><b>Problem Solving by Searching</b></p> <p>Problem-Solving Agents</p> <ul style="list-style-type: none"> <li>Well defined problem and solutions</li> <li>Formulating Problems</li> </ul> <p>Example Problems</p> <p>Toy Problems</p> <p>Searching for Solution</p> <p>Uninformed Search Strategies</p> <ul style="list-style-type: none"> <li>Concept of BFS</li> <li>Concept of DFS</li> <li>Depth-limited search</li> <li>Iterative deepening DFS</li> <li>Bidirectional search</li> </ul> <p>Informed (Heuristic) Search Strategies</p> <ul style="list-style-type: none"> <li>Concept of Greedy BFS</li> <li>A* search: Minimizing the total estimated solution</li> </ul> <p>Case Study: Applications of AI in transportation.</p> | 15       |
| 3.             | <p><b>Natural language processing Language Models</b></p> <ul style="list-style-type: none"> <li>Terms used in Communication</li> <li>Understanding Action Agent Steps of Natural Language</li> <li>Example of Formal Grammar that represent English</li> </ul>  | 15       |

|    |   |    |
|----|---|----|
|    | <ul style="list-style-type: none"> <li>• Working of Natural Language Processing</li> <li>• Steps in Natural Language Processing</li> <li>• Knowledge Levels used in NLP</li> <li>• NLP Techniques</li> </ul>  |    |
| 4. | <p><b>Morphological Analysis Semantic Analysis</b></p> <ul style="list-style-type: none"> <li>• DCG Notation for Augmented Grammerwith Semantics</li> <li>• Pragmatic Processing</li> <li>• Generating Language with DCGs</li> <li>• Ambiguity and Disambiguation</li> </ul> <p><b>Syntactic Analysis</b></p> <ul style="list-style-type: none"> <li>• Problem Formulation for Top-Down Parsing</li> <li>• Problem Formulation for Bottom-Up Parsing</li> <li>• Using Dynamic Programming for Efficient Parsing Algorithm</li> </ul> <p><b>Augmented Grammars</b></p> <ul style="list-style-type: none"> <li>• Introduction to Augmented Grammars</li> <li>• Definite Clause Grammar</li> <li>• Verb Subcategorization</li> <li>• Generative Capacity of Augmented Grammars</li> <li>• Verb Subcategorization</li> </ul> <p>Examples: Applications of Natural Language Processing.<br/>Case Study: Automated Voice Assistants, Chat bots.</p> | 15 |
|    | <b>Total Lectures/Hours</b>   | 60 |

#### Reference Books:

- 1) Artificial Intelligence, 2nd Edition, Rich and Knight
- 3) Artificial Intelligence: A New Synthesis, Nils J. Nilsson

## TITLE OF THE COURSE: CYBER SECURITY

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MINOR-5         | 4      | 60             | 0               | 50                  | 50                  | 100         |

| Course Content |  |          |
|----------------|--|----------|
| Unit           | Description  | Lectures |
| 1.             | <b>Introduction to Cybercrime</b><br>Introduction, Classifications of Cybercrimes: E-Mail Spoofing - Spaming - Cyber defamation - Internet Time Theft - Newsgroup Spam/Crimes from Usenet Newsgroup - Industrial Spying/Industrial Espionage – Hacking - Online Frauds - Pornographic Offenses - Software Piracy - Password Sniffing - Credit Card Frauds and Identity Theft, Categories of Cybercrime : Passive Attack - Active Attacks - Scanning / Scrutinizing gathered Information - Attack (Gaining and Maintaining the System Access) - Social Engineering – Cyberstalking - Cybercafe and Cybercrimes. | 15       |
| 2.             | <b>Cybercrime using Mobile and Wireless Devices</b><br>Introduction, Proliferation of Mobile and Wireless Devices, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations - Organizational Measures for Handling Mobile - Organizational Security Policies.   | 15       |
| 3.             | <b>Techniques Used in Cybercrime</b><br>Introduction, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Attacks on Wireless Networks, Introduction – Phishing - Identity Theft (ID Theft) - Types of Identity Theft - Techniques of ID Theft - Identity Theft Counter measures, Protecting online identity.   | 15       |
| 4.             | <b>Laws in Cyber Crime</b><br>Introduction, Need for Cyberlaws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act , Cybercrime and Punishment, Cyberlaw, Technology and Students : Indian Scenario   | 15       |
|                | <b>Total Lectures/Hours</b>  | 60       |

### Reference Books:

- Nina Godbole, SunitBelapur, “Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley India Publications, April, 2011.
- James Graham, RicharHoward,Ryan Olson, “Cyber Security Essentials”, CRC Press, Tailor and Francis Group, 2011

**TITLE OF THE COURSE: ENTERPRISE RESOURCE PLANNING (ERP)**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | SEC             | 2      | 30             | 0               | 25                  | 25                  | 50          |

| Course Content |   |          |
|----------------|---|----------|
| Unit           | Description   | Lectures |
| 1.             | <b>Introduction to Enterprise and ERP</b><br>Introduction<br>Business Functions and Business Processes<br>Integrated Management Information<br>Role of the Enterprise in Implementing the ERP System<br>Business Modeling<br>Common ERP Myths<br>A Brief History of ERP<br>The Advantages of ERP  | 10       |
| 2.             | <b>Risk, Benefits and Technologies related to ERP</b><br>Risks of ERP<br>Risk Factors of ERP Implementation<br>People Issues<br>Process Risks<br>Technological Risks<br>Implementation Issues<br>Operation and Maintenance issues   | 10       |
| 3.             | <b>ERP – Functional Modules, ERP- Implementations</b><br>Functional Module of ERP Software<br>Financial Module<br>Manufacturing Module<br>HR Module<br>Materials Management Module<br>Production Planning Module<br>Plant Maintenance Module<br>Quality Management Module<br>Purchasing Module<br>Marketing Module<br>Sales and Distribution Module | 10       |
|                | <b>Total Lectures/Hours</b>   | 30       |

**Reference Books:**

- Enterprise Resource Planning (Second Edition) By Alexis Leon, McGraw Hill ERP Demystified (Second Edition) By Alexis Leon, McGraw Hill
- Enterprise Resource Planning By Mahadeo Jaiswal and Ganesh Vanapalli, MacMillan Publications
- Enterprise Resource Planning (Edition-2008) By Summer, Pearson

# SHRI GOVIND GURU UNIVERSITY

## Course Structure under NEP-2020

### BCA – Semester-VI

| Subject  |          | Code | Subject Title                                   | Theory | Practical | Credits   | Marking Scheme |          |       |
|--|----------|------|---|--------|-----------|-----------|----------------|----------|-------|
|  |          |      |   |        |           |           | Internal       | External | Total |
| <b>Discipline Specific Course Core (Major)</b> | Major-14 |      | Advanced Python                                 | 2      | 2         | 4         | 50             | 50       | 100   |
|  | Major-15 |      | Website Development (ASP.Net using C#)          | 2      | 2         | 4         | 50             | 50       | 100   |
|  | Major-16 |      | Digital Marketing                               | 4      | 0         | 4         | 50             | 50       | 100   |
| <b>Minor</b>                                   | Minor-6  |      | Cloud Computing                                 | 4      | 0         | 4         | 50             | 50       | 100   |
| <b>Ability Enhancement Course</b>              | AEC      |      | Personality Development and Corporate Skills-II | 2      | 0         | 2         | 25             | 25       | 50    |
| <b>Project – 4</b>                             | Project  |      | Project / Internship                            | 0      | 4         | 4         | 50             | 50       | 100   |
|  |          |      | <b>Total</b>                                    |        |           | <b>22</b> |                |          |       |

# **BCA (Bachelor of Computer Applications)**

**BCA (Semester–VI)**

## **TITLE OF THE COURSE: ADVANCED PYTHON**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MAJOR-14        | 2 + 2  | 30             | 60              | 50                  | 50                  | 100         |

| Course Content |  |          |
|----------------|--|----------|
| Unit           | Description  | Lectures |
| 1.             | <b>Object Oriented Programming</b><br>Abstract Data Types and classes, Inheritance, Encapsulation and Information hiding, Mortgages and Extended Examples.<br>Case Study: Banking Application  | 7+12     |
| 2.             | <b>Data Science and Data Visualization using Python</b><br><b>Data Science Using Python:</b> Data Frame (Creating Data Frame from an Excel Spreadsheet, Creating Data Frame from .csv Files, Creating Data Frame from a Python Dictionary, Creating Data from Python List of Tuples, Operations on Data Frames)<br><b>Data Visualization:</b> Bar Graph, Histogram, creating a Pie Chart, Creating Line Graph<br><b>Plotting:</b> Plotting using PyLab, Plotting mortgages and extended examples | 8+16     |
| 3.             | <b>Advanced Topics II: Regular Expressions</b><br><b>REs and Python:</b> Regular Expressions, Sequence Characters in Regular Expressions, Quantifiers in Regular Expressions, Special Characters in Regular Expressions, Using Regular Expressions on Files, Retrieving Information from a HTML File.  | 8+18     |
| 4.             | <b>Python's Database Connectivity</b><br>Verifying the MySQL dB Interface Installation, Working with MySQL Database, Using MySQL from Python, Retrieving All Rows from a Table, Inserting Rows into a Table, Deleting Rows from a Table, Updating Rows in a Table, Creating Database Tables through Python.  | 7+14     |
|                | <b>Total Lectures/Hours</b>  | 30+60    |

## **Reference Books:**

- 1) Wesley J Chun, Core Python Applications Programming, 3rd Edition. Pearson
- 2) Luke Sneeringer, Professional Python, WROX
- 3) Robert Sedgewick, Kevin Wayne, Robert Dondero, Introduction to Programming in Python, Pearson

## PRACTICAL – ADVANCED PYTHON

|     |   |
|-----|---|
| 1   | <p>Write a program in python to implement Salary printing file read operation. (File format:<br/>Employee No, name, deptno, basic, DA, HRA, Conveyance) should perform below operations.</p> <ul style="list-style-type: none"> <li>a) Print Salary Slip for given Employee Number</li> <li>b) Print Employee List for Given Department Number</li> </ul>   |
| 2   | <p>Write a program in python to implement Railway Reservation System using file handling technique. System should perform below operations.</p> <ul style="list-style-type: none"> <li>a. Reserve a ticket for a passenger.</li> <li>b. List information all reservations done for today's trains.</li> </ul>   |
| 3   | Write a Python program to implement module.   |
| 4   | Write a program which will implement decorators for functions and methods in python.  |
| 5   | Write a program to read CSV file and generate output using HTML table.  |
| 6   | Write a program to process CSV file using CSV module.   |
| 7   | Desirable: Write a program to process JSON and XML data.  |
| 8   | <p>Create Web Database Application “Address Book” with options to</p> <ul style="list-style-type: none"> <li>a) add/ insert a record</li> <li>b) modify a record</li> <li>c) display a record</li> </ul> <p>delete a record</p>   |
| 9.  | <p>Create Web Database Application “Event Registration” with options to</p> <ul style="list-style-type: none"> <li>a) Event Registration</li> <li>b) Cancel Registration</li> </ul> <p>display a record</p>   |
| 10. | <p>Perform following operations on a CSV file</p> <ul style="list-style-type: none"> <li>a. Create a data frame from csv file, dictionary, List of tuples</li> <li>b. Operations on Data Frame Shape, head, tail</li> <li>c. Retrieving rows / columns from data frame</li> <li>d. Finding maximum and minimum values</li> <li>e. Displaying statistical information</li> <li>f. Performing queries</li> </ul> <p>Data Analysis using groupby()</p> |
| 11. | Write a program in python to implement simple interest and compound interest values on chart using PyLab. Show the difference between both. (Note: Use of object oriented paradigm is compulsory.)  |

|     |   |
|-----|---|
| 12. | <p>Write a program in python to implement simple interest and compound interest values on chart using PyLab. Show the difference between both. (Note: Use of object oriented paradigm is compulsory.)</p>   |
|     | <p>a) Recognize following strings bit, but, bat, hit, hat or hut</p> <p>b) Match any pair of words separated by a single space, that is, first and last names.</p> <p>c) Match any word and single letter separated by a comma and single space, as in last name, first initial.</p>  |
|     | <p>d) Match simple Web domain names that begin with www and end with a “.com” suffix; for example, www.yahoo.com. Extra Credit: If your regex also supports other high-level domain names, such as .edu, .net, etc. (for example: www.foothill.edu).</p>  |
|     | <p>e) Match a street address according to your local format (keep your regex general enough to match any number of street words, including the type designation). For example, American street addresses use the format: 1180 Bordeaux Drive. Make your regex flexible enough to support multi-word street names such as: 3120 De la Cruz Boulevard.</p>  |
| 13  | <p>Perform following operations on a CSV file</p> <ul style="list-style-type: none"> <li>a. Create a data frame from csv file, dictionary, List of tuples</li> <li>b. Operations on Data Frame Shape, head, tail</li> <li>c. Retrieving rows / columns from data frame</li> <li>d. Finding maximum and minimum values</li> <li>e. Displaying statistical information</li> <li>f. Performing queries</li> </ul> <p>Handling missing data</p> |
| 14. | <p>Using a data file, draw</p> <ul style="list-style-type: none"> <li>a. Bar Graph</li> <li>b. Histogram</li> <li>c. Pie Chart</li> <li>d. Line Chart</li> </ul>  |

**TITLE OF THE COURSE: WEBSITE DEVELOPMENT (ASP.NET USING C#)**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MAJOR-15        | 2+2    | 30             | 60              | 50                  | 50                  | 100         |

| Course Content |   |          |
|----------------|---|----------|
| Unit           | Description   | Lectures |
| 1.             | <p><b>The .Net Platform and the Web</b><br/> The Pathway to Web Application, The Web Client/Server Model, Components of ASP.NET and .NET framework, Overview of IIS, Overview of ASP.NET Language Independence in the .NET framework</p> <p><b>Working with ASP.NET</b><br/> The Features of ASP.NET, The Anatomy of ASP.NET Pages, Introducing Web Forms, Visual Studio IDE Basics, Code-Behind feature</p> <p><b>Application Configuration</b><br/> Over view of Global.asax file and Web.config file</p> <p><b>Web controls for Displaying and Formatting Data Following properties should be consider in each control of ASP.NET Properties</b></p> <ul style="list-style-type: none"> <li>• AccessKey      BackColor      BorderWidth</li> <li>• BorderStyle    CSSClass      Enabled</li> <li>• Font.Bold      Font.Italic    Font.Name</li> <li>• Font.Overline    Font.Size    Font.Strikeout</li> <li>• Font.Underline    ForeColor   Height</li> <li>• TabIndex      ToolTip      Width</li> <li>• Id              Runat      Text</li> </ul> <p><b>Label</b></p> <ul style="list-style-type: none"> <li>• BorderStyle</li> <li>• BorderWidth</li> </ul> <p><b>Panel</b></p> <ul style="list-style-type: none"> <li>• BackImageUrl</li> <li>• HorizontalAlign</li> <li>• Wrap</li> </ul> <p>Add runtime control/s in panel</p> <p><b>Table</b></p> <ul style="list-style-type: none"> <li>• BackImageUrl</li> <li>• CellSpecing</li> <li>• CellPadding</li> <li>• GridLines</li> <li>• HorizontalAlign</li> </ul> | 7+12     |

|    |   |      |
|----|---|------|
|    | <p><b>TableRow</b></p> <ul style="list-style-type: none"> <li>• HorizontalAlign</li> <li>• VerticalAlign</li> </ul> <p><b>TableCell Controls</b></p> <ul style="list-style-type: none"> <li>• ColumnSpan</li> <li>• RowSpan</li> <li>• HorizontalAlign</li> <li>• VerticalAlign</li> <li>• Wrap</li> </ul>  |      |
| 2. | <p><b>Web Controls for Creating Buttons</b></p> <p><b>Button, Image Button, Link Button</b></p> <ul style="list-style-type: none"> <li>• Command</li> <li>• CommandArgument</li> <li>• ImageUrl (Only for Image Button)</li> </ul> <p>Event</p> <ul style="list-style-type: none"> <li>• OnClick</li> </ul> <p><b>Web Control for Inputting Text</b></p> <p><b>Textbox</b></p> <ul style="list-style-type: none"> <li>• AutoPostBack</li> <li>• TextMode</li> <li>• Columns</li> <li>• MaxLength</li> <li>• Rows</li> <li>• Text</li> <li>• Wrap</li> </ul> <p>Event</p> <ul style="list-style-type: none"> <li>• OnTextChanged</li> </ul> <p><b>Web Controls for Selecting Choices</b></p> <p><b>CheckBox</b></p> <ul style="list-style-type: none"> <li>• AutoPostBack</li> <li>• Text</li> <li>• TextAlign</li> <li>• Checked</li> </ul> <p>Event</p> <ul style="list-style-type: none"> <li>• OnCheckedChanged</li> <li>• Text</li> </ul> <p><b>RadioButton</b></p> <ul style="list-style-type: none"> <li>• AutoPostBack</li> <li>• Checked</li> <li>• GroupName</li> <li>• Text</li> <li>• TextAlign</li> </ul> | 8+16 |

|  |   |  |
|--|---|--|
|  | <p>Event</p> <ul style="list-style-type: none"> <li>• OnCheckedChanged</li> </ul> <p><b>CheckBoxList , RadioButtonList</b></p> <ul style="list-style-type: none"> <li>• AutoPostBack      CellPadding      DataSource</li> <li>• DataTextField      DataValueField      RepeatColumns</li> <li>• RepeatDirection      RepeatLayout      TextAlign</li> <li>• Items      SelectedIndex      SelectedItem</li> <li>• SelectedItems (only for CheckBoxList)</li> </ul> <p>Event</p> <ul style="list-style-type: none"> <li>• OnSelectedIndexChanged</li> </ul> <p><b>Web Controls for Creating Lists</b></p> <p><b>ListBox , DropDownList</b></p> <ul style="list-style-type: none"> <li>• DataSource      DataTextField      DataValueField</li> <li>• AutoPostBack      Rows</li> <li>• SelectionMode(Only for ListBox)</li> </ul> <p>Event</p> <ul style="list-style-type: none"> <li>• OnSelectedIndexChanged</li> </ul> <p><b>Rich Controls</b></p> <p><b>Calendar</b></p> <ul style="list-style-type: none"> <li>• CellPadding , CellSpaceing ,DayHeaderStyle</li> <li>• DayNameFormat,DayStyle,FirstDayofWeek</li> <li>• NextMonthText ,NextPrevFormat, NextPrevStyle</li> <li>• OtherMonthDayStyle , PrevMonthText</li> <li>• SelectedDate , SelectedDates, SelectedDayStyle</li> <li>• SelectionMode , SelectMonthText , SelectorStyle</li> <li>• SelectWeelText, ShowDayHeader ShowGridLine</li> <li>• ShowNextPrevMonth, ShowTitle,TitleFormat</li> <li>• TitleStyle TodayDayStyle TodayDate</li> <li>• VisibleDate WeekendDayStyle</li> </ul> <p>Event</p> <ul style="list-style-type: none"> <li>• DayRender</li> <li>• SelectionChanged</li> <li>• VisibleMonthChanged</li> </ul> <p><b>AdRotator</b></p> <ul style="list-style-type: none"> <li>• AdvertisementFile</li> <li>• OnAdCreated</li> <li>• KeywordFilter</li> <li>• Target</li> </ul> <p><b>File Upload</b></p> <p><b>Other Controls</b></p> <p><b>Hyperlink</b></p> <ul style="list-style-type: none"> <li>• NavigateUrl</li> </ul> |  |
|--|---|--|

|           |  |              |          |         |           |           |              |  |
|-----------|--|--------------|----------|---------|-----------|-----------|--------------|--|
|           | <ul style="list-style-type: none"> <li>• Text</li> <li>• ImageUrl</li> <li>• Target</li> </ul> <p><b>Image</b></p> <ul style="list-style-type: none"> <li>• ImageUrl</li> <li>• AlternateText</li> <li>• ImageAlign</li> </ul> <p><b>Image Map</b></p> <ul style="list-style-type: none"> <li>• HotSpotMode</li> <li>• HotSpots</li> <li>• ImageUrl</li> <li>• AlternateText</li> </ul> <p><b>ASP.NET Page Directives</b></p> <table border="0"> <tr> <td>@Page</td><td>@Control</td><td>@Import</td></tr> <tr> <td>@Register</td><td>@Assembly</td><td>@OutputCache</td></tr> </table>  | @Page        | @Control | @Import | @Register | @Assembly | @OutputCache |  |
| @Page     | @Control   | @Import      |          |         |           |           |              |  |
| @Register | @Assembly  | @OutputCache |          |         |           |           |              |  |
| 3.        | <p><b>Validation Controls ASP.NET Objects and Data Collection Class</b></p> <p><b>Validation Controls</b></p> <p><b>Following properties should be considered in each Validation control of ASP.NET</b></p> <p><b>Properties</b></p> <ul style="list-style-type: none"> <li>• ControlToValidate</li> <li>• Display</li> <li>• Enabled</li> <li>• ErrorMessage</li> <li>• ForeColor</li> <li>• IsValid</li> </ul> <p><b>RequiredFieldValidator Control</b></p> <p><b>CompareValidator Control</b></p> <ul style="list-style-type: none"> <li>• ControlToCompare</li> <li>• Operator</li> <li>• Type</li> <li>• ValueToCompare</li> </ul> <p><b>RangeValidator Control</b></p> <ul style="list-style-type: none"> <li>• MaximumValue</li> <li>• MinimumValue</li> </ul> <p><b>RegularExpressionValidator Control</b></p> <ul style="list-style-type: none"> <li>• ValidationExpression</li> </ul> <p><b>Introduction to Custom Validator control</b></p> <ul style="list-style-type: none"> <li>• ClientValidationFunction</li> <li>• OnServerValidate</li> </ul> <p><b>Data List Controls</b></p> <p><b>Repeater Control and DataList Control</b></p> | 8+18         |          |         |           |           |              |  |

|   |  |       |
|---|--|-------|
|   | <b>Introduction of GridView Or DataGrid Control</b><br>(Simple Demo of view records using above control)<br><b>Introduction of FormView and Detail View Controls</b> (Simple Demo of edit, delete and insert records using above control)  |       |
| 4 | <b>I/O and ADO.NET</b><br><b>Handling File I/O</b><br>Reading Text Files<br>Writing Text Files<br>Binary Files I/O<br>Performing File Operations<br>File Information<br><b>ADO.NET</b><br>ADO.NET Programming Objects and Architecture<br>Displaying Database Data<br>Working with The Data Set and Data Table Objects | 7+14  |
|   | <b>Total Lectures/Hours</b>  | 30+60 |

#### Reference Books:

- ASP.NET and VB.NET Web Programming By Matt J. Crouch, Pearson
- ASP.NET Developer's Guide By Gerg Buczek, McGraw Hill

## TITLE OF THE COURSE: DIGITAL MARKETING

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MAJOR-16        | 4      | 60             | 0               | 50                  | 50                  | 100         |

| Course Content |   |          |
|----------------|---|----------|
| Unit           | Description   | Lectures |
| 1.             | <p><b>Introduction to Digital Marketing-</b></p> <p>Evolution of Digital Marketing from traditional to modern era, Role of Internet; Current trends, Info-graphics, implications for business &amp; society; Emergence of digital marketing as a tool; Drivers of the new marketing environment; Digital marketing strategy; P.O.E.M. framework, Digital landscape, Digital marketing plan, Digital marketing models.</p>   | 15       |
| 2.             | <p><b>Internet Marketing and Digital Marketing Mix</b></p> <p>Internet Marketing, opportunities and challenges; Digital marketing framework; Digital Marketing mix, Impact of digital channels on IMC;</p> <p><b>Search Engine Advertising:</b></p> <ul style="list-style-type: none"> <li>- Pay for Search Advertisements, Ad Placement, Ad Ranks, Creating Ad Campaigns, Campaign Report Generation</li> </ul> <p><b>Display marketing:</b></p> <ul style="list-style-type: none"> <li>- Types of Display Ads</li> <li>- Buying Models</li> <li>- Programmable Digital Marketing</li> <li>- Analytical Tools-</li> </ul> <p>YouTube marketing</p> | 15       |
| 3.             | <p><b>Social Media Marketing – Role of Influencer Marketing, Tools &amp; Plan–</b></p> <p>Introduction to social media platforms, penetration &amp; characteristics; Building a successful social media marketing strategy</p> <p><b>Facebook Marketing:</b></p> <ul style="list-style-type: none"> <li>- Business through Facebook Marketing, Creating Advertising Campaigns, Adverts, Facebook Marketing Tools</li> </ul> <p><b>LinkedIn Marketing:</b></p> <ul style="list-style-type: none"> <li>- Introduction and Importance of LinkedIn Marketing, Framing LinkedIn Strategy, Lead Generation through LinkedIn, Content</li> </ul>           | 15       |

|    |   |    |
|----|---|----|
|    | <p>Strategy, Analytics and Targeting</p> <p><b>Twitter Marketing:</b></p> <ul style="list-style-type: none"> <li>- Introduction to Twitter Marketing, how twitter Marketing is different than other forms of digital marketing, framing content strategy, Twitter Advertising Campaigns</li> </ul> <p><b>Instagram and Snapchat:</b></p> <ul style="list-style-type: none"> <li>- Digital Marketing Strategies through Instagram and Snapchat</li> </ul> <p><b>Mobile Marketing:</b></p> <ul style="list-style-type: none"> <li>- Mobile Advertising, Forms of Mobile Marketing, Features, Mobile Campaign Development, Mobile Advertising Analytics</li> </ul> |    |
| 4. | <p><b>Introduction to SEO, SEM, Web Analytics, Mobile Marketing, Trends in Digital Advertising–</b></p> <ul style="list-style-type: none"> <li>- Introduction and need for SEO, How to use internet &amp; search engines; search engine and its working pattern, On-page and off-page optimization, SEO Tactics</li> <li>- Introduction to SEM</li> </ul> <p><b>Web Analytics:</b></p> <ul style="list-style-type: none"> <li>- Google Analytics &amp; Google AdWords; data collection for web analytics, multichannel attribution, Universal analytics, Tracking code</li> </ul> <p><b>Trends in digital advertising</b></p>                                   | 15 |
|    | <b>Total Lectures/Hours</b>   | 60 |

#### Reference Books:

1. Seema Gupta Digital Marketing Mc-Graw Hill
2. Ian DodsonThe Art of Digital Marketing Wiley
3. Puneet Singh Bhatia Fundamentals of Digital Marketing Pearson

**TITLE OF THE COURSE: CLOUD COMPUTING**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | MINOR-6         | 4      | 60             | 0               | 50                  | 50                  | 100         |

**Course Content**

| Unit | Description   | Lectures |
|------|---|----------|
| 1.   | <p><b>Introduction Cloud Computing at a glance</b></p> <ul style="list-style-type: none"> <li>• The vision of cloud computing</li> <li>• Defining a cloud</li> <li>• A closer look</li> <li>• The cloud computing reference model</li> <li>• Characteristics and benefits</li> <li>• Challenges ahead</li> <li>    Historical Developments</li> <li>• Distributed systems</li> <li>• Virtualization</li> <li>• Web 2.0</li> <li>    Build Cloud Computing Environments</li> <li>• Computing platforms and technologies</li> <li>• Amazon Web Services (AWS)</li> <li>• Google App Engine</li> <li>• Microsoft Azure</li> <li>• Hadoop</li> </ul>  | 15       |
| 2.   | <p><b>Principles of Parallel and Distributed Computing</b></p> <p>Eras of computing Parallel vs. distributed computing</p> <p>Elements of parallel computing</p> <ul style="list-style-type: none"> <li>• What is parallel processing?</li> <li>• Hardware architectures for parallel processing</li> <li>• Approaches to parallel programming</li> </ul> <p>Elements of distributed computing</p> <ul style="list-style-type: none"> <li>• General concepts and definitions</li> <li>• Components of a distributed system</li> <li>• Architectural styles for distributed computing</li> <li>• System architectural styles</li> <li>• Models for inter process communication</li> </ul> <p>Technologies for distributed computing</p> <ul style="list-style-type: none"> <li>• Service-oriented computing</li> </ul> | 15       |

|    |  |    |
|----|--|----|
| 3. | <p><b>Virtualization Introduction Characteristics of virtualized environments</b></p> <p>Taxonomy of virtualization techniques</p> <ul style="list-style-type: none"> <li>• Execution virtualization</li> <li>• Machine reference model</li> <li>• Other types of virtualization</li> </ul> <p>Virtualization and cloud computing</p> <p>Pros and cons of virtualization Technology examples</p> <ul style="list-style-type: none"> <li>• VMware: full virtualization</li> <li>• Virtualization Solution</li> <li>• End-user (desktop) virtualization</li> </ul> | 15 |
| 4. | <p><b>Cloud Computing Architecture Introduction</b></p> <p>The cloud reference model</p> <ul style="list-style-type: none"> <li>• Architecture Infrastructure- and hardware-as-a-service</li> <li>• Platform-as-a-service</li> <li>• Software-as-a-service</li> </ul> <p>Types of clouds</p> <ul style="list-style-type: none"> <li>• Public clouds</li> <li>• Private clouds</li> <li>• Hybrid clouds</li> </ul> <p>Community clouds</p> <p>Economics of the cloud</p>  | 15 |
|    | <b>Total Lectures/Hours</b>  | 60 |

### Reference Books:

Essentials of Cloud Computing By K. Chandrasekaran Publication: CRC press, 2015

**TITLE OF THE COURSE: PERSONALITY DEVELOPMENT AND CORPORATE SKILLS-II**

| Course Code | Course Category | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|-----------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | AEC             | 2      | 30             | 0               | 25                  | 25                  | 50          |

| Course Content              |   |          |
|-----------------------------|---|----------|
| Unit                        | Description   | Lectures |
| 1.                          | Concept, Significance, Factors affecting attitudes; Positive attitude, Advantages, Negative attitude, Disadvantages, Ways to develop positive attitude, Carl Jung's contribution to personality development, theories of attitude   | 10       |
| 2.                          | Skills enhancing Personality; Body language, Problem-solving, Conflict and Stress Management, Decision-making skills, Time management and Goal Setting; Setting Smart Goals; Employability Quotient; Resume building- The art of participating in Group Discussion, Preparing for interview | 10       |
| 3.                          | Introduction, Concept and definition of success, Hurdles in achieving success, Overcoming hurdles, Factors responsible for success, Concept and definition of Failure, Causes of Failure, SWOT analysis   | 10       |
| <b>Total Lectures/Hours</b> |   | 30       |

**Reference Books:**

1. Enhance your employability: A Practical manual to career planning, interview process and group discussion- Dr. V. K Verma & Prof. N. K Chadha.
2. Understanding Psychology: By Robert S Feldman. ( Tata McGraw Hill Publishing).
3. Hurlock Elizabeth B Personality Development Tata Mcgraw Hill New Delhi.
4. McGrath Eh Basics Management Skills For All Printish Hall Of India Pvt Ltd New Delhi.
5. Mitra Barun(2016). Personality development and soft Skills.Oxford University Press.
6. Personality Development and Career management: By R.M.Onkar (S Chand Publications).
7. Personality Development and Career management: By R.M.Onkar (S Chand Publications).

**Title of the Course: Project / Internship**

| Course Code | Course Category    | Credit | Teaching Hours | Practical Hours | Internal Exam Marks | External Exam Marks | Total Marks |
|-------------|--------------------|--------|----------------|-----------------|---------------------|---------------------|-------------|
|             | Project/Internship | 4      | 0              | 90              | 50                  | 50                  | 100         |

**Project/ Internship**

|      |  |
|------|--|
|      | Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of semester-VI (At the time of Project-Viva examination student must show all the Workouts, SDLC, Documentation, Program Codes and project in the running mode) |
| Note | <ul style="list-style-type: none"><li>• Project must be submitted before two weeks of commencement of theory exam.</li><li>• Project viva examination may be arranged before theory exam.<br/>During the Project Viva examination project must be run.</li></ul>   |