



**SWAMINARAYAN  
UNIVERSITY**  
THE RESERVOIR OF ALL KNOWLEDGE

## FACULTY OF IT AND COMPUTER SCIENCE

### COURSE CURRICULUM

**COURSE TITLE : CONCEPTS OF AI & ML - II**  
**(CODE:)**

| IT and CS Programmes in which this course is offered    | Semester in which offered |
|---------------------------------------------------------|---------------------------|
| Bachelor of Science In Information Technology-(B.Sc.IT) | Sixth Semester            |

#### Course Objectives –

- The purpose of this course is to help the student to attain the following industry identified competency through various teaching-learning experiences:
- Apply Artificial Intelligence and Machine Learning concepts to solve real world problems.
- Understand fundamental principles of Artificial Intelligence.
- Compare types of machine learning.
- Build a simple Neural Network model to solve real world problem.
- Apply data preprocessing on text/paragraph using NLTK library.
- Demonstrate word embedding techniques to develop real world NLP applications.

#### Teaching and Examination Scheme –

| Content Hours per Week |   |   | Course Credits |   | Examination Marks |    |                 |    | 100 |
|------------------------|---|---|----------------|---|-------------------|----|-----------------|----|-----|
| L                      | T | P | T              | P | Theory Marks      |    | Practical Marks |    |     |
|                        |   |   | 3              | 1 | E                 | M  | I               | EV |     |
| 3                      | 0 | 2 | 4              |   | 25                | 25 | 25              | 25 |     |

\*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,  
EV - External Viva

#### Detailed Course Contents –

| Sr. | Topic                                                                                                                                                                                                                                                                                                                                                          | Teaching Hrs. | Weightage (%) |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| 1   | <b>Foundation of Natural Language processing (NLP)</b><br><b>Introduction To NLP:</b> History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP: Natural Language Understanding (NLU), Natural Language Generation (NLG)<br>Phases of NLP: Lexical Analysis, Syntactic Analysis, Semantic Analysis, Discourse Integration, Pragmatic Analysis | 10            | 20            |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |    |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
|          | <b>Data Preprocessing Using NLTK:</b> Tokenization, Frequency Distribution of Words, Filtering Stop Words, Stemming, Lemmatization, Parts of Speech (POS) Tagging, Name Entity Recognition, WordNet, Types of Ambiguities in NLP                                                                                                                                                                                                          |    |    |
| <b>2</b> | <b>Word Embedding in Natural Language Processing</b><br><b>Word Embedding techniques:</b> Term Frequency – Inverse Document Frequency (TFIDF), Bag Of Words (BoW), Word2Vec, Challenges with TF-IDF and BoW, Pre Trained word Embedding: GloVe : Global Vector for word representation<br><b>Applications of NLP :</b> Question Answering, Spam Detection, Sentiment analysis, Machine Translation, Spelling Correction, Chabot (ChatGPT) | 10 | 20 |
| <b>3</b> | <b>Preparing to Model</b><br><b>Preparing to Model:</b> Machine Learning activities, Types of data in Machine Learning, Structures of data, Data quality and remediation, Data PreProcessing, Dimensionality reduction, Feature subset selection.                                                                                                                                                                                         | 09 | 20 |
| <b>4</b> | <b>Feature Engineering</b><br><b>Basics of Feature Engineering:</b> Feature and Feature Engineering, Feature transformation: Construction and extraction, Feature subset selection: Issues in high-dimensional data, key drivers, measure and overall process                                                                                                                                                                             | 09 | 20 |
| <b>5</b> | <b>Modeling and Evaluation</b><br><b>Selecting a Model:</b> Predictive/Descriptive, training a Model for supervised learning, model representation and interpretability, evaluating performance of a model, Improving performance of a model.                                                                                                                                                                                             | 10 | 20 |

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Suggested Learning Resources**

**A. List of Books**

| SR NO. | TITLE OF BOOKS                                                                             | AUTHOR NAME                            | PUBLICATION                          |
|--------|--------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------|
| 1      | Machine Learning_ Step-by-Step Guide To Implement Machine Learning Algorithms with Python. | Rudolph Russell                        | Rudolph Russell Publications         |
| 2      | Machine Learning                                                                           | Saikat Dull, S.Chjandramouli           | Das, Pearson                         |
| 3      | Natural Language Processing with Python                                                    | Steven Bird, Ewan klein & Edward Loper | O'Reilly, 2009                       |
| 4      | Speech and Language Processing                                                             | Daniel Jurafsky & James H. Martin.     | Second Edition, Prentice Hall, 2008. |

**B. List of Software/Learning Websites**

- <https://www.geeksforgeeks.org/machine-learning/>
- <https://www.geeksforgeeks.org/natural-language-processing-nlp-tutorial/>
- [https://www.tutorialspoint.com/machine\\_learning\\_with\\_python/index.htm](https://www.tutorialspoint.com/machine_learning_with_python/index.htm)
- [https://onlinecourses.nptel.ac.in/noc19\\_cs56/preview](https://onlinecourses.nptel.ac.in/noc19_cs56/preview)
- [https://onlinecourses.nptel.ac.in/noc20\\_cs29/preview](https://onlinecourses.nptel.ac.in/noc20_cs29/preview)

**Course Learning Outcomes (CLO):**

| <b>Sr. No.</b> | <b>CO statement</b>                                   | <b>Marks % Weightage</b> |
|----------------|-------------------------------------------------------|--------------------------|
| CLO-1          | Understand the Fundamental Architecture of NLP.       | <b>20</b>                |
| CLO -2         | Implement Text Pre-processing and Linguistic Analysis | <b>20</b>                |
| CLO -3         | Evaluate and Construct Vector Space Models            | <b>20</b>                |
| CLO -4         | Execute Data Preparation and Feature Engineering      | <b>20</b>                |
| CLO -5         | Design and Deploy Practical NLP Applications          | <b>20</b>                |

**Revised Bloom's Taxonomy**

| <b>Distribution of Theory Marks</b> |                   |              |                |                 |               |
|-------------------------------------|-------------------|--------------|----------------|-----------------|---------------|
| <b>Remember</b>                     | <b>Understand</b> | <b>Apply</b> | <b>Analyze</b> | <b>Evaluate</b> | <b>Create</b> |
| <b>07</b>                           | <b>07</b>         | <b>11</b>    | <b>-</b>       | <b>-</b>        | <b>-</b>      |

\*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

**Suggested List Of Practical/Exercises**

| <b>Sr. No</b> | <b>Practical/ Exercises</b>                | <b>Approx Hrs. Required</b> |
|---------------|--------------------------------------------|-----------------------------|
| <b>1.</b>     | Introduction to NLP – Text Analysis Basics | 02                          |
| <b>2.</b>     | Components of NLP – NLU and NLG            | 02                          |
| <b>3.</b>     | Lexical Analysis using Tokenization (NLTK) | 02                          |
| <b>4.</b>     | Frequency Distribution of Words            | 02                          |
| <b>5.</b>     | Stop Word Removal                          | 02                          |
| <b>6.</b>     | Stemming and Lemmatization                 | 02                          |
| <b>7.</b>     | Part of Speech (POS) Tagging               | 02                          |
| <b>8.</b>     | Named Entity Recognition (NER)             | 02                          |
| <b>9.</b>     | Word Embedding using Bag of Words          | 02                          |
| <b>10.</b>    | TF-IDF Word Embedding                      | 02                          |
| <b>11.</b>    | Sentiment Analysis (Application of NLP)    | 02                          |
| <b>12.</b>    | Model Evaluation – Accuracy Calculation    | 02                          |

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## FACULTY OF IT AND COMPUTER SCIENCE

### COURSE CURRICULUM

Course Title: DATA SCIENCE-II  
(Code:)

| IT and CS Programmes in which this course is offered    | Semester in which offered |
|---------------------------------------------------------|---------------------------|
| Bachelor of Science In Information Technology-(B.Sc.IT) | Sixth Semester            |

**Course Objectives** – The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

The practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

- Discuss various concepts of data science.
- Utilize Python toolkits to read, manipulate, extract and analyze data.
- Apply various Statistical analysis techniques.
- Use various data visualization libraries for effective interpretations and insights of data.
- Summarize fundamental concept of big data analysis.

### Teaching and Examination Scheme –

| Content Hours per Week |   |   | Course Credits |   | Examination Marks |    |                 |    |
|------------------------|---|---|----------------|---|-------------------|----|-----------------|----|
| L                      | T | P | T              | P | Theory Marks      |    | Practical Marks |    |
|                        |   |   | 3              | 1 | E                 | M  | I               | EV |
| 3                      | 0 | 2 | 4              |   | 25                | 25 | 25              | 25 |
| 100                    |   |   |                |   |                   |    |                 |    |

\*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

### DETAILED COURSE CONTENTS -

| Sr. | Topic                                                                                                                  | Teaching Hrs. |  |
|-----|------------------------------------------------------------------------------------------------------------------------|---------------|--|
| 1   | <b>Data Preprocessing, Plotting and Visualization</b><br>Data types and forms, Possible data error types, Various data | 8             |  |

|          |                                                                                                                                                                                                                           |   |  |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--|
|          | preprocessing operations, Introduction to data visualization, Visual encoding, Data visualization libraries, Basic data visualization tools                                                                               |   |  |
| <b>2</b> | <b>Statistical Data Analysis</b><br>Role of statistics in data science, Descriptive statistics, Inferential statistics. Measures of Central Tendency (Mean, Median, Mode) & Dispersion (Range, Variance, Std Dev)         | 8 |  |
| <b>3</b> | <b>Introduction to Machine Learning</b><br>Overview of machine learning, Supervised machine learning, Regression methods, Classification methods, Unsupervised machine learning, Clustering methods, Association analysis | 8 |  |
| <b>4</b> | <b>Time-series Analysis</b><br>Overview of time-series analysis, Components of time-series, Time-series forecasting models                                                                                                | 8 |  |
| <b>5</b> | <b>Recent Trends in the Domain of Data Science</b>                                                                                                                                                                        |   |  |

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

**Revised Bloom's Taxonomy**

| Distribution of Theory Marks |            |       |         |          |        |
|------------------------------|------------|-------|---------|----------|--------|
| Remember                     | Understand | Apply | Analyze | Evaluate | Create |
| 07                           | 07         | 11    | -       | -        | -      |

\*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate  
C : Create and Above Levels (Revised Bloom's Taxonomy)

**SUGGESTED LEARNING RESOURCES**

**A. List of Books**

| SR NO. | TITLE OF BOOKS                                          | AUTHOR NAME             | PUBLICATION                                               |
|--------|---------------------------------------------------------|-------------------------|-----------------------------------------------------------|
| 1      | Data Science and Analytics                              | Jain V.K                | Khanna Publishing House, Delhi                            |
| 2      | Data Science From Scratch: First Principles with Python | Joel Grus , SPD         | Shroff/O'Reilly Second Edition, 2019, ISBN-978-9352138326 |
| 3      | Data Mining Concepts and Techniques                     | Jiawei Han and Jian Pei | Morgan Kaufmann, Third Edition 2011, ISBN- 978-9380931913 |
| 4      | Data Science with Jupyter                               | Author: Prateek Gupta,  | BPB publicationU                                          |

**B. List of Major Equipment/ Software**

1. Computer System with latest configuration and memory
2. Latest version of python
3. Python anaconda/Jupyter
4. Microsoft Excel

**C. List of Software/Learning Websites**

1. <https://www.anaconda.com>
2. <https://www.python.org>
3. <https://www.w3schools.com>
4. <https://www.tutorialspoint.com>

#### **SUGGESTED LIST OF PRACTICAL/EXERCISES**

| <b>Sr.<br/>No</b> | <b>Practical/ Exercises</b>                                                                                               | <b>Approx<br/>Hrs.<br/>Required</b> |
|-------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>1.</b>         | Apply Descriptive Statistics in Python to Analyze Passenger Demographics on the Titanic, Including Mean, Median, and Mode | <b>04</b>                           |
| <b>2.</b>         | Create a Python script that uses Matplotlib to generate simple line charts                                                | <b>04</b>                           |
| <b>3.</b>         | Create a Python script that uses Matplotlib to generate simple bar graph.                                                 | <b>04</b>                           |
| <b>4.</b>         | Create a Python script that uses Matplotlib to generate scatter plots from sample data                                    | <b>04</b>                           |
| <b>5.</b>         | Customize the appearance of these plots, including labels, colors, and annotations.                                       | <b>08</b>                           |
| <b>6.</b>         |                                                                                                                           | <b>04</b>                           |
| <b>7.</b>         |                                                                                                                           | <b>10</b>                           |
| <b>8.</b>         |                                                                                                                           | <b>08</b>                           |
| <b>9.</b>         |                                                                                                                           | <b>02</b>                           |
| <b>10.</b>        |                                                                                                                           | <b>02</b>                           |

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## FACULTY OF IT & COMPUTER SCIENCE

### COURSE CURRICULUM

Course Title: Linux Server Security  
(Code:)

| IT and CS Programmes in which this course is offered    | Semester in which offered |
|---------------------------------------------------------|---------------------------|
| Bachelor of Science In Information Technology-(B.Sc.IT) | Sixth Semester            |

#### Course Objectives -

- This course is intended to make the students:
- Apply a range of security techniques to secure a Linux server environment.
- Manage user access and authentication securely while preventing unauthorized access.
- Use industry-standard security tools to monitor, detect, and respond to security threats.
- Implement best practices for network and application security on Linux servers.
- Understand and implement secure configurations in virtualized and cloud environments.
- Perform security audits, penetration testing, and continuous monitoring to maintain a secure Linux server environment.

#### Teaching and Examination Scheme –

| Content Hours per Week |   |   | Course Credits |   | Examination Marks |    |                 |    |
|------------------------|---|---|----------------|---|-------------------|----|-----------------|----|
| L                      | T | P | T              | P | Theory Marks      |    | Practical Marks |    |
|                        |   |   | 3              | 2 | E                 | M  | I               | EV |
| 3                      | 0 | 2 | 4              |   | 25                | 25 | 25              | 25 |
| 100                    |   |   |                |   |                   |    |                 |    |

\*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,  
EV - External Viva

#### DETAILED COURSE CONTENTS -

| Sr. | Topic                                                                                                                                                                                                                                                                                                                                                                  | Teaching Hrs. | Weightage (%) |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| 1   | <b>Introduction to Linux Security</b><br><b>Linux introduction :</b> file system Basic Features, Different flavors of Linux. Advantages, How Linux access files, storage files, Linux standard directories. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons - cmp & | 08            | 15            |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |    |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
|   | comm, View files, disk related commands, checking disk free spaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |    |
| 2 | <b>Linux System Hardening</b><br>Understanding shells, Processes in linux, connecting processes with pipes, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron commands, kill, ps, who, sleep, Printing commands, touch, file related commands - wc, cut, dd, etc. Mathematical commands- bc, expr. Creating and editing files with vi & vim editor. Simple filter commands - pr, head, tail, cut, paste, sort, uniq, tr. Filter using regular expressions - grep, egrep, and sed.                                                                                                                                                                                                                                                                                      | 08 | 15 |
| 3 | <b>Introduction to Shell Programming-</b><br>develop some shell programs. System administration: Common administrative tasks, configuration and log files, Role of system administrator. Installing requirement, Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 09 | 18 |
| 4 | <b>Managing user accounts-adding &amp; deleting users :</b> changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, file security & Permissions, becoming super user using su. host name, disk partitions & sizes, users, kernel. Backup and restore files, installing and removing packages. Starting & Using KDE & Gnome graphical interfaces. Basic networking administration: Setting up a LAN using Linux, choosing peer to peer vs client/server model, setting up an Ethernet Lan, configuring host computers, checking Ethernet connecting, connecting to Internet, common networking administrative tasks, configuring Ethernet, initializing Ethernet Interface, ifconfig, netstat and netconfig commands, TCP/IP network, DNS services. Automating backups with cron. | 10 | 20 |
| 5 | <b>Installation, configuration &amp; Administration of following servers in Linux</b><br>Mail server<br>DNS<br>Remote access<br>FTP server<br>Apache web server<br>Vnc Server                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 04 | 15 |

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests(Summative/MCQ) etc.

**Revised Bloom's Taxonomy**

| Distribution of Theory Marks |            |       |         |          |        |
|------------------------------|------------|-------|---------|----------|--------|
| Remember                     | Understand | Apply | Analyze | Evaluate | Create |
| 07                           | 07         | 11    | -       | -        | -      |

\*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

## SUGGESTED LEARNING RESOURCES

### A. List of Books

| SR NO. | TITLE OF BOOKS                              | AUTHOR NAME                             | PUBLICATION      |
|--------|---------------------------------------------|-----------------------------------------|------------------|
| 1      | Linux Administration: A Beginner's Guide    | Wale Soyinka                            | McGraw-Hill      |
| 2      | Fedora 9 And Red Hat Enterprise Linux Bible | Christopher Negus                       | Wiley India Ltd  |
| 3      | Linux Bible, 9ed                            | Christopher Negus                       | Wiley India Ltd  |
| 4      | Linux Security Cookbook                     | Daniel J. Barrett, Richard E. Silverman | O'Reilly Media   |
| 5      | Practical Linux Security Cookbook           | Tajinder Kalsi                          | Packt Publishing |
| 6      | Linux Administration: A Beginner's Guide    | Wale Soyinka                            | McGraw-Hill      |

### B. List of Software/Learning Websites

<https://www.redhat.com/en/services/training/rh415-red-hat-security-linux-physical-virtual-and-cloud>  
<https://training.linuxfoundation.org/resources/free-courses/>

### COURSE OUTCOMES:

| Sr. No. | CO statement                                                                | Marks % Weightage |
|---------|-----------------------------------------------------------------------------|-------------------|
| CO-1    | Fully understand the fundamental concepts of Linux server administration,   | 15                |
| CO-2    | Put those concepts to use in real-world situations                          | 15                |
| CO-3    | Install and customize Linux (administration of Linux servers from the GUI); | 18                |
| CO-4    | Manage users, permissions, folders, and native applications;                | 20                |

### SUGGESTED LIST OF PRACTICAL/EXERCISES

| S.No. | Practical Exercises<br>(Outcomes' in Psychomotor Domain)                            | Hrs. required |
|-------|-------------------------------------------------------------------------------------|---------------|
| 1     | Understand and modify file and directory permissions using chmod, chown, and chgrp. | 02            |
| 2     | Add, modify, and delete users and groups.                                           | 02            |
| 3     | Set up SSH key-based authentication.                                                | 02            |
| 4     | Configure basic iptables rules to allow or block specific traffic.                  | 02            |
| 5     | Set up and test rules using firewalld.                                              | 02            |
| 6     | Analyze system logs in /var/log.                                                    | 02            |
| 7     | Install and configure Tripwire.                                                     | 02            |
| 8     | Encrypt files using GPG.                                                            | 02            |
| 9     | Restore data from a backup.                                                         | 02            |
| 10    | Use nmap to perform a basic network vulnerability scan.                             | 02            |
| 11    | Configure HTTPS on a web server (Apache or Nginx).                                  | 02            |

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## FACULTY OF IT & COMPUTER SCIENCE

### COURSE CURRICULUM

Course Title: Web .NET with ADO  
(Code: ADBIE106-1C)

| IT and CS Programmes in which this course is offered    | Semester in which offered |
|---------------------------------------------------------|---------------------------|
| Bachelor of Science In Information Technology-(B.Sc.IT) | Sixth Semester            |

#### Course Objectives -

This course is intended to make the students:

- Understand ASP.NET life cycle, work with web forms, configure with Global.asax /web.config, and manage IIS requests and virtual directories.
- Understand AJAX technology, use AJAX controls (Script Manager, Update Panel), and apply AJAX Control Toolkit extenders. Explore ASP.Net controls for interactive interfaces and validations.
- Use data controls, apply LINQ, implement MVC, manage state, use ASP.NET objects, and handle exceptions.
- Understand component-based programming with RCW, optimize performance with caching, and implement authentication and authorization using login controls.

#### Teaching and Examination Scheme –

| Content Hours per Week |   |   | Course Credits |   | Examination Marks |    |                 |    |     |
|------------------------|---|---|----------------|---|-------------------|----|-----------------|----|-----|
| L                      | T | P | T              | P | Theory Marks      |    | Practical Marks |    | 100 |
|                        |   |   | 2              | 2 | E                 | M  | I               | EV |     |
| 3                      | 0 | 2 | 4              |   | 25                | 25 | 25              | 25 |     |

\*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,  
EV - External Viva

#### DETAILED COURSE CONTENTS -

| Sr. | Topic                                                                                                                                                                                                           | Teaching Hrs. | Weightage (%) |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| 1   | <b>INTRODUCTION to C#:</b> Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations. | 10            | 20            |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |    |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
|   | <b>OBJECT ORIENTED ASPECTS OF C#:</b> Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Errors and Exceptions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |    |
| 2 | <b>WINDOWS APPLICATIONS:</b> Drawbacks of Console Applications, Container Controls, Non Container Controls, Developing Windows Application from Notepad and Visual Studio, Events, Types of Events – Mouse, Focus, Drag, Key and Other Related Events, Building Windows Applications.                                                                                                                                                                                                                                                                                                                                                                                                           | 09 | 20 |
| 3 | <b>ADO.NET:</b> Problems with File Handling, Data Source Communication, Drivers and Providers, Introduction of ADO.NET, ADO.NET Namespaces, ADO.NET Objects, Accessing Data with ADO.NET.<br><b>CONNECTED AND DISCONNECTED ARCHITECTURE</b><br><b>THE "CONNECTED" ARCHITECTURE:</b><br>SqlConnection: Establishing and managing connections.<br>SqlCommand: Executing SQL queries and Stored Procedures.<br>SqlDataReader: High-speed, forward-only stream of data.<br><b>THE "DISCONNECTED" ARCHITECTURE:</b><br>SqlDataAdapter: The bridge between the database and the DataSet.<br>DataSet & DataTable: In-memory representation of data.<br>DataView: Filtering and sorting data in memory. | 09 | 20 |
| 4 | <b>BUILDING ASP.NET WEB PAGES:</b> HTML form Development, Client side Scripting, Server side Scripting, Web applications and Web servers, HTTP, Advantages Using ASP.NET, ASP.NET Application, ASP.NET Namespaces, ASP.NET Web Page Structure, Creating Sample C# Web Applications, ASP.NET Web Page Execution Architecture, Debugging and Tracing of ASP.NET                                                                                                                                                                                                                                                                                                                                   | 10 | 20 |
| 5 | <b>ASP.NET WEB CONTROLS:</b> Web Form Structures, Introduction to Web Form controls, Server Side Controls, Web Server Controls, GET and POST, Page Submission, Web Page Creation Techniques, Redirection between Web Pages, Validation Controls.                                                                                                                                                                                                                                                                                                                                                                                                                                                | 09 | 20 |

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests(Summative/MCQ) etc.

**Revised Bloom's Taxonomy**

| Distribution of Theory Marks |            |       |         |          |        |
|------------------------------|------------|-------|---------|----------|--------|
| Remember                     | Understand | Apply | Analyze | Evaluate | Create |
| 07                           | 07         | 11    | -       | -        | -      |

\*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

**SUGGESTED LEARNING RESOURCES**

**A. List of Books**

| SR NO. | TITLE OF BOOKS                 | AUTHOR NAME       | PUBLICATION      |
|--------|--------------------------------|-------------------|------------------|
| 1      | Pro ASP.NET 4 in C# and VB     | Andrew Troelsen   | -                |
| 2      | The Complete Reference ASP.NET | Matthew MacDonald | TATA McGraw-Hill |

|   |                                    |                                |              |
|---|------------------------------------|--------------------------------|--------------|
| 3 | ASP.NET Black Book.                | Kogent Learning Solutions Inc. | Wiley        |
| 4 | Pro ASP.Net Core MVC 2             | Adam Freeman                   | Apress, 2017 |
| 5 | ASP.NET AJAX: A Beginner's Guide   | Rakesh Rajan                   | -            |
| 6 | ASP.NET 4.6 and Visual Studio 2015 | Mark J. Price                  | O'Reilly     |

### B. List of Software/Learning Websites

<https://www.w3schools.com/asp/>

<http://www.tutorialspoint.com/listtutorials/asp-dot-net/1>

[http://www.pragimtech.com/dot\\_net\\_tutorials\\_for\\_beginners.aspx](http://www.pragimtech.com/dot_net_tutorials_for_beginners.aspx)

### COURSE OUTCOMES:

| Sr. No. | CO statement                                                                                  | Marks % Weightage |
|---------|-----------------------------------------------------------------------------------------------|-------------------|
| CO-1    | Understand ASP.NET lifecycle, page processing, and configure with Global.asax and web.config. | 20                |
| CO-2    | Develop web apps using web forms, coding models, and manage IIS configurations.               | 20                |
| CO-3    | Learn AJAX and use AJAX controls to enhance functionality.                                    | 20                |
| CO-4    | Use data controls and LINQ for data manipulation in ASP.NET apps.                             | 20                |
| CO-5    | Implement state management and handle errors with ASP.NET objects.                            | 20                |

### SUGGESTED LIST OF PRACTICAL/EXERCISES

| S.No. | Practical Exercises<br>(Outcomes' in Psychomotor Domain)                                                                                                                                                                                                                                                                                                                                                                                                            | Hrs. required |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1     | 1.Implementation of a Rectangle class and discuss C# basic syntax<br>2.Write a program to demonstrates all the arithmetic operators<br>3.Write a program to demonstrates all the relational operators<br>4.Write a program to demonstrates all the logical operators<br>5.Write a program to demonstrates all the assignment<br>6.Write a program to demonstrates all the assignment<br>7.Write a program to demonstrates all the bitwise operators                 | 08            |
| 2     | 1.The program finds greatest of three numbers and then prints the number which is the greatest. If all 3 input numbers are same then it prints "Entered Numbers are not Distinct."<br>2.Write a program using Looping and Conditional statements.<br>3.Write a program uses a nested for loop to find the prime numbers from 2 to 50<br>4.Write a Program to Convert Digits to Word<br>5.Write a Program demonstrates use of some of the methods of the Array class | 08            |
| 3     | 1. Write a program for addition and multiplication of two matrices.<br>2. Write a program to display the digits of an integer in words.<br>3. Write a program to which reads a set of strings into the rows a two dimensional array and then prints the string having more number of vowels.                                                                                                                                                                        | 06            |

|     |                                                                                                                                                                                                                                                                                   |    |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 4   | 1. Write a programs to demonstrate the concepts of Structures and Enumerations.<br>2. Write a programs to demonstrate the concepts of Constructors and Inheritance.<br>3. Write a programs to demonstrate the concepts of Polymorphism.                                           | 06 |
| 5   | 1. Write a C# programs to demonstrate the concepts of Partial classes and Extension methods.<br>2. Write a C# programs to demonstrate the concepts of Delegates.                                                                                                                  | 04 |
| 6   | create a windows application in c#, having two text boxes and three buttons names as factorial, prime and Fibonacci series when you click any button the resultant value will be displayed on the second textbox using button click event.                                        | 02 |
| 7   | 1.create a ADO.NET application to establish unmanaged connection with oracle server<br>2.create a ADO.NET application to establish unmanaged connection with SQL server<br>3.create a ADO.NET application , to create a table and insert values into created table.               | 06 |
| 8   | 1.create an ADO.NET application, to retrieve the values from the table using DataReader object<br>2.create an ADO.NET application, to retrieve the values based on the user input using DataReader object.<br>3.create an ADO.NET application ,to demonstrate DataAdapter object. | 06 |
| 9   | 1.create an ADO.NET application, to demonstrate dataGridView Control.<br>2.create an ADO.NET application, that impliments the following tasks using dataGridView object.                                                                                                          | 04 |
| 10. | create an ADO.NET application to demonstrate the DataView object.                                                                                                                                                                                                                 | 02 |

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## FACULTY OF IT & COMPUTER SCIENCE

### COURSE CURRICULUM

Course Title: Web .NET with ADO  
(Code:)

| IT and CS Programmes in which this course is offered    | Semester in which offered |
|---------------------------------------------------------|---------------------------|
| Bachelor of Science In Information Technology-(B.Sc.IT) | Sixth Semester            |

#### Course Objectives -

This course is intended to make the students:

- Understand ASP.NET life cycle, work with web forms, configure with Global.asax /web.config, and manage IIS requests and virtual directories.
- Understand AJAX technology, use AJAX controls (Script Manager, Update Panel), and apply AJAX Control Toolkit extenders. Explore ASP.Net controls for interactive interfaces and validations.
- Use data controls, apply LINQ, implement MVC, manage state, use ASP.NET objects, and handle exceptions.
- Understand component-based programming with RCW, optimize performance with caching, and implement authentication and authorization using login controls.

#### Teaching and Examination Scheme –

| Content Hours per Week |   |   | Course Credits |   | Examination Marks |    |                 |    |     |
|------------------------|---|---|----------------|---|-------------------|----|-----------------|----|-----|
| L                      | T | P | T              | P | Theory Marks      |    | Practical Marks |    | 100 |
|                        |   |   | 2              | 2 | E                 | M  | I               | EV |     |
| 3                      | 0 | 2 | 4              |   | 25                | 25 | 25              | 25 |     |

\*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,  
EV - External Viva

#### DETAILED COURSE CONTENTS -

| Sr. | Topic                                                                                                                                                                                                                                                            | Teaching Hrs. | Weightage (%) |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| 1   | <b>Introduction of Asp.Net:</b> Asp.net Application Life Cycle, ASP.net Page Life Cycle, Page Processing Sequence.<br><b>Working With Asp.Net:</b> Introduction to Web-Form and its events, Coding. Model (Inline and Code-behind), Built-in Directory Structure | 10            | 20            |

|   |                                                                                                                                                                                                                                                                                                                                                                        |    |    |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
|   | (App_data, App_code, Bin), Application Configuration (Global.asax file, web.config), Installation of IIS, IIS request.<br>Handling Process, IIS manager & Creating Virtual Directory.                                                                                                                                                                                  |    |    |
| 2 | <b>Introduction AJAX Technology:</b> Advantages of AJAX, AJAX Extension control (Script Manager, Script Manager Proxy, Update Panel, Update Progress, Time), AJAX Control Toolkit, Downloading and Installation AJAX Control Toolkit Extenders (The controls available in AJAX Control Toolkit)                                                                        | 09 | 20 |
| 3 | <b>Data Controls :</b> Data List, Detail View, Form View, Grid View, List View, Repeater. Introduction to LINQ, MVC, MVC Architecture.                                                                                                                                                                                                                                 | 09 | 20 |
| 4 | <b>State Management: Client-Side:</b> Cookies, query strings, hidden fields.<br><b>Server-Side:</b> Session, application variables. State Management Issues.<br><b>ASP.NET Inbuilt Objects:</b> Request, Response, Session, Application objects.<br><b>Debugging and Error Handling:</b> Common Errors.<br>Exception Handling: Managing errors using try-catch blocks. | 10 | 20 |
| 5 | <b>Component-Based Programming:</b> Introduction to reusable components and using<br>Runtime Callable Wrappers (RCW) in ASP.NET.<br><b>Caching Techniques:</b> Output Caching, Fragment Caching, Data Caching.<br><b>Security Implementation:</b> Authentication, Authorization .Using built-in Login Controls for user authentication.                                | 09 | 20 |

**\*Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests(Summative/MCQ) etc.

**Revised Bloom's Taxonomy**

| Distribution of Theory Marks |            |       |         |          |        |
|------------------------------|------------|-------|---------|----------|--------|
| Remember                     | Understand | Apply | Analyze | Evaluate | Create |
| 07                           | 07         | 11    | -       | -        | -      |

\*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

**SUGGESTED LEARNING RESOURCES**

**A. List of Books**

| SR NO. | TITLE OF BOOKS                   | AUTHOR NAME                    | PUBLICATION      |
|--------|----------------------------------|--------------------------------|------------------|
| 1      | Pro ASP.NET 4 in C# and VB       | Andrew Troelsen                | -                |
| 2      | The Complete Reference ASP.NET   | Matthew MacDonald              | TATA McGraw-Hill |
| 3      | ASP.NET Black Book.              | Kogent Learning Solutions Inc. | Wiley            |
| 4      | Pro ASP.Net Core MVC 2           | Adam Freeman                   | Apress, 2017     |
| 5      | ASP.NET AJAX: A Beginner's Guide | Rakesh Rajan                   | -                |
| 6      | ASP.NET 4.6 and                  | Mark J. Price                  | O'Reilly         |

|  |                    |  |  |
|--|--------------------|--|--|
|  | Visual Studio 2015 |  |  |
|--|--------------------|--|--|

## B. List of Software/Learning Websites

<https://www.w3schools.com/asp/>

<http://www.tutorialspoint.com/listtutorials/asp-dot-net/1>

[http://www.pragimtech.com/dot\\_net\\_tutorials\\_for\\_beginners.aspx](http://www.pragimtech.com/dot_net_tutorials_for_beginners.aspx)

## COURSE OUTCOMES:

| Sr. No. | CO statement                                                                                  | Marks % Weightage |
|---------|-----------------------------------------------------------------------------------------------|-------------------|
| CO-1    | Understand ASP.NET lifecycle, page processing, and configure with Global.asax and web.config. | 20                |
| CO-2    | Develop web apps using web forms, coding models, and manage IIS configurations.               | 20                |
| CO-3    | Learn AJAX and use AJAX controls to enhance functionality.                                    | 20                |
| CO-4    | Use data controls and LINQ for data manipulation in ASP.NET apps.                             | 20                |
| CO-5    | Implement state management and handle errors with ASP.NET objects.                            | 20                |

## SUGGESTED LIST OF PRACTICAL/EXERCISES

| S.No. | Practical Exercises<br>(Outcomes' in Psychomotor Domain)                                | Hrs. required |
|-------|-----------------------------------------------------------------------------------------|---------------|
| 1     | Write a Steps for configure IIS with Asp.Net                                            | 02            |
| 2     | Write a program using the concept of cascading style sheet in ASP.net                   | 02            |
| 3     | Write a program to demonstrate use of Global.asax.                                      | 02            |
| 4     | Write a program to demonstrate Login Page using Database.                               | 02            |
| 5     | Write a program to upload a file to a server.                                           | 02            |
| 6     | Write a program which uses the AJAX Script Manager and Update Panel Control.            | 02            |
| 7     | Write a program which uses the AJAX Update Progress Control.                            | 02            |
| 8     | Write a program which uses the AJAX Timer Control.                                      | 02            |
| 9     | Write steps to add AJAX control Toolkit in to the Toolbox.                              | 02            |
| 10    | Write a program for Insert, Update, Delete and Search using Grid View Control.          | 02            |
| 11    | Write a program for Insert, Update, Delete and Search using Detail View Control.        | 02            |
| 12    | Write a program for Insert, Update, Delete and Search using Form View Control.          | 02            |
| 13    | Write a program for State Management Control.                                           | 02            |
| 14    | Write a program for pass one web form value to another web form using Query String.     | 02            |
| 15    | Write a program for pass one web form value to another web form using session variable. | 02            |
| 16    | Write a program to demonstrate Cookies.                                                 | 02            |
| 17    | Write a program for exception handling.                                                 | 02            |
| 18    | Write a program to design ASP.net Login Page for website with session and cookies.      | 02            |
| 19    | Write a program for online entrance examination registration form.                      | 02            |

|    |                                                                                      |    |
|----|--------------------------------------------------------------------------------------|----|
| 20 | Write a program to create a MSSQL table and execute queries to Read, Add, Remove and | 02 |
|----|--------------------------------------------------------------------------------------|----|

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## FACULTY OF IT & COMPUTER SCIENCE

### COURSE CURRICULUM

Course Title: MAJOR PROJECT  
(Code:)

| IT and CS Programmes in which this course is offered    | Semester in which offered |
|---------------------------------------------------------|---------------------------|
| Bachelor of Science In Information Technology-(B.Sc.IT) | Sixth Semester            |

#### Course Objectives -

- Perform various tasks like market survey, industrial visits, creative and innovative techniques, etc to identify project.
- Draw details and assembly production drawings.
- Plan material and processes optimally and economically.
- Develop sense of environmental responsibility..

#### Teaching and Examination Scheme –

| Content Hours per Week |   |   | Course Credits |   | Examination Marks |   |                 |    |    |
|------------------------|---|---|----------------|---|-------------------|---|-----------------|----|----|
| L                      | T | P | T              | P | Theory Marks      |   | Practical Marks |    | 50 |
|                        |   |   | 2              | 2 | E                 | M | I               | EV |    |
| 0                      | 0 | 2 | 4              |   | 0                 | 0 | 25              | 25 |    |

\*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,  
EV - External Viva

#### DETAILED COURSE CONTENTS -

| Sr. | Topic                                                                                                                                                                                                                                               | Teaching Hrs. | Weightage (%) |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| 1   | <b>Preparatory activities:</b><br>Objectives of learning this subject.<br>List attitude dos and don'ts.                                                                                                                                             | 2             | 10            |
| 2   | Basic techniques.<br>a. Explain all basic techniques as per Unit II.<br>b. Identify at least five needs which require product development/modification. Each student will identify separately.<br>c. Given the live product/case (to be assigned by | 4             | 20            |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |    |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
|   | <p>teacher),generate at least ten questions for each following basic techniques leading to identify project/problem:</p> <p>i. Productivity.<br/> ii. Quality.<br/> iii. Cost/waste reduction.<br/> iv. Value analysis.</p> <p>d. Carry out market survey for given product. (Teacher will assign the required data).<br/> e. Prepare cause and effect diagram (Fish bone diagram) for given data.(Teacher will assign the required data).<br/> f. Perform SWOT analysis for self.<br/> g. Briefly explain and present 5-S and 7-S frame work.<br/> h. Visit an industry and prepare the report on project which can be undertaken for manufacturing at institute place and/or live problems which can be solved at industry place.<br/> i. Carry out literature survey for basic techniques.</p> |    |    |
| 3 | <p><b>Identification of problem/project.</b><br/> Student will practice and will identify at least one problem/project and will prepare following.</p> <p>i. Details and assembly production drawings.(For manufacturing type project).<br/> OR<br/> i. Define live problems at industry place. Also prepare necessary drawings for live problem solution at industry place.<br/> ii. Bill of material.<br/> iii. Cost estimation of parts and complete project.</p>                                                                                                                                                                                                                                                                                                                              | 05 | 25 |
| 4 | <p><b>Draft project report:</b><br/> Prepare draft project report and include following.</p> <p>i. Activities performed at sr.no.2 from b to i. (Questions generated, market survey carried out, fishbone diagram, self SWOT analysis, tutorials, examples, 5-S and 7-S brief techniques, industrial visit outcome, literature survey).<br/> ii. Title of project.<br/> iii. Details and assembly production drawings prepared with use of software.(AutoCAD/ProE, CREO, etc.<br/> OR<br/> iii. Description of live problem to be solved at industry place.<br/> iv. Bill of material.<br/> v. Cost estimation of parts and complete project.</p>                                                                                                                                                 | 15 | 25 |

#### NOTE:

**Prepare project report with MS Office with following guidelines.**

|        |   |                      |
|--------|---|----------------------|
| PAGE   | : | A4 (ON ONE SIDE)     |
| MARGIN | : | TOP 15mm             |
|        | : | BOTTOM 15mm          |
|        | : | RIGHT 15mm           |
|        | : | LEFT 30mm            |
| FONT   | : | ARIAL                |
| SIZE   | : | TITLE : 12 BOLD      |
|        | : | CONTENT : 12         |
|        | : | SPACING : 18 points. |

HEADER : TITLE OF THE PROJECT, PAGE  
NUMBER ON TOP RIGHT.  
FOOTER: ACADEMIC YEAR, SHORT NAME

It is compulsory to prepare log book of exercises. It is also required to get each exercise recorded in logbook, checked and duly dated signed by teacher. PA component of practical marks is dependent on continuous and timely evaluation of exercises.

For practical ESE part, students are to be assessed for competencies achieved.

#### A. SUGGESTED LEARNING RESOURCES

- a. Use of Library.
- b. Reference books.
- c. Hand books.
- d. Encyclopaedia.
- e. Magazines.
- f. Periodicals.
- g. Journals.
- h. Visits of industry, organizations related as per the requirement.
- i. Internet.

#### COURSE OUTCOMES:

| Sr.<br>No. | CO statement | Marks %<br>Weightage |
|------------|--------------|----------------------|
| CO-1       |              |                      |
| CO-2       |              |                      |
| CO-3       |              |                      |
| CO-4       |              |                      |

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