स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

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Academic-1 (BOS) Section

विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरण २०२० नुसार पदवी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २७ मे २०२५ रोजी संपन्न झालेल्या मा. विद्यापरिषद बैठकीतील विषय क्रमांक १६/६१–२०२५ च्या ठरावानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील राष्ट्रीय शैक्षणिक धोरण–२०२० नुसारचे पदवी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्यास मा. विद्यापरिषदेने मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील बी. एस्सी द्वितीय वर्षाचे खालील विषयाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्यात येत आहेत.

01	B.Sc. Computer Management (Single Major)
02	B.Sc. Information Technology (Single Major)
03	B.Sc. Software Engineering (Single Major)
04	B.Sc. Computer Network Technology (Single Major)
05	B.Sc. Computer Science (Single Major)
06	B.Sc. Artificial Intelligence & Machine Learning (Single Major)
07	B.Sc. BCA (Single Major)
08	B.Sc. Computer Maintenance
09	B.Sc. Computer Science
10	B.Sc. Information Technology
11	B. Sc. Computer Application
12	B. Sc. Software Development
13	B. Sc. Data Science
14	B. Sc. Computer Science (with data Science specialization)

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शै–१/एनइपी/विवर्तविपदवी/२०२५–२६/126
दिनांक १२.०६.२०२५

सहाय्यक कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत : माहितीस्तव तथा कार्यवाहीस्तव.

१) मा. कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. प्र. कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
४) मा. संचालक, परीक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
५) मा. प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, परिपत्रक अभ्यासक्रम संकेतस्थळावर प्रसिध्द करण्यात यावेत.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606 (MS)

(Credit Framework and Structure of

B. Sc. Artificial Intelligence and Machine Learning (Single Major)

Second Year

with Multiple Entry and Exit Options as per NEP-2020)

UNDERGRADUATE PROGRAMME OF SCIENCE & TECHNOLOGY

Major in **AML** and Minor in **DSM** (Subject)

Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology (Three Optional in the First Year)
Credit Framework for Second Year with Multiple Entry and Exit
Subject: AML (Major) /DSM (Minor 1)
B.Sc. Artificial Intelligence and Machine Learning (Single Major) Second Year

Year & Level	Sem ester	Optional 1 (Major) *(From the same Faculty)*	Optional 2 (Minor 1) *(From the same Faculty)*	Optional 3 (Minor 2) *(From the same Faculty)*	Generic Elective (GE) (select from Basket 3 of Faculties other than Science and Technology)	Vocational & Skill Enhancement Course	Ability Enhancement Course (AEC) (Basket 4) Value Education Courses (VEC) / Indian Knowledge System (IKS) (Basket 5) *(Common across all faculties)*	Field Work / Project/Internship/ OJT/ Apprenticeship / Case Study Or Co-curricular Courses (CCC) (Basket 6 for CCC) *(Common across all faculties)*	Credits	Total Credits
1	2	3	4	5	6	7	8	9	10	11
2 (5.0)	III	SAMLCT1201 (T 2Cr) SAMLCT1202 (T 2Cr) SAMLCP1203 (P 2Cr) SAMLCP1204 (P 2Cr) 8 Credits	SAMLMT1201 (T 2Cr) SAMLMP1201 (P 2Cr) 4 Credits	--	SAMLGE1201 2 Credits	SAMLSC1201 2 Credits	AECENG1201 (2cr) AECMIL1201 (2Cr) (MAR/HIN/URD /KAN/PAL) 4 Credits	CCC1201 (2Cr) *(NCC/NSS/SPT(sports)/ CLS(Cultural Studies)/HWS(Health Wellness)/ YGE(Yoga Education) / FIT(Fitness)* 2 Credits	22	44
	IV	SAMLCT1251 (T 2Cr) SAMLCT1252 (T 2Cr) SAMLCP1253 (P 2Cr) SAMLCP1254 (P 2Cr) 8 Credits	SAMLMT1251 (T 2Cr) SAMLMP1251 (P 2Cr) 4 Credits	--	SAMLGE1251 2 Credits	SAMLVC1251 2 Credits	AECENG1251 (2cr) AECMIL1251 (2Cr) (MAR/HIN/URD /KAN/PAL) VECEVS1251 (2Cr) 6 Credits	---	22	
	Cum. Cr.	16	08	00	04	04	10	02	44	

Abbreviations:

1. **DSC:** Department/Discipline Specific Core (Major)

2. **DSE:** Department/Discipline Specific Elective (Major)

3. **DSM:** Discipline Specific Minor

4. **GE/OE:** Generic/Open Elective

5. **VSEC:** Vocational Skill and Skill Enhancement Course

6. **VSC:** Vocational Skill Courses

7. **SEC:** Skill Enhancement Courses

8. **AEC:** Ability Enhancement courses

9. **MIL:** Modern Indian languages

10. **IKS:** Indian Knowledge System

11. **VEC:** Value Education Courses

12. **OJT:** On Job Training: (Internship/Apprenticeship)

13. **FP:** Field Projects

14. **CEP:** Community Engagement and Service

15. **CC:** Co-Curricular Courses

16. **RM:** Research Methodology

17. **RP:** Research Project/Dissertation

18. **AML:** Artificial Intelligence and Machine Learning

B. Sc. AI and ML Second Year Semester III *(Level 5.0)*

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs./ week)	
			Theory	Practical	Total	Theory	Practical
Optional 1	SAMLCT1201	Data Analytics with Python	02	--	**08**	03	--
	SAMLCT1202	Analyzing Data with Power BI	02	--		03	--
	SAMLCP1203	Data Analytics with Python (P)	--	02		--	04
	SAMLCP1204	Analyzing Data with Power BI (P)	--	02		--	04
Optional 2	SAMLMT1201	Mathematics for AI and ML	02	--	**04**	03	--
	SAMLMP1201	Mathematics for AI and ML (P)	-	02		--	04
Generic Electives *(from other Faculty)*	SAMLGE1201	Web Designing	02	--	**02**	03	--
Skill Based Course (related to Major)	SAMLSC1201	AI Tools-Chat GPT (P)	--	02	**02**	--	04
Ability Enhancement Course	AECENG1201	Select from **(Basket 4)**	02	--	**02**	02	--
Ability Enhancement Course	AECMIL1201	Select from **(Basket 4)**	02	--	**02**	02	--
Community Engagement Services (CES)	CCCXXX1201	Select from **(Basket 6)**	--	02	**02**	--	02
Total Credits			**12**	**10**	**22**	**16**	**18**

B. Sc. AI and ML Second Year Semester III *(Level 5.0)*

Examination Scheme

[20% Continuous Assessment (CA) and 80% End Semester Assessment (ESA)]

Subject (1)	Course Code (2)	Course Name (3)	Theory				Practical		Total Col (6+7) / Col (8+9) (10)
			Continuous Assessment (CA)			ESA	CA (8)	ESA (9)	
			Test I (4)	Test II (5)	Average of T1 & T2 (6)	Total (7)			
Optional 1	SAMLCT1201	Data Analytics with Python	10	10	10	40	--	--	50
	SAMLCT1202	Analyzing Data with Power BI	10	10	10	40	--	--	50
	SAMLCP1203	Data Analytics with Python (P)	--	--	--	--	20	30	50
	SAMLCP1204	Analyzing Data with Power BI (P)	--	--	--	--	20	30	50
Optional 2	SAMLMT1201	Mathematics for AI and ML	10	10	10	40	--	--	50
	SAMLMP1201	Mathematics for AI and ML (P)	--	--	--	--	20	30	50
Generic Elective	SAMLGE1201	Web Designing	10	10	10	40	--	--	50
Skill Based Course	SAMLSC1201	AI Tools-Chat GPT (P)	--	--	--	--	20	30	50
Ability Enhancement Course	AECENG1201	Select from (Basket 4)	10	10	10	40	--	--	50
Ability Enhancement Course	ACEMIL1201	Select from (Basket 4)	10	10	10	40	--	--	50
Community Engagement Services (CES)	CCCXXX1201	Select from (Basket 6)	--	--	--	--	20	30	50

B. Sc. AI and ML Second Year Semester IV *(Level 5.0)*
Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs./ week)	
			Theory	Practical	Total	Theory	Practical
Optional 1	SAMLCT1251	Fundamentals of AI and ML	02	--	**08**	03	--
	SAMLCT1252	Data Structures and Algorithms	02	--		03	--
	SAMLCP1253	Fundamentals of AI and ML (P)	--	02		--	04
	SAMLCP1254	Data Structures and Algorithms (P)	--	02		--	04
Optional 2	SAMLMT1251	Software Engineering	02	--	**04**	03	--
	SAMLMP1251	Software Engineering (P)	-	02		--	04
Generic Electives *(from other Faculty)*	SAMLGE1251	Cyber Security	02	--	**02**	02	--
Vocational Course *(related to Major)*	SAMLVC1251	AI Tools for Image and Video Generation (P)	--	02	**02**	--	04
Ability Enhancement Course	AECENG1251	Select from **(Basket 4)**	02	--	**02**	02	--
Ability Enhancement Course	AECMIL1251	Select from **(Basket 4)**	02	--	**02**	02	--
Value Education Courses	VECEVS1251	Select from **(Basket 5)**	02	--	**02**	02	--
Total Credits			**14**	**08**	**22**	**17**	**16**

B. Sc. AI and ML Second Year Semester IV *(Level 5.0)*

Examination Scheme
[20% Continuous Assessment (CA) and 80% End Semester Assessment (ESA)]

Subject (1)	Course Code (2)	Course Name (3)	Theory				Practical		Total Col (6+7) / Col (8+9) (10)
			Continuous Assessment (CA)			ESA	CA (8)	ESA (9)	
			Test I (4)	Test II (5)	Average of T1 & T2 (6)	Total (7)			
Optional 1	SAMLCT1251	Fundamentals of AI and ML	10	10	10	40	--	--	50
	SAMLCT1252	Data Structures and Algorithms	10	10	10	40	--	--	50
	SAMLCP1253	Fundamentals of AI and ML (P)	--	--	--	--	20	30	50
	SAMLCP1254	Data Structures and Algorithms (P)	--	--	--	--	20	30	50
Optional 2	SAMLMT1251	Software Engineering	10	10	10	40	--	--	50
	SAMLMP1251	Software Engineering (P)	--	--	--	--	20	30	50
Generic Elective	SAMLGE1251	Cyber Security	10	10	10	40	--	--	50
Vocational Course	SAMLVC1251	AI Tools for Image and Video Generation (P)	--	--	--	--	20	30	50
Ability Enhancement Course	AECENG1251	Select from **(Basket 4)**	10	10	10	40	--	--	50
Ability Enhancement Course	AECMIL1251	Select from **(Basket 4)**	10	10	10	40	--	--	50
Value Education Courses	VECEVS1251	Select from **(Basket 5)**	10	10	10	40	--	--	50

Detailed Curriculum

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 8

Course Structure:

Major 1 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCT1201	Data Analytics with Python	03	--	02	--	02

Major 1 – Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLCT1201	Data Analytics with Python	10	10	10	40	--	--	**50**

SAMLCT1201: Data Analytics with Python (Major 1) Curriculum Details

Course pre-requisite:

1. Basic understanding of programming concepts (preferably in Python or any language).
2. Familiarity with mathematics and statistics at the high school level.
3. Basic computer operation and software installation skills.
4. Logical reasoning and problem-solving ability.

Course Objectives:

1. To introduce students to the fundamental concepts and tools of Data Analytics using Python.
2. To enable students to perform data manipulation and analysis using libraries like NumPy, Pandas, and SciPy.
3. To develop skills in data visualization using Matplotlib, Seaborn, and Plotly.
4. To provide knowledge of real-world data analytics applications including data preprocessing, EDA, and basic machine learning.

Course Outcomes:

Students will be able to:

1. Write Python programs to manipulate data using built-in and external libraries.
2. Apply data handling techniques to clean, merge, transform, and analyze datasets.
3. Create effective data visualizations using various plotting libraries.
4. Demonstrate the ability to perform basic data analytics tasks, including model development and evaluation using scikit-learn.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 9

Curriculum Details:

Module No.	Unit No.	Topic	Hrs. Required
1.0		**Introduction to Data Analytics and Python for Data Handling**	
	1.1	Introduction to Data Analytics – Definition, Need, and Applications	**6**
	1.2	Introduction to Jupyter Notebook, Spyder, VS Code and Google co-lab	
	1.3	File Handling in Python	
	1.4	Exception Handling – try, except, finally, raise	
	1.5	Modules and Packages	
	1.6	Object-Oriented Programming in Python – Class, Object, Inheritance	
2.0		**NumPy, SciPy and Pandas for Data Handling**	
	2.1	Introduction to NumPy: Arrays, Array Operations	**8**
	2.2	NumPy Functions: arrange, linspace, reshape, slicing, indexing, etc.	
	2.3	Matrix Operations, Statistical Functions in NumPy	
	2.4	Introduction to SciPy: Sub-packages	
	2.5	Basics of Pandas: Series and DataFrame	
	2.6	DataFrame Operations: Reading, Writing, Indexing, Filtering	
	2.7	Handling Missing Values and Duplicates	
	2.8	Data Aggregation, Grouping, and Sorting	
	2.9	Merging, Joining and Concatenating DataFrames	
	2.10	Data Cleaning and Transformation using Pandas	
3.0		**Data Visualization with Python**	
	3.1	Importance of Data Visualization in Analytics	**8**
	3.2	Introduction to Matplotlib: Plotting Line, Bar, Histogram, Scatter	
	3.3	Customization of Plots – Titles, Labels, Legends, Colors	
	3.4	Introduction to Seaborn: Distribution Plots, Categorical Plots	

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 10

	3.5	Pairplot, Boxplot using Seaborn	
	3.6	Styling and Themes in Seaborn	
	3.7	Plotting Time Series Data	
	3.8	Saving Plots and Subplots	
	3.9	Introduction to Plotly and interactive plots	
	3.10	Dashboards with Plotly Dash (Basic Concepts	
4.0		**Data Analytics Concepts, Examples and Applications**	
	4.1	Data Analytics and Data Science	
	4.2	Types of Data Analytics: Descriptive, Diagnostic, Predictive, Prescriptive	
	4.3	Data Collection, Wrangling, and Pre-processing	
	4.4	**Data Analytics examples:** Student Performance Analysis	**8**
	4.5	Customer Segmentation, Weather Data Analysis	
	4.6	Stock Market Data Analysis	
	4.7	Introduction to Machine Learning with scikit-learn	
	4.8	Simple and Multiple Linear Regression	

Reference Books:

1. Python for Data Analysis by Wes McKinney, 2nd Edition, O'Reilly
2. Python Data Science Handbook by Jake VanderPlas, O'Reilly
3. Think Python: How to Think Like a Computer Scientist" by Allen B. Downey, 2nd Edition, O'Reilly
4. Data Science from Scratch by Joel Grus, 2nd Edition, O'Reilly
5. Hands-On Data Analysis with Pandas by Stefanie Molin, Packt

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 11

Course Structure:

Major 1 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCP1203	Data Analytics with Python	--	04	--	02	02

Major 1 – Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLCP1203	Data Analytics with Python	--	--	--	--	20	30	**50**

SAMLCP1203: Data Analytics with Python (Major 1) Practical List

Sr. No.	Practical
1	Write Python programs using variables, data types, loops, and functions including lambda expressions. Create and manipulate Python data structures: lists, tuples, and dictionaries.
2	Perform file handling operations: read, write, and append text files using Python.
3	Demonstrate exception handling using try, except, finally, and raise in Python.
4	Create a Python class with methods, inheritance, and demonstrate object-oriented programming concepts.
5	Implement and use iterators, generators, and decorators in Python.
6	Use NumPy to create and manipulate arrays; apply functions like arrange, linspace, reshape, and slicing.
7	Perform matrix operations and use statistical functions in NumPy.
8	Use Pandas to create Series and DataFrames; perform indexing, slicing, filtering, and I/O operations.
9	Clean data by handling missing values, duplicates, and perform grouping, merging, and aggregation in Pandas.
10	Create basic plots in Matplotlib – line, bar, histogram, and scatter plots with customization.
11	Create Seaborn plots: distribution plots, boxplots, heatmaps, pairplots, and style them appropriately.
12	Plot time series data and export/save plots in different formats using Matplotlib/Seaborn.
13	Create interactive plots using Plotly and design a basic dashboard using Plotly Dash.

14	Data Analytics examples: Student Performance Analysis Customer Segmentation, Weather Data Analysis Stock Market Data Analysis
15	Perform exploratory data analysis (EDA) and implement simple linear regression using scikit-learn.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 13

Course Structure: *Major 2 -Teaching Scheme*

Course Code	Course Name (Paper Title)	Teaching Scheme(Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCT1202	Analyzing Data with Power BI	02	--	02	--	02

Major 2 -Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)	CA (8)	ESA (9)	
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)				
SAMLCT1202	Analyzing Data with Power BI	10	10	10	40	--	--	50

SAMLCT1202: *Analysing Data with Power BI (Major 2) Curriculum Details*

Course pre-requisite:
1. Basic understanding of data concepts (e.g., rows, columns, tables)
2. Familiarity with Excel or spreadsheets is helpful

Course Objectives:
3. To equip learners with skills to connect, clean, model, visualize, and publish data using Power BI for decision-making and business intelligence.

Course Outcomes:
Students will be able to:
1. Describe the role of Power BI in business intelligence and its key components (Desktop, Service, Mobile).
2. Import and clean data from various sources (Excel, CSV, Web) using Power BI's Power Query Editor.
4. Transform and model data by creating relationships between tables and defining proper data types.
5. Apply DAX formulas to create calculated columns, measures, and KPIs for meaningful data analysis.
6. Create interactive dashboards using a variety of visualizations like bar charts, slicers, tables, and maps.
7. Design user-friendly reports with filters, drill-through, tooltips, and conditional formatting.
8. Publish reports to Power BI Service and configure scheduled refresh and row-level security.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 14

Curriculum Details:

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Introduction to Power BI & Data Loading**	**5**
	1.1	Introduction to Business Intelligence and Power BI	
	1.2	Understanding Power BI interface	
	1.3	Connecting to data sources: Excel, CSV, Web	
	1.4	Power Query Editor: Renaming columns, Changing data types, Removing errors/nulls, Filtering and sorting	
2.0		**Data Modeling and DAX**	**10**
	2.1	Understanding data models and relationships	
	2.2	Creating relationships between tables	
	2.3	Introduction to DAX (Data Analysis Expressions)	
	2.4	Measures vs Calculated Columns	
	2.5	Basic DAX functions: SUM, AVERAGE, DIVIDE, IF, Time intelligence: YTD, SAMEPERIODLASTYEAR	
3.0		**Visualization and Report Building**	**10**
	3.1	Types of visualizations in Power BI: Bar, column, line, pie, cards, tables, matrix	
	3.2	Using slicers, filters, and drill-through Conditional formatting and tooltips	
	3.3	Designing interactive dashboards	
	3.4	Using custom visuals from marketplace	
4.0		**Publishing, Sharing, and Power BI Service**	
	4.1	Introduction to Power BI Service	

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 15

	4.2	Publishing reports from Desktop to Service	5
	4.3	Creating dashboards from reports	
	4.4	Sharing reports and dashboards	
	4.5	Row-Level Security (RLS) setup	
		Total	**30**

Reference Books:

1. **"Mastering Microsoft Power BI"** by Brett Powell
2. **"The Definitive Guide to DAX"** by Marco Russo and Alberto Ferrari
3. **"Power BI Cookbook"** by Brett Powell

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 16

Course Structure: *Major 2 -Teaching Scheme*

Course Code	Course Name (Paper Title)	Teaching Scheme(Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCP1204	Analyzing Data with Power BI (Practical)	--	04	--	02	02

Major 2 -Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)	CA (8)	ESA (9)	
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)				
SAMLCP1204	Analyzing Data with Power BI (Practical)	--	--	--	--	30	20	50

SAMLCP1204**:   Analyzing Data with Power BI** *(practical) (Major 2)*

Exp. No	Name of the Practical
1	Connect Power BI to Excel, CSV, and a public web source. Combine and load data for further analysis
2	Navigate the Power BI Desktop interface. Identify areas like the report view, data view, model view, and field's pane.
3	To Use Power Query to rename columns, change data types, remove errors and nulls, and apply filters.
4	Sort a dataset by date or value and format columns appropriately (e.g., currency, percentage).
5	**Create Data Model and** Load multiple related tables (e.g., Sales, Products, and Customers) and define relationships between them.
6	Detect issues in automatic relationships, manually create or fix them, and test with simple visuals.
7	Write DAX expressions to create both calculated columns and measures using SUM, AVERAGE, DIVIDE, and IF.
8	Calculate YTD Sales and SAMEPERIODLASTYEAR Sales using DAX for trend analysis.
9	**Build Basic Visuals like** Create a report with bar, column, line, pie charts, cards, tables, and a matrix visual.
10	Add slicers for category and date filtering, and apply page/visual-level filters.

11	Set up drill-through functionality to view detailed sales performance by product or region.
12	Highlight underperforming regions with color formatting and create informative custom tooltips.
13	Import a custom infographic visual from the marketplace and integrate it into your report.
14	Combine multiple visuals into an interactive sales dashboard using bookmarks and buttons.
15	Publish a report to Power BI Service, set up a dashboard, configure Row-Level Security, and share with users based on roles.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 18

Course Structure: *Minor 1 -Teaching Scheme*

Course Code	Course Name (Paper Title)	Teaching Scheme(Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLMT1201	Mathematics for AI and ML	03	--	02	--	02

Minor 1 -Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)	CA (8)	ESA (9)	
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)				
SAMLMT1201	Mathematics for AI and ML	10	10	10	40	--	--	50

SAMLMT1201: *Mathematics for AI and ML (Minor 1) Curriculum Details*

Course pre-requisite:

1. Basic knowledge of Mathematics.

Course Objectives:

- Understand the Mathematical Foundations.
- Develop Problem-Solving and Analytical skill.
- Enable Practical Application of Mathematical Concepts in Real-World AI Problems

Course Outcomes:

- o Solve Complex AI/ML Problems with a Mathematical Approach
- o Understand and apply the concepts of **Mathematics** for modeling data
- o Develop Research and Innovation in AI/ML

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 19

Curriculum Details:*(There shall be FOUR Modules in each course)*

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Set Theory**	
	1.1	Set definition, types	7
	1.2	Operation on set	
	1.3	Venn diagram	
	1.4	Problems on set operation	
2.0		**Mathematical Logic**	
	2.1	Proposition	
	2.2	Compound statement	
	2.3	Logical Connectivity	
	2.4	Tautology, Contradiction, contingency	8
	2.5	Logical Equivalence	
	2.6	Problems on Logical Equivalence	
	2.7	Problems on Tautology, Contradiction, contingency.	
3.0		**Function and Relation**	
	3.1	Function	
	3.2	Types of function	
	3.3	Relation	8
	3.4	Types of relation	
	3.5	Cartesian product	
	3.6	Examples on function and relation	
4.0		**Graph Theory**	
	4.1	Basic Concepts of Graph Theory	
	4.2	Types of Graphs	
	4.3	Degree of vertex	
	4.4	Connected and Disconnected graph	7
	4.5	Walk, Path, Circuit	
		Total	**30**

Reference Books:

1. Elements of discrete mathematics, C. L. Liu
2. Discrete mathematics, Olympia Nicodemi
3. Graph theory, Narsing Deo
4. Basic mathematics, Mittal & Agrawal

Course Structure: *Minor 1 -Teaching Scheme*

Course Code	Course Name (Paper Title)	Teaching Scheme(Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLMP1201	Mathematics for AI and ML (Practical)	--	02	--	02	02

Minor 1-Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)	CA (8)	ESA (9)	
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)				
SAMLMP1201	Mathematics for AI and ML (Practical)	--	--	--	--	30	20	50

SAMLMP1201: *Mathematics for Data Science (practical) (Minor 1)*

Sr. No.	Name of the Practical
1	To perform union and intersection operations on two sets and understand how these operations work
2	To perform Difference operations on two sets and understand how these operations work
3	To perform Complement operations on two sets and understand how these operations work
4	To calculate the Cartesian product of two sets and understand the concept of ordered pairs.
5	To understand how to construct truth tables for logical expressions and determine their truth values
6	To understand and apply logical equivalences to simplify logical expressions.
7	To understand how to construct truth tables for Tautology
8	To understand how to construct truth tables for Contradiction
9	To understand the difference between a relation and a function and determine whether a given relation is a function.
10	To find the domain and range of a given function defined by a set of ordered pairs or a rule.
11	To classify functions based on their properties: one-one (injective), onto (surjective), and bijective.
12	To construct a **Knowledge Graph** from a given dataset
13	To analyze a **social network graph** using centrality measures:
14	To analyze a **Walks** measures in graph:
15	To Analyze degree of vertex.

Course Structure:

Generic Electives- Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLGE1201	Web Designing	03	--	02	--	02

Generic Electives – Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLGE1201	Web Designing	10	10	10	40	--	--	50

SAMLGE1201: Web Designing –(Generic Elective) Curriculum Details

Course pre-requisite:

1. Should have basic knowledge about computer.

2. Should have basic knowledge of internet.

Course Objectives:

1. To improve the skill to create the static web page.

2. To develop the ability to create the dynamic web pages.

3. To enhance the ability of Insert a graphic within a web page.

4. To improve the skills to Create, validate and publish a web page

Course Outcomes:

Students will be able to:

1. Able to design and implement dynamic websites

2. Able to implement new html 5 tags.

Curriculum Details:

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Introduction of Web**	
	1.1	History of WWW.	
	1.2	Web browser and web Server.	
	1.3	Web Protocols HTTP & FTP	
	1.4	What is Tags & attributes of HTML	7
	1.5	Structure of HTML	
	1.6	Create web page using Headings, Paragraph, BR & HR	
2.0		**Implementing of HTML**	
	2.1	Text level elements	
	2.2	Creating Ordered & Unordered List	
	2.3	Marquee Tag	7
	2.4	Using Images in HTML	
	2.5	Client-Server Model	
	5.6	Creating hyperlink with Anchor Tag	
3.0		**HTML Advance and HTML5**	
	3.1	Using frames in HTML	
	3.2	Creating Table in HTML	
	3.3	Creating Forms in HTML	8
	3.4	Introduction to HTML 5	
	3.5	Structure of HTML 5	
4.0		**Designing to HTML with CSS**	
	4.1	Introduction to CSS with Advantage and Disadvantages	
	4.2	Internal CSS: Inline and Embedded	
	4.3	External CSS	8
	4.4	Framework of CSS: Bootstrap	
	4.5	Introduction to Tailwind CSS	
	4.6	CSS Selectors	
		Total	**30**

Reference Books:

1. "HTML & CSS: The Complete Reference", 5th Edition By Thomas A. Powel, Publisher(s): Tata McGraw Hill publication. ISBN-13978-0070701946
2. "HTML & XHTML: The complete Reference", 4th Edition By Thomas A. Powel, Publisher(s):Tata McGraw Hill publication, ISBN-13978-0072229424

Course Structure:

Skill Based Course– Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLSC1201	AI Tools-Chat GPT	--	04	--	02	02

Skill Based Course– Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLSC1201	AI Tools-Chat GPT	--	--	--	--	20	30	**50**

SAMLSC1201: AI Tools-Chat GPT (Skill Based Course) Practical List

Practical No.	Practical Description
1	Generate a short creative story using ChatGPT based on a given theme or character.
2	Summarize a long article or paragraph into exactly 100 words using ChatGPT.
3	Translate an English paragraph into Hindi and Marathi using ChatGPT.
4	Prepare a weekly balanced and healthy meal plan for students using ChatGPT.
5	Design a professional resume and cover letter for a specific job role using ChatGPT prompts.
6	Create 5 objective multiple-choice quiz questions on an academic topic using ChatGPT.
7	Debug a simple program in any programming language using ChatGPT for suggestions and corrections.
8	Write a formal leave application email for academic or professional purpose using ChatGPT.
9	Prepare a basic lesson plan for a school-level subject (e.g., Science or Math) using ChatGPT.
10	Generate creative social media captions for a festival, product, or image using ChatGPT.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 24

11	Plan a 3-day budget-friendly trip itinerary to Goa or any location using ChatGPT's suggestions.
12	Simulate a role-play conversation using ChatGPT (e.g., doctor-patient, teacher-student, etc.).
13	Solve basic logical reasoning or puzzle questions with step-by-step explanation using ChatGPT.
14	Develop a simple digital marketing plan for a new product launch using ChatGPT.
15	Write an honest product or app review based on listed features and expected user experience using ChatGPT.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 25

Semester IV

Course Structure:

Major 1 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCT1251	Fundamentals of AI & ML	03	--	02	--	02

Major 1 – Assessment Scheme

Course Code	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLCT1251	Fundamentals of AI & ML	10	10	10	40	--	--	**50**

Code: SAMLCT1251- Fundamentals of AI & ML (Major 1) Curriculum Details

Course pre-requisite:

1. Basic knowledge of programming languages.

Course Objectives:

1. To familiarize students with the fundamental concepts, theories, and applications of artificial intelligence.
2. To insight into the various subfields of AI, such as machine learning, natural language processing, computer vision, and robotics.

Course Outcomes:

Students will be able to:

1. have a clear understanding of the fundamental concepts and terminology of Artificial Intelligence, enabling them to discuss and comprehend AI-related topics.

Curriculum Details:

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Introduction to Artificial Intelligence**	
	1.1	Definition and history of AI	
	1.2	Basic concepts and goals of AI	
	1.3	Applications of AI	
	1.4	Evolution of AI	
	1.5	Classification/Types of AI.	**8**
	1.6	Ethical and Societal Impacts of AI	
2.0		**Problem-Solving and Search Algorithms**	
	2.1	Problem-solving methods in AI	
	2.2	Search Algorithms in Artificial Intelligence- Terminologies, Properties of search Algorithms	
	2.3	Types of search algorithms: uninformed search and informed search	
	2.4	Search algorithms: breadth-first search, depth-first search, A* search, etc.	**7**
	2.5	Heuristic search techniques	
	2.6	Introduction to Game Playing and AI (e.g., Minimax Algorithm)	
3.0		**Knowledge Representation and Reasoning**	
	3.1	knowledge representation: Techniques of knowledge representation	
	3.2	Propositional logic	
	3.3	Rules of Inference	**8**
	3.4	First-Order Logic, Forward Chaining and backward chaining in AI	

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 27

	3.5	Reasoning in Artificial intelligence: Types of Reasoning and Probabilistic reasoning	
	3.6	Uncertainty.	
	3.7	Semantic Networks and Ontologies	
4.0		**Introduction to ML**	
	4.1	Introduction to Machine Learning, History of ML	
	4.2	Examples of Machine Learning Applications	
	4.3	Learning Types - Introduction to Supervised and Unsupervised Learning with Examples	7
	4.4	ML Life cycle	
	4.5	AI & ML	
	4.6	Overview of Common ML Algorithms (e.g., Linear Regression, Decision Trees, K-Means)	
	4.7	Introduction to Tools & Frameworks (e.g., Scikit-learn, TensorFlow, Google Colab)	
		Total	**30**

Reference Books:

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach, Prentice Hall
2. M. Tim Jones, "Artificial Intelligence: A Systems Approach (Computer Science)", Jones and Bartlett Publishers, Inc.; 1st Edition, 2008.
3. Nils J. Nilsson, "The Quest for Artificial Intelligence", Cambridge University Press,2009
4. J. Gabriel, Artificial Intelligence: Artificial Intelligence for Humans (Artificial Intelligence, Machine Learning), Create Space Independent Publishing Platform, First edition, 2016
5. Peter Flach: Machine Learning: The Art and Science of Algorithms that Make Sense of Data, Cambridge University Press, Edition 2012

Course Structure:

Major 1 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCP1253	Fundamentals of AI & ML	--	04	--	02	02

Major 1 – Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLCP1253	Fundamentals of AI & ML	--	--	--	--	20	30	**50**

SAMLCP1253: Fundamentals of AI & ML (Major 1) Practical List

Sr. No.	Practical
1	Write a report on the history, evolution, and goals of Artificial Intelligence.
2	Identify and explain at least 5 applications of AI in different domains (healthcare, finance, etc.).
3	Classify and differentiate types of AI (Narrow AI, General AI, Super AI) with real-life examples.
4	Discuss the ethical and societal impacts of AI through a case study or group discussion summary.
5	Implement Breadth-First Search (BFS) and Depth-First Search (DFS) for a sample graph.
6	Simulate an A* search algorithm with a heuristic function using Python.
7	Demonstrate the working of the Minimax algorithm using a simple game like Tic-Tac-Toe.
8	Represent knowledge using propositional logic and apply basic rules of inference on given statements.

9	Implement forward and backward chaining using a rule-based expert system example.
10	Show examples of different reasoning types: deductive, inductive, probabilistic reasoning.
11	Create a semantic network and ontology for a domain such as "University Management System."
12	Create and explain a chart of the Machine Learning lifecycle with key steps and their roles.
13	Implement a simple Linear Regression using scikit-learn on a small dataset.
14	Demonstrate K-Means clustering using scikit-learn for unsupervised learning.
15	Use Google Colab to execute a simple ML program and demonstrate importing libraries like sklearn and TensorFlow.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 30

Course Structure:

Major 2 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCT1252	Data Structure and Algorithms	03	--	02	--	02

Major 2 – Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLCT1252	Data Structure and Algorithms	10	10	10	40	--	--	**50**

SAMLCT1252: Data Structure and Algorithms (Major 2) Curriculum Details

Course pre-requisite:

1. Basic knowledge of computers
2. Basic knowledge of algorithms and problem solving.
3. Knowledge of C Programming Language

Course Objectives:

1. Implement Data Structures using C programming language
2. Develop problem-solving skills using Data Structures
3. Understand the fundamental concepts of Data Structures and their applications

Course Outcomes:

Students will be able to:

1. Learn the fundamentals of Algorithms.
2. Develop algorithm for problem-solving skills
3. Implement algorithm into a program.
4. How to work with algorithms and programs.

Curriculum Details:

Module No.	Unit No.	Topic	Hrs. Required
1.0		**Introduction and Overview**	
	1.1	Definition	
	1.2	Types of Data Structures	
	1.3	Data Structure operations	**5**
	1.4	Space and time complexity	
	1.5	Best, Worst, Average case analysis, Asymptotic notations (Big O, Omega Ω, Theta θ)	
2.0		**Arrays and Linked List**	
	2.1	Linear array.	
	2.2	Memory representation of linear array.	
	2.3	Array operations: Traversing, Inserting, Deleting, Searching.	
	2.4	Searching Methods: linear and binary.	**10**
	2.5	Sorting Methods: Bubble Sort, Selection Sort, insertion sort, Quick Sort, Merge Sort.	
	2.6	Linked list and memory representation of linked list.	
	2.7	Types of linked list: singly, doubly, Circular and doubly linked list.	
3.0		**Stack and Queue**	
	3.1	Stack, Memory representation of stack.	
	3.2	Stack operations (push and pop)	
	3.3	Arithmetic expression: Conversion of Infix Expression to Postfix Expression	
	3.4	Evaluation of postfix expression	**10**
	3.5	Recursion: Factorial of Number.	
	3.6	Queue, Memory representation of Queue	
	3.7	Operations on Queue	
	3.8	Types of Queue: circular, priority, De-queue.	
4.0		**Tree and Graph**	

	4.1	Definition, Terminology, Binary tree.	
	4.2	Traversal of binary tree.	5
	4.3	Graph: definition, Terminology, Representation, Traversal.	

Reference Books:

4. Seymour Lipschutz, "Data Structures with C", Schaum's Outlines, Tata McGraw-Hill, 2011.
5. Introduction to Data Structures in C-Ashok Kamthane, Pearson Education
6. Yashavant Kanetkar, "Data Structures Through C", 4th Edition, BPB Publications, 2022.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 33

Course Structure:

Major 2 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLCP1254	Data Structure and Algorithms	--	04	--	02	02

Major 2 – Assessment Scheme

Course Code	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLCP1254	Data Structure and Algorithms	--	--	--	--	20	30	**50**

SAMLCP1254: Data Structure and Algorithms (Major 2) Practical List

Practical No.	Title of Practical
1	Write a program for traversing linear array.
2	Write a program to insert operation of an array.
3	Write a program to delete operation of a array.
4	Write a program to search ITEM from a liner array by using linear search.
5	Write a program to search ITEM from a liner array by using binary search.
6	Write a program to sort the given array elements in ascending order by using bubble sort.
7	Write a program to sort the given array elements in ascending order by using selection sort.
8	Write a program to sort the given array elements in ascending order by using insertion sort.
9	Write a program to insert an element into a Singly Linked List.
10	Write a program to delete an element into a Singly Linked List.
11	Write a program to implement push operation on to a stack by using an array.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 34

12	Write a program to implement pop operation on to a stack by using an array.
13	Write a program to evaluation of postfix expression.
14	Write a program to implement queue operation by using an array.
15	Write a program to implement binary tree.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 35

Course Structure:

Minor 1 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLMT1251	Software Engineering	02	--	02	--	02

Minor 1 – Assessment Scheme

Course Code	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLMT1251	Software Engineering	10	10	10	40	--	--	50

SAMLMT1251: **Software Engineering** (Minor 1) Curriculum Details

Course pre-requisite:

1. Basic knowledge of Programming in C/C++/Java
2. Understanding of Data Structures and Algorithms
3. Familiarity with Database Management Concepts

Course Objectives:

1. To introduce the fundamental concepts of software engineering and various software process models.
2. To develop an understanding of software requirements engineering, risk analysis, and project planning techniques.
3. To expose students to design principles, modeling techniques, software testing strategies, and quality management practices.

Course Outcomes:

Students will be able to:

1. Describe the role and nature of software, and explain various software development life cycle models including Agile methodologies.
2. Analyze and document software requirements, perform risk analysis, and prepare effective project plans.
3. Apply software design principles and use UML diagrams for modeling software systems.
4. Demonstrate various software testing strategies and debugging techniques to ensure software reliability.
5. Implement software quality assurance techniques, manage software releases, and plan for software product sustenance.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 36

Curriculum Details:

Module No.	Unit No.	Topic	Hrs. Required
1.0		**Software Engineering Fundamentals**	
	1.1	Introduction to Software Engineering	
	1.2	Software Process Models: Waterfall, Iterative, Agile, Spiral	
	1.3	Software Development Life Cycle (SDLC)	**5**
	1.4	Software Crisis and Challenges in SE	
	1.5	Role of Software Engineer	
2.0		**Requirements & Design Engineering**	
	2.1	Requirement Engineering Process	
	2.2	Types of Requirements: Functional & Non-Functional	
	2.3	Feasibility Study and SRS Document	
	2.4	Design Concepts: Abstraction, Modularity, Coupling & Cohesion	**10**
	2.5	Structured Design and Object-Oriented Design Basics	
	2.6	UML Diagrams (Use Case, Class Diagram)	
3.0		**Software Quality, Testing & Maintenance**	
	3.1	Software Quality Factors (McCall's, ISO)	
	3.2	Verification vs Validation	
	3.3	Levels of Testing: Unit, Integration, System, Acceptance	
	3.4	Testing Techniques: White-box, Black-box, Automation tools	**5**
	3.5	Maintenance Types and Challenges	
	3.6	Software Configuration Management	
4.0		**Software Project Management & Modern Trends**	
	4.1	Project Estimation: LOC, FP, COCOMO	
	4.2	Project Scheduling: Gantt Charts, PERT & CPM	
	4.3	Risk Management	**5**
	4.4	Software Documentation & Metrics	
	4.5	DevOps, Agile and CI/CD	

Reference Books:

1. Stephen Schach, Software Engineering 7th ed, McGraw-Hill, 2007

2. Software Engineering: Principles and Practice Hans van Vliet

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 38

Course Structure:

Minor 1 – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLMP1251	Software Engineering	--	02	--	02	02

Minor 1 – Assessment Scheme

Course Code	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLMP1251	**Software Engineering**	-	-	--	--	20	30	**50**

SAMLMP1251: **Software Engineering** (Minor 1) Practical List

Practical No.	Title of Practical
1	Draw Waterfall and Spiral Model diagrams.
2	Create a Software Development Life Cycle (SDLC) chart.
3	Prepare a list of roles and responsibilities of a Software Engineer.
4	Prepare a Software Requirement Specification (SRS) for a Library Management System.
5	Perform a Feasibility Study Report for an Online Food Delivery System.v
6	Draw a Use Case Diagram for a Hospital Management System.
7	Draw a Class Diagram for an Online Banking System.
8	Design a Data Flow Diagram (DFD) – Level 0 and 1 for a Student Management System.
9	Write test cases for Login Module of a Web Application.
10	Differentiate White Box vs Black Box Testing with examples.
11	Create a Software Quality Checklist for a project.
12	Simulate a Bug Tracking Sheet using Excel or Google Sheets.
13	Estimate project cost using COCOMO Model (Basic).
14	Draw a Gantt Chart for your mini project timeline using any tool (Excel/online).
15	Use GitHub to upload your mini project – demonstrate version control basics.

Course Structure:

Generic Electives – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLGE1251	Cyber Security	02	--	02	--	02

Generic Electives – Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLGE1251	Cyber Security	10	10	10	40	--	--	50

SAMLGE1251: Cyber Security (Generic Electives) Curriculum Details

Course pre-requisite:

1. Basic Computer Skills.

2. Basics of networking.

Course Objectives:

1. To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.

2. To develop students can identify the current Computer security and breaches.

Course Outcomes:

Students will be able to:

1. Analyze and evaluate the cyber security needs of an organization.

2. Measure the performance and troubleshoot cyber security systems.

3. To introduce the current cyber related activities.

B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 40

Curriculum Details:

Module No.	Unit No.	Topic	Hrs. Required
1.0		**Introduction to Cyber Security**	
	1.1	Overview of Cybersecurity	
	1.2	Cyber Threat Landscape	
	1.3	Key Principles of Cybersecurity	**7**
	1.4	Risk Management in Cybersecurity	
	1.5	Legal and Ethical Considerations	
2.0		**Basics of Networking and Security**	
	2.1	Networking Fundamentals	
	2.2	Common Network Attack	
	2.3	Network Security Technologies	**8**
	2.4	Wireless Network Security	
	2.5	Securing Network Devices	
3.0		**Operating System and Web Security**	
	3.1	Basics of Operating System Security	
	3.2	Patch Management	
	3.3	Antivirus and Anti-malware Protection	
	3.4	Encryption and Secure Boo	**7**
	3.5	Secure Web Browsing	
	3.6	HTTPS and SSL/TLS	
	3.7	Web Security Policies and Compliance	
4.0		**Security Best Practices and Emerging Trends**	
	4.1	Security Awareness and Training	
	4.2	Incident Response and Management	
	4.3	Threat Intelligence and Information Sharing	**8**
	4.4	Future Trends in Cybersecurity	

Reference Books:

1. Computer Security Basics by by Rick Lehtinen , Publisher : O'Reilly Media; 2nd edition
2. Fundamentals of Computer Security by Josef Pieprzyk ,Thomas Hardjono, Jennifer Seberry

Course Structure:

Vocational Course – Teaching Scheme

Course Code	Course Name	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SAMLVC1251	AI Tools for Image and Video Generation	--	04	--	02	02

Vocational Course – Assessment Scheme

Course Code (1)	Course Name (2)	Theory				Practical		Total [col (5+6) Or Col(7+8)]
		CA			ESA (6)	CA (7)	ESA (8)	
		Test I (3)	Test II (4)	Avg. (T1&t2) (5)				
SAMLVC1251	AI Tools for Image and Video Generation	--	--	--	--	20	30	**50**

SAMLVC1251: AI Tools for Image and Video Generation (Vocational Course) Practical List

Practical No.	Title of Practical
1	Generate an AI artwork from a text prompt using **DALL·E**, **Craiyon**, or **Bing Image Creator**
2	Create a stylized portrait or avatar using AI photo editors like **Fotor** or **Artbreeder**
3	Remove or edit image backgrounds using **Remove.bg** or **Cleanup.pictures**
4	Use **Topaz AI** or **Let's Enhance** to upscale or enhance a low-resolution image
5	Design a visual poster using **Canva AI** tools and AI-generated assets
6	Generate social media graphics or memes using AI tools like **Simplified** or **Hotpot.ai**
7	Animate a still photo to speak or move using **Wombo**, **Deep Nostalgia**, or **D-ID**
8	Create a face-swap video using **Reface** and discuss ethical implications
9	Create a product mockup using AI-based **mockup generators**
10	Convert a short story or script into a **visual storyboard** using AI-generated images
11	Generate a short explainer video from a text using **Pictory**, **Lumen5**, or **Invideo AI**

12	Build a YouTube thumbnail or promotional banner using **AI-based design tools** (e.g., Microsoft Designer)
13	Create a talking avatar using **HeyGen**, **Synthesia**, or similar tools
14	Create a mini video ad or promo using **Canva Video** or **Animoto** with AI-assisted content
15	Compile a mini portfolio (3–5 pieces) of AI-generated image and video content and present it in class

Guidelines for the Course Assessment:

A. Continuous Assessment (CA) (20% of the Maximum Marks) of theory and practical courses:

    i.   **For Theory Course:** CA shall form 20% of the Maximum Marks and shall be carried out over the entire semester. It shall be done by conducting **Two Tests** (Test I on 40% curriculum) and **Test II** (on remaining 40% syllabus) and average of the marks scored by a student in these two tests of a particular paper shall be taken as the **CA** score.

    ii.   **For Practical Course:** CA score of the practical course shall be marks scored by a student in the internal practical examination conducted by the concerned teacher.

B. End Semester Assessment (80% of the Maximum Marks) of theory and practical courses:

(For illustration a paper of 02 credits, 50 marks has been considered and shall be modified appropriately depending upon credits of the individual paper)

Question Paper Pattern of the ESA:
    i. ESA Question paper shall consist 6 questions, each of 10 marks
    ii. Question No.1 shall be compulsory and shall be based on the entire syllabus
    iii. Students shall have to solve *ANY THREE* of the remaining Five Questions (i.e. from question 2 to 6)
    iv. Students shall have to solve a TOTAL of 4 Questions.

C. Assessment of On Job Training (OJT) Course (for 04 credits):

    a. Continuous assessment part (**40%, 40 marks out of 100**) of this course shall be done by the mentor of the student, where he /she is supposed to complete his On Job Training. This shall be based on the regularity, participation and performance of the students at the place of OJT.

b. Semester End Assessment (ESA) (**60% of the total marks, 60 marks out of 100**) of this course shall be done by a panel of examiners in two parts

i. based on the work report submitted by the student (**50% i.e. 30 marks)** and

ii. **Remaining 50%** (30 marks) shall be based on his presentation and viva-voce on the work carried to be assessed by the panel of examiners. This assessment shall be done along with practical examinations of respective courses / subjects.

D. Assessment of Field Project (FP) and Research Project (RP) (e.g. for 02 credits)

a. Continuous assessment part (**40%, 20 marks out of 50**) of this course shall be done by the mentor of the student and shall be based on regularity, experimental work and performance of the student.

b. Semester End Assessment (ESA) (**60% of the total marks, 30 marks out of 50**) of this course shall be done shall be done by a panel of examiners in two parts

i. based on the work report submitted by the student (**50% i.e. 30 marks)** and

ii. **Remaining 50%** (30 marks) shall be based on his presentation and viva-voce on the work carried out by the student. This assessment shall be done along with practical examinations of the respective courses / subjects.

E. Assessment of Co-Curricular courses (CCC):

a. Assessment of the CCC course shall be done by the respective course coordinator as a part of CA and be based on the regularity, performance of a student and his participation in various activities as prescribed in the regulations prepared in this regard.

b. The End Semester Assessment (ESA) of the CCC courses shall be done as per the regulations prepared in this regard and shall be done on the basis of the write-up, presentation by the student on the activities that he has carried out in a semester.

c. Students shall have freedom to opt for more than one CCC courses. However, score of the best performing CC shall be considered for preparing his result.

F. Syllabi, Teaching and Examination Scheme for the courses in Column 7 and Column 8 (AEC, VEC, IKS, CI, EVS, CCCs, etc.) shall be common for all the students from different faculties.

Note: **Number of lectures required to cover syllabus of a course depends on the number of credits assigned to a particular course. One credit of theory corresponds to 15 Hours lecturing and for practical course one credit corresponds to 30 Hours. For example, for a course of two credits 30 lectures of one-hour duration are assigned, while that for a three credit course45 lectures.**

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B.Sc. Artificial Intelligence and Machine Learning Second Year UG programme under the Faculty of Sci. & Tech of S.R.T.M.U., Nanded

Page 45