



**SWAMINARAYAN
UNIVERSITY**
THE RESERVOIR OF ALL KNOWLEDGE

FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

COURSE TITLE : CONCEPTS OF AI & ML - I
(CODE: AMBIM111-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fifth 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	Fundamentals of Artificial Intelligence (AI) Artificial Intelligence Introduction, Future of Artificial Intelligence, Definition of AI, History and Types of AI, AI ethics and limitations, Artificial Intelligence Areas, Expert Systems, Natural Language Processing, Neural Networks, Robotics, Fuzzy Logic Systems AI applications in various industries (healthcare, finance, manufacturing,	9	25

	etc.)		
2	Foundation of Machine learning (ML) What is Machine Learning? Well-Posed learning Problem Types of Machine Learning : Supervised, Unsupervised, Reinforcement Reinforcement Learning : Terms, Key features Approaches to implement reinforcement learning: Value based, Policy Based, Model based, - Elements of reinforcement learning- Policy, reward signal, value function, Model; Types of reinforcement learning: Positive and Negative Comparison Comparison between Supervised, unsupervised and reinforcement learning	10	25
3	Neural networks Introduction to Neural Networks: Understanding the Biological Neuron, Exploring the Artificial Neuron Types of Activation Functions: ReLU, Sigmoid, Hyperbolic Tangent Function	12	25
4	Foundation of Neural Networks Architectures of Neural Network: Single-layer feed forward network, Multi-layer feed forward ANNs, Recurrent network Learning Process in ANN: Number of layers, Direction of signal flow, Number of nodes in layers, Weight of interconnection between , Back Propagation	14	25

***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 Major Equipment/ Software

1. XXAMP, WAMP or LAMP SERVER

C. 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://onlinecourses.nptel.ac.in/noc19_cs56/preview
- https://onlinecourses.nptel.ac.in/noc20_cs29/preview

Course Learning Outcomes (CLO):

Sr. No.	CO statement	Marks % Weightage
CLO-1	Apply Artificial Intelligence and Machine Learning concepts to solve real world problems.	25
CLO -2	Understand fundamental principles of machine learning AND Compare types of machine learning.	25
CLO -3	Build a simple Neural Network model to solve real world problem.	25
CLO -4	develop real world NLP applications	25

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 List Of Practical/Exercises

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Use Cancer Dataset for detecting whether the cancer cells in data are benign or malignant. The data contains 2 types of cancers: 1. benign cancer (B) and 2. malignant cancer (M). Use relevant ML techniques for the same.	06
2.	Implement following activation functions using python to build simple neural network. a. ReLU	04
3.	Implement following activation functions using python to build simple neural network. b. Sigmoid	04
4.	Implement following activation functions using python to build simple neural network. c. Tanh	04
5.	Implement following feed forward neural network using python programming: a. Single layer feed forward neural network.	04
6.	Implement following feed forward neural network using python programming: a. Multi-layer feed forward neural network.	04



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COURSE CURRICULUM

Course Title: DATA SCIENCE-1
(Code: DSBIM112-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fifth 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				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.
1	Overview of Python and Data Structures: <ul style="list-style-type: none">Basics of Python including data types ,Variables, Expressionsobjects and functionsPython data structures including String, Array, List, Tuple, Set, Dictionary and operations them	8
2	Introduction to Data Analysis <ul style="list-style-type: none">Sources and nature of data, classification of data (structured, semi-structured, unstructured)Characteristics of dataIntroduction to Big Data platformNeed of data AnalysisEvolution of analytic scalabilityAnalytical processAnalysis vs. reportingModern data analysis toolsApplications of data analysis.Key roles for successful analysis	8
3	Python libraries for Data Science <ul style="list-style-type: none">NumPy-<ul style="list-style-type: none">Difference between array and listN dimension array - 1D array, 2D array, 3D arrayZeros matrix, Ones matrix, Identity matrix, Reshape, Working with random numberStacking - Vertical stacking, horizontal stackingPandas-<ul style="list-style-type: none">Working with Dataframes Read csv and xlsx fileAnalyze the basic dataset characteristicsPerform different merge and sort operations with multiple dataframesAnalyze the DataFrame with loc and iloc, nlargest(), nsmallest(), add or remove an attribute from the DataFrame.	8
4	Data Visualization <ul style="list-style-type: none">Introduction to Data VisualizationImportance of Data VisualizationBasic Data Visualization with matplotlibCustomizing matplotlib plotsData visualization with Seaborn	8

*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
19	25	16	-	-	-

*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

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Write a program to perform the below operations on the list: <ul style="list-style-type: none"> • Create a list. • Add/Remove an item to/from a list. • Get the number of elements in the list. • Access elements of the list using the index. • Sort the list. • Reverse the list. 	04
2.	Write a program to perform below operations on tuple: <ul style="list-style-type: none"> • Create a tuple with different data types. • Print tuple items. • Convert tuple into a list. • Remove data items from a list. 	04

	<ul style="list-style-type: none"> • Convert list into a tuple. • Print tuple items. 	
3.	<p>Write a program to perform below operations on set:</p> <ul style="list-style-type: none"> • Create two different sets with the data. • Print set items. • Add/remove items in/from a set. • Perform operations on sets: union, intersection, difference, symmetric difference, check subset of another set. 	04
4.	<p>Write a program to perform below operations on dictionary:</p> <ul style="list-style-type: none"> • Create a dictionary. • Print dictionary items. • Add/remove key-value pair in/from a dictionary. • Check whether a key exists in a dictionary. • Iterate through a dictionary. • Concatenate multiple dictionaries. 	04
5.	<ul style="list-style-type: none"> • Write a program to check whether a given string is palindrome or not. • Create numpy array with filled with all zeros • Find the most frequent value in a array • Count number of non zero value in the array 	08
6.	<ul style="list-style-type: none"> • Write a numPy program to generate five random numbers from the normal distribution. • Write a numPy program to create a 5x5 array with random values and find the minimum and maximum values 	04
7.	<ul style="list-style-type: none"> • Write a Pandas program to create a dataframe from a dictionary and display it. • Write a Pandas program to select the rows where the number of attempts in the examination is greater than 2. • Write a Pandas program to read specific columns from a given excel file • Write a Pandas program to import excel data into a Pandas data frame. • Write a Pandas program to import some excel data skipping first twenty rows into a Pandas dataframe. 	10
8.	<ul style="list-style-type: none"> • Create a Python script that uses Matplotlib to generate simple line charts • Create a Python script that uses Matplotlib to generate simple bar graph • Create a Python script that uses Matplotlib to generate scatter plots from sample data • Customize the appearance of these plots, including labels, colors, and annotations 	08
9.	Utilize Seaborn to create a bar plot to visualize the average income across different regions in the "tips" dataset.	02
10.	Write a Pandas program to import excel data (coalpublic2013.xlsx) into a Pandas dataframe	02



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COURSE CURRICULUM

COURSE TITLE : WEB DEVELOPMENT USING PHP
(CODE: WDBIE104-1C)

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

Course Objectives –

This course is intended to make the students:

- To understand fundamentals of Open Source, Server Side Programming Technology PHP.
- To learn exception handling, cookie and session management.
- To develop websites using open source technology PHP and MySQL.

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.	Weightage (%)
1	Introduction of Open Source: Introduction to Open Source, Pros and cons of Open Source, Features of Open Source, Introduction to different open source software (Linux, ERP, CMS). PHP Basics: History of PHP, Features of PHP, Basic Syntax of PHP, Creating & Running PHP Webpage, Data Types, Comments, Defining Variables and Constants, Operators and Expressions, Scope of Variables (local, global, static), Type Casting, including files using include() and require().	9	25
2	Control Structures: Conditional Statements (If and Switch) Looping Statements (While, For, Do... While, For Each).		

	Working With Array: Creating and using Arrays, Types of an Array (Indexed and Associative Arrays). Working With PHP Functions: User Defined Functions, Variable Functions, Array Functions, and String Functions.	10	25
3	Object Oriented Programming With PHP: Creating Class and Objects, Accessing Class Members, Visibility of Class Members (Private, Public, Protected), working with Constructors and Destructors. Inheritance: Introduction of Inheritance, Types of Inheritance. Error and Exception Handling: Types of Errors, Error Handling, Creating Custom Error handler, Exception Handling using Try, Catch and Throw, Creating Custom Exception handler.	12	25
4	Working With Forms: Creating and Handling HTML Form elements, Sending form data using GET and POST Methods, Receiving Form data using \$_GET, \$_POST and \$_REQUEST variables, Use of Hidden Field, Validating Form Data, Redirecting User, File Uploading, Sending mail. State Management: Working With Cookies: Introduction of Cookie, Setting and Accessing a Cookie, Destroying a Cookie. Working With Session: Introduction of Session, Starting a Session, Use of Session Variable, Destroying Session. Database Connectivity With MySQL : Introduction to MySQL and MySQLi, MySQL Data Types, Connection with MySql Database, Database Manipulation (INSERT, SELECT, UPDATE, DELETE), MySQLi Functions.	14	25

***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	Beginning PHP and MySQL	Jason Gilmore	Dreamtech Press
2	PHP 5 and MySQL Bible	Tim Converse and Joyce Park with Clark Morgan	Wiley Publishing, Inc
3	Learning PHP, MySQL, JavaScript, and CSS	Robin Nixon	O'Reilly Publication Media
4	The Complete Reference PHP	Steven Holzner	Tata Mcgraw Hill Education Private Limited
5	Teach Yourself PHP, MySQL and Apache All in One	By Julie C. Meloni	Pearson Education

B. List of Major Equipment/ Software

1. XXAMP,WAMP or LAMP SERVER

C. List of Software/Learning Websites

1. <https://www.w3schools.com/php/>

2. <https://www.tutorialspoint.com/php/>
3. <http://php.net/manual/en/manual.php>
4. <https://www.javatpoint.com/php-tutorial>
5. <https://www.w3resource.com/php/php-home.php>
6. <https://www.guru99.com/php-tutorials.html>
7. <https://www.tutorialrepublic.com/php-tutorial/>

Course Learning Outcomes (CLO):

Sr. No.	CO statement	Marks % Weightage
CLO-1	To have fundamental knowledge of Open Source Web Technology PHP.	25
CLO -2	To work with PHP functions.	25
CLO -3	To understand the basics of object oriented programming and event handling.	25
CLO -4	To develop web applications using cookie and session AND To develop database driven Web applications.	25

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 List Of Practical/Exercises

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Write a script to display "My First PHP Script" Message. Write a script to perform arithmetic operations. Write a script to demonstrate constant.	06
2.	Write a script to demonstrate the use of indexed arrays and associative arrays. Write a script to demonstrate the use of array functions. Write a script to demonstrate the use of string function.	06
3.	Write a script to implement custom error handling. Write a script to demonstrate exception handling using try, catch and throw.	04
4.	Write a script to demonstrate the use of constructor and destructor. Write a script to implement the concept of inheritance.	04
5.	Write a script to create a simple student registration form. Write a script to create a simple calculator using form. Write a script to prepare a student mark sheet using form.	06
6.	Write a script to validate form data. Write a script to redirect users. Write a script to upload a file.	06
7.	Write a script to send mail. Write a script to demonstrate the use of session. Write a script to demonstrate the use of cookies.	06
8.	Write a script to create a new database.	06

	Write a script to create a new table in the database. Write a script to insert records to the table in the database.	
9.	Write a script to retrieve all records from the table in the database. Write a script to delete and search record from the table in database	06
10.	Write a script to update records to the table in the database. Write a script to implement following tasks <ul style="list-style-type: none"> • Registration & Login of user. • Modify the details of user. • Logout. 	10



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COURSE CURRICULUM

COURSE TITLE : GRAPHICS DESIGN TOOLS
(CODE: SEC105-1C-D)

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

Course Objectives –

This course is intended to make the students:

- To familiarize students with the fundamental features and tools of Photoshop and PageMaker.
- To develop proficiency in editing, enhancing, and manipulating images using various tools and techniques available in Photoshop and PageMaker.
- To teach efficient workflow practices, including shortcuts, automation, and best practices for organizing and managing files within Photoshop and PageMaker
- To introduce advanced editing techniques such as retouching, masking, compositing, and special effects to create complex and visually compelling images.
- To apply learned skills through practical projects, encouraging creativity and problem-solving in real-world scenarios.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			0	2	E	M	I	EV
0	0	4	2		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	Photoshop: Overview of Photoshop interface and tools , Page setup dialog box.	10	25
2	Understanding layers and basic image adjustments Selection tools and techniques, Image resizing, cropping, and resolution , Blur , Sharpen tool	8	25
3	Understanding color modes and color adjustments, Using adjustment layers and masks, Pattern Stamp tool , Patch tool, Healing Brush tool , Text tools and formatting options,	15	25
4	Blending Option for Text Retouching techniques for portraits and photos , Restoring old or damaged photographs, Using filters and effects creatively , Incorporating advanced editing techniques	15	25

*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	ADOBE PHOTOSHOP 2024 : Beginners to Expert Guide to Explore all	SAMMIE SMITH	-
2	An Introduction to adobe Photoshop	Steve Bark	-
3	Photoshop 7 Savvy	Steve Romaniello	BPB Publications

B. List of Major Equipment/ Software

1. Photoshop 2024

C. List of Software/Learning Websites

1. https://www.youtube.com/watch?v=rSitQiZWB_Q
2. <https://www.youtube.com/watch?v=lsZiQJRfiXk>
3. <https://youtu.be/PkI4n8EPjJY?si=PG71d9cQAU5wRAOG>

Course Learning Outcomes (CLO):

Sr. No.	CO statement	Marks % Weightage
CLO-1	Students will apply design principles such as color theory , composition, and visual hierarchy to create visually appealing images and designs..	25
CLO-2	Students will demonstrate proficiency in using Photoshop tools and PageMaker Tools and functionalities to edit, enhance, and manipulate images effectively.	25
CLO -3	Students will execute advanced editing techniques including retouching, masking, layering, and compositing to produce complex and high-quality images	25
CLO -4	Students will develop problem-solving skills by employing critical thinking to troubleshoot and find creative solutions to editing challenges within Photoshop and PageMaker.	25

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 List Of Practical/Exercises

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Photo Editing Software like Photoshop Students must be trained by discussing various case studies. 1. Marge two picture into one image 2. Write a name of picture on the picture 3. Create a friendship card 4. Convert color photo into black and white	20
2.	Photo Editing Software like Photoshop Students must be trained by discussing various case studies. 5. Give them some extra effect on the photo 6. Create an Advertisement 7. Crete a Calendar 8. To convert black & white photo to color photo 9. Create 3D graphics text with different effects	20
