AC –24/11/2023

Item No. – 6.3 (N)

As Per NEP 2020

University of Mumbai

Title of the program

A- U.G. Certificate in Data Science
B- U.G. Diploma in Data Science
C- B.Sc. (Data Science)
D- B.Sc. (Honours) in Data Science
E- B.Sc. (Honours with Research) in Science

Ref: GR dated 20th April, 2023 for Credit Structure of UG

(With effect from the academic year 2024-25 Progressively)

University of Mumbai

Syllabus for Approval

(As per NEP 2020)

Sr. No.	Heading	Particulars	
1	**Title of program** **O. _____A**	A	Title of the program U.G. Certificate in Data Science
	O. _____B	B	U.G. Diploma in Data Science
	O. _____C	C	B.Sc. (Data Science)
	O. _____D	D	B.Sc. (Honours) in Data Science
	O. _____E	E	B.Sc. (Honours with Research) in Data Science
2	**Eligibility** **O. _____A**	A	A candidate for being eligible to the degree course o Bachelor of Science in Science should have passed XII standard examination of the Maharashtra Board of Higher Secondary Education or its equivalent in Arts/Science/Commerce/MCVC with Mathematics and/or Statistics as one of the subjects **(OR)** A candidate who has completed Diploma in IT/CS/Electrical/Electronics/Mechanical/Civil/ Electronics and Telecommunication/Instrumentation and/or allied branches from MSBTE or equivalent board **(OR)** A candidate for being eligible to the degree course o Bachelor of Science in Science should have passed XII standard examination of the Maharashtra Board of Higher Secondary

			Education or its equivalent in Arts/Science/Commerce/MCVC without Mathematics and/or Statistics has to undergo a bridge course of 30 hours in Mathematics and/or Statistics **(OR)** Passed Equivalent Academic Level 4.0 with Mathematics and/or Statistics as one of the subjects
	O. _____B	B	Under Graduate Certificate in Data Science Academic Level 4.5
	O. _____C	C	Under Graduate Diploma in Data Science Academic Level 5.0
	O. _____D	D	Bachelors of Science in Data Science with minimum CGPA of 7.5 Academic Level 5.5
	O. _____E	E	Bachelors of Science in Data Science with minimum CGPA of 7.5 Academic Level 5.5
3	**Duration of program** **R. _____**	A	One Year
		B	Two Years
		C	Three Years
		D	Four Years
		E	Four Years
4	**Intake Capacity** **R. _____**		
5	**Scheme of Examination** **R. _____**	NEP 40% Internal 60% External, Semester End Examination Individual Passing in Internal and External Examination	
6	**Standards of Passing** **R. _____**	40% in each component	

7	**Credit Structure** **Sem. I R: _____A** **Sem. II R: _____B**	Attached herewith	
	Credit Structure **Sem. III R: _____C** **Sem. IV R: _____D**		
	Credit Structure **Sem. V R: _____E** **Sem. VI R: _____F**		
8	**Semesters**	A	Sem I & II
		B	Sem III & IV
		C	Sem V & VI
		D	Sem VII & VIII
		E	Sem VII & VIII
9	**Program Academic Level**	A	4.5
		B	5.0
		C	5.5
		D	6.0
		E	6.0
10	**Pattern**	Semester	
11	**Status**	New	
12	**To be implemented from Academic Year Progressively**	From Academic Year: 2023-24	

Sign of Chairperson
Dr. Mrs. R. Srivaramangai
Ad-hoc BoS (Data Science)

Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science & Technology

Sign of Offg. Dean,
Prof. Shivram S. Garje
Faculty of Science & Technology

Preamble

1. Introduction: A Data Science degree program is a dynamic educational pathway that equips students with a multidisciplinary skill set essential for navigating the intricacies of the data-driven world. Foundational courses in mathematics and statistics lay the groundwork, while programming skills in languages like Python and Rare honed for data manipulation and analysis. The curriculum delves into machine learning techniques, covering both supervised and unsupervised learning, and explores big data technologies such as Hadoop and Spark. Students gain practical experience in applying these skills to real-world problems through capstone projects, ensuring they are well-prepared to address the challenges of data science in diverse industries.

Furthermore, Data Science degree programs emphasize the ethical considerations surrounding data use and privacy. Students engage in discussions about responsible conduct in data science, addressing the societal implications of their work. The program typically culminates in the development of strong communication skills, with a focus on data visualization and effective presentation of findings to non-technical stakeholders. Through a combination of theoretical knowledge, practical experience, and ethical considerations, graduates of Data Science degree programs are well-positioned to make meaningful contributions in a data-driven world.

2. Aims and Objectives:

A) Aims:

- To cultivate a strong foundation in mathematical and computational skills essential for data analysis.
- To enable students to understand and apply machine learning algorithms for predictive modeling and pattern recognition.
- familiarize students with technologies and frameworks for handling and processing large datasets efficiently.
- To instill a sense of ethical responsibility and awareness of privacy considerations in data science work.
- To prepare students to apply data science techniques to specific industry domains.
- To develop effective communication skills for conveying data-driven insights to diverse audiences.
- To ensure students can apply theoretical knowledge to solve real-world problems.
- To prepare students for a field that is constantly evolving.

B) Objectives:

- To provide courses in mathematics, statistics, and programming languages, enabling students to manipulate, process, and analyze large datasets.
- To cover supervised and unsupervised learning techniques, ensuring students can select and deploy appropriate models for various data-driven tasks.
- To provide hands-on experience with tools like Hadoop and Spark, allowing

students to work with big data in real-world scenarios.

- To incorporate discussions on ethical considerations in data collection, analysis, and dissemination, and to emphasize the responsible use of data.
- To offer courses or projects that focus on the application of data science in areas such as healthcare, finance, marketing, or other relevant sectors.
- To provide training in data visualization techniques and enhance report writing and presentation skills to facilitate clear communication of findings.
- To incorporate hands-on projects, possibly in the form of a capstone project or industry internship, allowing students to gain practical experience and build a portfolio of work.
- To encourage a mindset of continuous learning, adaptability, and staying abreast of emerging technologies and methodologies in data science.

3. Learning Outcomes: The B. Sc. (Data Science) Programme shall prepare and enable the graduates to:

- ✓ Proficiency in Data Analysis
- ✓ Mastery of Machine Learning Techniques
- ✓ Competence in Big Data Technologies
- ✓ Application of Data Science in Specific Domains
- ✓ Ethical Considerations and Privacy Awareness
- ✓ Effective Communication of Insights
- ✓ Critical Thinking and Problem-Solving
- ✓ Continuous Learning and Adaptability
- ✓ Team Collaboration and Interdisciplinary Skills
- ✓ Quantitative and Qualitative Research Skills
- ✓ Leadership and Decision-Making Skills

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completing the B. Sc. Data Science…

PSO 1. Graduates will possess a comprehensive skill set in data analysis, including the ability to collect, clean, and analyze data using statistical methods and programming languages.

PSO 2. Graduates will demonstrate expertise in machine learning techniques, enabling them to develop and deploy predictive models for various applications.

PSO 3. Graduates will be proficient in utilizing big data technologies, such as Hadoop and Spark, for processing and analyzing large datasets efficiently.

PSO 4. The program will prepare students to apply data science techniques effectively in diverse domains, addressing industry-specific challenges.

PSO 5. Graduates will exhibit ethical awareness and responsible practices in data science, considering privacy concerns and societal implications in their work.

PSO 6. Graduates will develop strong communication skills, both written and oral, and the ability to visually communicate complex data-driven insights through effective data visualization techniques.

PSO 7. The program will foster critical thinking skills, empowering graduates to approach complex problems systematically and devise innovative solutions using data-driven methodologies.

PSO 8. Graduates will embrace a culture of continuous learning, staying informed about emerging technologies and methodologies in data science, and adapting to industry advancements.

PSO 9. The program will instill the ability to collaborate effectively in multidisciplinary teams, leveraging data science expertise to contribute to broader organizational objectives.

PSO 10. Graduates will have engaged in hands-on, real-world projects, demonstrating their ability to apply theoretical knowledge to practical scenarios and solving authentic data science problems.

PSO 11. Graduates will possess skills in designing and conducting both quantitative and qualitative research, contributing to the advancement of knowledge in the field.

PSO 12. The program will nurture leadership skills, enabling graduates to make informed, data-driven decisions and contribute to strategic planning within organizations.

1) Credit Structure of the Program (Sem I, II, III, IV, V and VI)
Under Graduate Certificate in Data Science

(Credit Struture Sem I & II)

	R: _____A								
Level	**Semester**	**Major**		**Minor**	**OE**	**VSC, SEC (VSEC)**	**AEC, VEC, IKS**	**OJT, FP, CEP, CC, RP**	**Cum. Cr. / Sem.**	**Degree/ Cum. Cr.**
		Mandatory	**Electives**							
	I	**6**		**-**	**2+2**	**VSC:2, SEC:2**	**AEC:2, VEC:2, IKS:2**	**CC:2**	**22**	
		• Python Programming-02 • Descriptive Statistics-02 • Practical 1-02				• VSC : Excel for Business -02 • SEC – 02 • Office Tools for Data Scientists **OR** • Digital Marketing				**UG** **Certificate 44**
	R: _____B									
	II	**6**		**2**	**2+2**	**VSC:2, SEC:2**	**AEC:2, VEC:2**	**CC:2**	**22**	
		• Advanced Python Programming-02 • Database Management Systems-02 • Practical 2-02				• VSC : Discrete Mathematics – 02 • SEC: 02 • Web Technology **OR** • Graph Theory				
	Cum Cr.	**12**	**-**	**2**	**8**	**8**	**10**	**4**	**44**	
Exit option: Award of UG Certificate in Major with 40-44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Majorand Minor										

Under Graduate Diploma in Data Science

Credit Structure (Sem. III & IV)

	R: _____C									
Level	**Semester**	**Major**		**Minor**	**OE**	**VSC, SEC (VSEC)**	**AEC, VEC, IKS**	**OJT, FP, CEP, CC,RP**	**Cum. Cr. / Sem.**	**Degree/ Cum. Cr.**
		Mandatory	**Electives**							
	III	**8**		**4**	**2**	**VSC:2**	**AEC:2,**	**FP :2 CC:2**	**22**	**UG Diploma 88**
		• Design and Analysis of Algorithms-02 • Design and Analysis of Algorithms Practical-02 • Data Warehousing and Mining-02 • Data Warehousing and Mining Practical-02				VSC : Linear Algebra -02				
		R: _____D								
	IV	**6**		**4**	**2**	**SEC:2**	**AEC: 2**	**CEP: 2 CC:2**	**22**	
		• Big Data -02 • Big Data Practical-02 • Artificial Intelligence-02 • Artificial Intelligence Practical-02				• Testing of Hypothesis **OR** • Mojo				
	Cum Cr.	28		10	12	12	14	12	88	
Exit option; Award of UG Diploma in Major and Minor with 80-88 credits and an additional 4 credits core NSQF course/ Internship OR Continuewith Major and Minor										

B.Sc. (Data Science)

Credit Structure (Sem. V & VI)

	R: _____E									
Level	**Semester**	**Major**		**Minor**	**OE**	**VSC, SEC (VSEC)**	**AEC, VEC, IKS**	**OJT, FP, CEP, CC, RP**	**Cum. Cr. / Sem.**	**Degree/ Cum. Cr.**
		Mandatory	**Electives**							
	V	**10**	**4**	**4**		**VSC: 2**		**FP/CEP:2**	**22**	
		• Data Engineering-02 • Data Engineering Practical-02 • Cloud Computing-02 • Cloud Computing Practical-02 • Social Media Analytics-02	• Marketing and Retail Analytics-02 • Marketing and Retail Analytics Practical-02 **OR** • Robotic Process Automation-02 Robotic Process Automation Practical-02			• Data Visualization -02		FP: Project Dissertation-02	22	**UG Degree 132**
	R: _____F									
	VI	**10**	**4**	**4**				**OJT :4**	**22**	
		• Machine Learning-02 • Machine Learning Practical-02 • Deep Learning -02 • Deep Learning Practical-02 • Data Security and Compliance-02	• Applied Business Analytics-02 • Applied Business Analytics Practical-02 **OR** • Sports Analytics-02 • Sports Analytics Practical-02					• OJT: Project Implementation-04		
	Cum Cr.	**48**	**8**	**18**	**12**	**14**	**14**	**18**	**132**	
Exit option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor										

[Abbreviation - OE – Open Electives, VSC – Vocation Skill Course, SEC – Skill Enhancement Course, (VSEC), AEC – Ability Enhancement Course, VEC – Value Education Course, IKS – Indian Knowledge System, OJT – on Job Training, FP – Field Project, CEP – Continuing Education Program, CC – Co-Curricular, RP – Research Project]

SEMESTER II

Syllabus

B.Sc. (Data Science)

(Sem.- II)

Major Courses

Name of the Course: Advanced Python Programming

Sr.No.	Heading	Particulars
1	**Description the course:**	• **Introduction:** The Advanced Python Programming course represents a pivotal step for developers aiming to deepen their Python expertise. This introduction explores the course's relevance, usefulness, applications, and the rising demand for advanced Python skills, emphasizing its impact on career prospects. • **Relevance and Usefulness:** In today's tech landscape, advanced Python proficiency sets developers apart. This course addresses the growing need for individuals capable of mastering complex Python concepts, making it highly relevant for those looking to advance their programming skills. • **Applications:** The acquired advanced Python skills are immediately applicable across various domains, including software development, data analysis, and automation. Participants are equipped to contribute to the development of scalable, efficient, and maintainable solutions. • **Interest and Connection with Other Courses:** Attracting those seeking a deeper understanding of Python, the course complements other programming courses, providing a comprehensive learning path for individuals aiming for well-rounded expertise in software development. • **Demand in the Industry:** As industries increasingly rely on Python for complex applications, the demand for professionals with advanced Python skills is rising. Employers seek individuals who can harness Python's full potential, contributing to the growing demand for experts trained in advanced Python concepts. • **Job Prospects:** Completion of the Advanced Python Programming course significantly enhances job prospects. Professionals with advanced Python skills are well-positioned for roles like software architects and technical leads, offering lucrative career opportunities in fields where advanced proficiency is crucial.
2	**Vertical :**	Major
3	**Type :**	Theory
4	**Credits :**	2 credits (30 Hours in a semester)
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives(CO):**	

	CO 1. To learn the concept of Lists and tuples in python programming, CO 2. To understand use of Regular Expression in python. CO 3. To learn use of date and time in python. CO 4. To understand the concept of Numpy in python. CO 5. To learn manipulation and visualization of data in python.	
8	**Course Outcomes (OC):** OC 1. Ability to use lists and tuples in python programming. OC 2. Ability to implement different regular expressions. OC 3. Ability to use date time in python programming. OC 4. Acquire knowledge of Numpy. OC 5. Proficiency in handling, manipulating and visualizing data.	
9	**Modules:** **Module 1:**	
	1. **Lists and Tuples**: Lists, List Functions and Methods, List Operations, Tuples, 2. **Regular Expressions**: What is a Regular Expression? Sequence Characters in Regular Expressions, Quantifiers in Regular Expressions, Special Characters in Regular Expressions, Using Regular Expression on Files, Retrieving Information from an HTML File 3. **Date and Time in Python:** Date and Time, Date and Time Now, Combining Date and Time, Formatting Dates and Times, Finding Durations using "timedelta", Comparing Two Dates, Sorting Dates, Stopping Execution Temporarily, Knowing the Time taken by a Program, Working with Calendar Module. 4. **IPython:** Beyond Normal Python, Help and Documentation in IPython, Keyboard Shortcuts in the IPython Shell, IPython Magic Commands, Input and Output History, IPython and Shell Commands, Errors and Debugging, Profiling and Timing Code	**15 Hrs**
	Module 2:	
	1. **Introduction to NumPy**: Understanding Data Types in Python, The Basics of NumPy Arrays, Computation on NumPy Arrays: Universal Functions, Aggregations: Min, Max, and Everything In Between, Computation on Arrays: Broadcasting, Comparisons, Masks, and Boolean Logic, Fancy Indexing, Sorting Arrays, Structured Data: NumPy's Structured Arrays. 2. **Data Manipulation with Pandas**: Introducing Pandas Objects, Data Indexing and Selection, Operating on Data in Pandas, Handling Missing Data, Hierarchical Indexing, Combining Datasets: Concat and Append. 3. **Combining Datasets:** Merge and Join, Aggregation and Grouping, Pivot Tables, Vectorized String Operations, Working with Time Series. High-Performance Pandas: eval()and query()	**15 Hrs**

	4. Visualization with Matplotlib: Simple Line Plots, Simple Scatter Plots, Visualizing Errors, Density and Contour Plots, Histograms, Binnings, and Density, Customizing Plot Legends, Customizing Color bars, Multiple Subplots, Text and Annotation, Customizing Tick s, Customizing Matplotlib: Configurations and Stylesheets, Three- Dimensional Plotting in Matplotlib, Geographic Data with Basemap, Visualization with Seaborn	
10	**Text Books** 1. Programming through Python M. T. Savaliya, R.K Maurya, G.M Magar, Staredu Solutions, 1st edition (2018) 2. Python DataScience Handbook, Jake VanderPlas, O'Reilly Media, 1st edition (2016) 3. Let Us Python, Yashwant Kanetkar, BPB publication , 1st edition (2019)	
11	**Reference Books** 1. Programming in Python3, Mark Summerfield, Pearson Education, 2nd edition (2018) 2. Learning Python, LutzM, O'Reilly- Shroff, 5th edition, 2013. 3. Beginning Python, Magnus LieHetland, Apress, 2nd edition, 2009. 4. Star Python, Star Certification, Star Certification,1st , 2018.	
12	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**
13	**Continuous Evaluation through:** Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	**Format of Question Paper: External Examination (30 Marks)– 1 hr duration**
14	**Format of Question Paper:** (**Semester End Examination : 30 Marks. Duration:1 hour)** Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

Name of the Course: Database Management System

Sr.No.	Heading	Particulars
1	**Description the course:**	• **Introduction:** A Database Management System (DBMS) is a software that manages databases. It provides an interface for interacting with the database, ensures data integrity, and supports efficient and secure data retrieval and storage. • **Relevance and Usefulness:** DBMS is widely used in business applications to store and manage large volumes of data related to customers, transactions, products, and more. DBMS allows for efficient data retrieval and manipulation, improving overall system performance. • **Applications:** The versatility of DBMS makes it a fundamental component in numerous applications, contributing to the efficient management and utilization of data across various industries. • **Interest and Connection with Other Courses:** Prerequisite: Basic Computer knowledge of computer architecture, storage, operating system. It also good to know about basic programming knowledge. Understanding DBMS principles and practices can enhance the effectiveness of professionals in various fields by providing them with the skills to manage and utilize data efficiently. • **Demand in the Industry:** Database Management System course aims to gain the knowledge of DBMS concept, principle, and design. Database is a collection of interrelated data, and this data can be managed, access, manipulate and organise data in system with the help of software. It benefits to user by providing data access, reduced redundancy, data integrity, data sharing, data organizing, data consistency, data accuracy, and security • **Job Prospects:** The job prospects in DBMS are diverse, and professionals with expertise in this field are sought after in nearly every industry where data plays a crucial role in decision-making and operations. As technology continues to evolve, the demand for skilled DBMS professionals is likely to remain strong.
2	**Vertical :**	Major
3	**Type :**	Theory
4	**Credits :**	2 credits (30 Hours in a semester)
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives(CO):** CO 1. To understand concept of database by organizing, structuring and storing data. CO 2. To understand data models and entity relationship.	

	CO 3. To understand retrieve data and concept of redundancy CO 4. To specify the data requirement in database applications CO 5. To create, manipulate queries in database.	
8	**Course Outcomes (OC):** OC 1. Students should be able to use the concept of database and it's important in software development. OC 2. Students should be able to design database and draw logical structure using Entity relationship. OC 3. Students should be able to construct normalized database and functional dependencies. OC 4. Students should be able to design the database schema with the appropriate data types. OC 5. Students should be able to create, manipulate the database management system to evaluate the business information problem.	
9	**Modules:** **Module 1:**	
	1. Introduction & DBMS Architecture: What is Database? Need of database, Role and Advantages of the DBMS, Types of Databases, Data Processing, Database System**s** **2. Data Models:** Data Modelling and Data Models, The Importance of Data Models, Data Model Basic Building Blocks, Business Rules, Degrees of Data Abstraction **3. Entity Relationship Model and Unified Modelling Language:** Relationships, Connectivity and Cardinality, Existence Dependence, Relationship Strength, Weak Entities, Relationship Degree, Recursive Relationships, Associative (Composite) Entities, Developing an ER Diagram. **4. Advanced Data Modelling:** The Extended Entity Relationship Model, Entity Clustering, Entity Integrity: Primary Keys, Design Cases: Learning Flexible Database Design.	**15 Hrs**
	Module 2:	
	1. **Normalization of Database Tables:** Database Tables and Normalization, The Normalization Process, Surrogate Key Considerations, Higher-Level Normal Forms, Normalization and Database Design, Denormalization, Data-modelling Checklist. 2. **Database Design:** The Information System, The Systems Development Life Cycle, The Database Life Cycle, Conceptual Design, DBMS Software Selection, Logical Design, Physical Design, Database Design Strategies, Centralized versus Decentralized Design 3. **Transaction Management and Concurrency Control:** What Is a Transaction? Concurrency Control with Locking Methods, Concurrency Control with Time Stamping Methods, Concurrency Control with Optimistic Methods, ANSI Levels of	**15 Hrs**

<table>
<tr><td></td><td colspan="2">Transaction Isolation, Database Recovery Management Database Performance Tuning and Query Optimization: Database Performance-Tuning Concepts, Query Processing, Indexes and Query Optimization, Optimizer Choices, SQL Performance Tuning, Query Formulation, DBMS Performance Tuning.
4. Database Administration and Security: Data as a Corporate Asset, The Need for a Database and Its Role in an Organization, Special Considerations, Security, Database Administration Tools, Data Administration Strategy, The DBA’s Role in the Cloud, The DBA at Work: Using Oracle for Database Administration</td></tr>
<tr><td>10, 11</td><td colspan="2">Reference and Text Books
1. Fundamentals of Database Systems, Elmasri Ramez and Navathe Shamkant B, Pearson Education 6th Edition, 2010.
2. Database System Concepts Silberschatz, Korth, Sudarshan, McGraw Hill, 5 Edition, 2006.
3. Database Management Systems, Ramakrishna, Gehrke, McGraw- Hill, 2007
4. Murach’s MySQL Joel Murach, Murach, 2012.</td></tr>
<tr><td>12</td><td>Internal Continuous Assessment: 40%</td><td>Semester End Examination: 60%</td></tr>
<tr><td>13</td><td>Continuous Evaluation through:
Class test of 1 of 15 marks
Class test of 2 of 15 marks
Average of the two: 15 marks

Quizzes/ Presentations/ Assignments: 5 marks
Total: 20 marks</td><td>Format of Question Paper: External Examination (30 Marks)– 1 hr duration</td></tr>
<tr><td>14</td><td colspan="2">Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)
Q1: Attempt any two (out of four) from Module 1 (15 marks)
Q2: Attempt any two (out of four) from Module 2 (15 marks)</td></tr>
</table>

Name of the Course: Major Practical 2

Sr.No.	Heading	Particulars
1	**Description the course:**	Advanced python programming practical modules make able to acquire knowledge for implementing python code for various applications such as handling data, analysing and visualizing data. Database Management System's practical approach is useful to gain the knowledge for software backend development. It benefits to user by providing data definition, data access, reduced data redundancy, data integrity, data sharing, data organizing, data consistency, data accuracy, and security.
2	**Vertical :**	Major
3	**Type :**	Practical
4	**Credits :**	2 credits
5	**Hours Allotted :**	60 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives (CO):** CO 1. To implement tuple in python programming. CO 2. To implement various regular expression in python programming. CO 3. To use date and time with calendar module in python programming. CO 4. To implement Numpy in python programming. CO 5. To use pandas in python programming. CO 6. Identify entities and its relationship with relational model structure. CO 7. To understand relational database using SQL and constraints implementation using create table queries. CO 8. To Understand DML operations and backing of database CO 9. To understand how to retrieve data from database and learn how to retrieve single value after performing calculations on group of values. CO 10. To understand built-in functions to perform operations on data CO 11. To understand how to fetch data from two or more tables, which is joined to appear as single set of data CO 12. To understand nested and larger query as advanced fetching of data to understand concept of virtual table. CO 13. To understand how to control user access in a database.	
8	**Course Outcomes (OC):** OC 1. Ability to use list tuples in different ways using python programming. OC 2. Ability to implement different regular expression for search and replace operations. OC 3. To use date and time with different format in python programming. OC 4. Ability to use Numpy in python programming. OC 5. Acquire knowledge about pandas libraries and implement it. OC 6. Students able to perform various operations such as insert, update delete and retrieve data from database using SQL queries. OC 7. Students able to perform alteration in tables and can restore and take backup of the database.	

	OC 8. Students able to perform operations using simple SQL Queries to fetch data and learns various aggregate functions to get single value. OC 9. Students able to perform SQL Queries using JOIN keyword for joining two or more tables. OC 10. Students able to perform nested queries using in, exists operators. OC 11. Students able to create new table by joining one or more tables and learn how to hide attribute from end user. OC 12. Students able to restrict the user from accessing data in database. OC 13. Students should be able to create, manipulate the database management system to evaluate the business information problem.	
9	**Modules:** **Module 1:**	
	Practical No. 1 a. Write a python code to demonstrate concatenating tuples to nested tuples. b. Write a python code to sort the nested tuple using sorted() function. c. Write a python code to demonstrate unpacking of nested tuples. d. Write a python code to clone list using slice operator. **Practical No.2** a. Write a Python code to Find the size of Tuples. b. Write a Python code Find sum of tuple elements. c. Write a Python code to remove duplicate element from tuple. d. Write a Python code to Flatten tuple of list to tuple. **Practical No. 3** a. Write a python code to check immutability property of python tuples. b. Write a python code to implement various methods to search and replace operations. c. Write a python code to retrieve data from HTML file. d. Write a python code to print current date in different format. **Practical No. 4** a. Write a Python code to demonstrate time class. b. Write a Python code to use timedelta function to print date. c. Write a Python code to use strftime and strptime functions in python. d. Write a Python code to count remaining days using date object. **Practical No. 5** a. Write a python code to convert time stamp to date stamp. b. Write a python code to develop calendar module. c. Write a python code to compare two dates. d. Write a python code to create Numpy Array. **Practical No. 6** a. Write a Python code to find minimum elements in array using Numpy. b. Write a Python code to find mean of every Numpy array in the given list. c. Write a Python code to reverse Numpy array.	**30 Hrs**

	d. Write a Python code to add rows and columns in Numpy array. **Practical No. 7** a. Write a python code to demonstrate basic operations on single array. b. Write a python code to create array with 10 elements and slice element from 1st to 5th element. c. Write a python code to sort an array alphabetically. d. Write a python code to create a filter array that will return maximum values from an array. **Practical No.8** a. Write a python code to demonstrate importing pandas libraries and create data frame object. b. Write a Python code to create pandas series from a dictionary of values and ndarray. c. Write a Python code to perform arithmetic operations on two pandas series. d. Write a Python code to add some data in existing series. **Practical No. 9** a. Write a Python code to select the rows where percentage greater than 9b. Write a Python code to join the two given dataframes along rows and assign all data. b. Write a Python code to select rows from dataframe based on values in columns.(use relational and logical operators.) c. Write python code to filter duplicate rows. **Practical No. 10** a. Write a python code to demonstrate filter pandas series with Boolean arrays. b. Write a code to import and export data between pandas and csv files. c. Read employee.csv file to create dataframe and perform following operations: i) Display Name, Gender and department of employee. ii) Display first 5 and last 5 records from employee.csv d. Write a code to import and export data between pandas and MySQL Database. e. Write a code to replace all negative values to 0.	
	Module 2: Demonstration with explanation of concept of practical should be added in the beginning for each practical session. Student should practice on different databases during practical. **Practical No. 1**: **Write SQL query for given problem statement.** a. Viewing all databases b. Creating a Database c. Viewing all Tables in a Database **Practical No. 2**: **Perform the following Operations.** a. Creating Tables (With and Without Constraints) b. Inserting/Updating/Deleting Records in a Table	**30 Hrs**

	c. Saving (Commit) and Undoing (rollback) **Practical No. 3: Perform the following Operations.** a. Altering a Table b. Dropping/Truncating/Renaming Tables c. Backing up / Restoring a Database. **Practical No. 4: Perform following:** a. Simple Queries with Where Operators b. Where with Keywords and Logical Operators c. Simple Queries with Aggregate functions d. Queries with Aggregate functions (group by and having clause) **Practical No. 5: Perform Queries involving:** a. Date Functions b. String Functions c. Math Functions **Practical No. 6: Retrieving Data from Multiple Table:** a. Joining Tables (InnerJoins, Outer-Joins) b. Aliases for Table Names **Practical No. 7: Write Subqueries:** a. With IN clause b. With EXISTS clause c. Handling NULL **Practical No. 8**: **Perform Views commands:** a. Creating Views b. Dropping Views c. Selecting from view **Practical No. 9** : **Perform DCL statements:** a. Granting permissions b. Revoking permissions **Practical No. 10 : Use of DDL DML and DCL statement for employee payroll system (Or any other system recommended by teacher)** a. Identify employee payroll entities b. Define and Create Database, tables with constraint c. Insert 10 to 20 relevant records to support further queries d. Design simple queries using operators and functions e. Create Views and perform drop and select view command f. Perform grant and revoke commands.	
10, 11	**Reference and Text Books** 1. Programming through Python M. T. Savaliya, R.K Maurya, G.M Magar, Staredu Solutions, 1st edition (2018) 2. Python DataScience Handbook, Jake VanderPlas, O'Reilly Media, 1st edition (2016) 3. Let Us Python, Yashwant Kanetkar, BPB publication , 1st edition (2019) 4. Programming in Python3, Mark Summerfield, Pearson Education, 2nd edition (2018) 5. Learning Python, LutzM, O'Reilly- Shroff, 5th edition, 2013. 6. Beginning Python, Magnus LieHetland, Apress, 2nd edition, 2009. Star Python, Star Certification, Star Certification,1st , 2018.	

	7. Fundamentals of Database Systems, Elmasri Ramez and Navathe Shamkant B, Pearson Education 6th Edition, 2010. 8. Database System Concepts Silberschatz, Korth, Sudarshan, McGraw Hill, 5 Edition, 2006. 9. Database Management Systems, Ramakrishna, Gehrke, McGraw- Hill, 2007 10. Murach's MySQL Joel Murach, Murach, 2012.	
12	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**
13	**Continuous Evaluation through:** Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
14	**Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination** Practical Slip: Q1. From Module 1 13 marks Q2. From Module 2 12marks Q3. Journal and Viva 05 marks	

Vocational Skill Course (VSC)

Name of the Course: Discrete Mathematics

Sr.No.	Heading	Particulars
1	**Description the course:**	• **Introduction:** Discrete Mathematics, the study of distinct and separate values, is the backbone of computer science and various other disciplines. In the digital era, it plays a crucial role in algorithm development, cryptography, and information theory. • **Relevance and Usefulness:** In a world dominated by technology, Discrete Mathematics is highly relevant, providing the theoretical basis for efficient algorithms, data structures, and logical reasoning in computer science. Discrete Mathematics is useful for solving real-world problems through concepts like set theory, graph theory, and combinatorics. • **Applications:** With applications in computer science, cryptography, operations research, and artificial intelligence, Discrete Mathematics is integral to developing algorithms, designing networks, and creating secure encryption protocols. • **Interest and Connection with Other Courses:** The field's appeal lies in its logic and precision, making it attractive to those with a penchant for problem-solving, logical reasoning, and abstract thinking, especially in the context of computer science. Discrete Mathematics forms a crucial foundation for advanced computer science courses, such as algorithms, data structures, computer networks, and artificial intelligence, creating a seamless progression for students. • **Demand in the Industry:** In the tech-driven industry, there is a growing demand for professionals with a strong foundation in Discrete Mathematics. Employers seek individuals capable of applying discrete structures to solve complex problems in software development, cybersecurity, and data analysis. • **Job Prospects:** Professionals proficient in Discrete Mathematics are well-positioned for rewarding careers as software developers, computer scientists, data analysts, and cybersecurity specialists, given their ability to solve complex problems in the tech landscape.
2	**Vertical :**	Vocational Skill Course (VSC)
3	**Type :**	Theory
4	**Credits :**	2 credits (1 credit = 15 Hours for Theory in a semester)
5	**Hours Allotted:**	30 Hours

6	**Marks Allotted:** 50 Marks	
7	**Course Objectives(CO):** **OC 1.** To lay mathematical foundation of computing through studies of different mathematical structures. **OC 2.** To learn about Advanced counting **OC 3.** To work with relations and investigate their properties **OC 4.** To learn about Permutation and Recurrence Relation **OC 5.** To use finite-state machines to model computer operations	
8	**Course Outcomes (OC):** **OC 1.** Read, interpret and write basic mathematical notations. **OC 2.** Determine types of mathematical relations and functions **OC 3.** Use various counting techniques to solve an appropriate counting problem **OC 4.** Solve puzzles based on counting principles. **OC 5.** Provide basic knowledge about models of automata theory and the corresponding formal languages.	
9	**Modules:-** **Module 1:**	
	1. Functions: Definition of function; Domain, co-domain, range of a function; Examples of standard functions such as identity and constant functions, absolute value function, logarithmic and exponential functions, flooring and ceiling functions; Injective, surjective and bijective functions; Composite and inverse functions. **2. Relations**: Definition and examples of relation; Properties of relations, Representation of relations using diagraphs and matrices; Equivalence relation; Partial Order relation, Hasse Diagrams, maximal, minimal, greatest, least element, Lattices. **3. Recurrence Relations**: Definition and Formulation of recurrence relations; Solution of a recurrence relation; Solving recurrence relations- Back tracking method, Linear homogeneous recurrence relations with constant coefficients; Homogeneous solution of linear homogeneous recurrence relation with constant coefficients; Particular solution of non-linear homogeneous recurrence relation with constant coefficients; **4.** General solution of non-linear homogeneous recurrence relation with constant coefficients; Applications- Formulate and solve recurrence relation for Fibonacci numbers, Tower of Hanoi, Intersection of lines in a plane, Sorting Algorithms.	**15 Hrs**
	Module 2:	
	1. Counting Principles: Basic Counting Principles (Sum and Product Rule); Pigeonhole Principle (without proof) - Simple examples; Inclusion Exclusion Principle (Sieve formula) (without proof); Counting using Tree diagrams. **2. Permutations and Combinations**: Permutation without and with repetition; Combination without and with repetition; Binomial numbers and identities: Pascal Identity, Vandermonde‟s Identity, Pascal triangle, Binomial theorem (without proof) and applications;	**15 Hrs**

	Multinomial numbers, Multinomial theorem (without proof) and applications. **3. Languages, Grammars and Machines**: Languages and Grammars – Introduction, Phase structure grammar, Types of grammar, derivation trees; Finite-State Machines with Output; Finite-State Machines with No Output **4.** Regular Expression and Regular Language.	
10	**Text Books** **1.** Applied Combinatorics by Alan Tucker **2.** Norman L. Biggs, Discrete Mathematics, Revised Edition, Clarendon Press, Oxford 1989. **3.** Discrete Mathematics: An Open Introduction by Oscar Levin **4.** Combinatorics to Topics, techniques, Algorithms by Peter J. Cameron. **5.** Foundations in Discrete Mathematics: K.D. Joshi, New Age Publication, New Delhi.	
11	**Reference Books** **1.** "Discrete Mathematical Structures" by Shanker G Rao **2.** "Discrete Mathematics and its Applications" by Kenneth H Rosen **3.** “Discrete Mathematical Structures" by J P Chauhan **4.** “Discrete Mathematical Structures" by Subramaniyan **5.** “Discrete Mathematics: SemyourLipschutz, Marc Lipson, Schaum‟s out lines, McGraw- Hill Inc.	
12	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**
13	**Continuous Evaluation through:** Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	**Format of Question Paper: External Examination (30 Marks)– 1 hr duration**
14	**Format of Question Paper:** (**Semester End Examination : 30 Marks. Duration:1 hour)** Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

Skill Enhancement Courses (SEC)

Name of the Course: Web Technology

Sr.No.	Heading	Particulars
1	**Description the course:**	• **Introduction:** Web design involves the creation and arrangement of visual elements on a website to ensure an aesthetically pleasing and user-friendly experience. It encompasses various disciplines, including graphic design, user interface (UI) design, and user experience design. • **Relevance and Usefulness:** In an era dominated by digital presence, web design is crucial for attracting and retaining online users. It focuses on creating visually appealing layouts, intuitive navigation, and a positive overall user experience. Effective web design enhances a website's functionality and communicates the brand's message. • **Applications:** Web design is applied across various platforms, including websites, web applications, and mobile applications. It plays a key role in shaping the online identity of businesses, organizations, and individuals. Well-designed websites are essential for engaging and converting visitors into customers or users. • **Interest and Connection with Other Courses:** Linked with graphic design, visual communication, and user experience design. • **Demand in the Industry:** There is a continuous demand for skilled web designers as businesses recognize the significance of a visually appealing and user-friendly online presence. Companies across various industries seek designers who can create websites and interfaces that align with their brand identity and effectively communicate their message to the target audience. • **Job Prospects:** Opportunities include roles like web designer, UI/UX designer, and graphic designer. • **Emerging Trends:** Dark mode adoption, micro-interactions, and a focus on accessibility are shaping the future of web design.
2	**Vertical:**	Skill Enhancement Course(SEC)
3	**Type :**	Theory
4	**Credits :**	2 credits (1 credit = 15 hrs in a semester)
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives (CO):** **CO 1:** Define the Internet and its role in connecting global networks. **CO 2:** Introduce HTML 5 and its role in structuring web content.	

	CO 3: Explore linking external resources such as stylesheets and scripts to HTML documents. **CO 4:** Cover various HTML elements, including input controls, forms, divs, sectioning elements, navigation bars, labels, output elements, void elements, media elements, progress elements, selection menu controls, embed, iframes, SVG, canvas, and tabindex. **CO 5:** Demonstrate how to implement styles using stylesheets and apply them to text and links. **CO 6:** Introduce jQuery as a powerful JavaScript library. **CO 7:** Understand and implement basic jQuery effects. **CO 8:** Understand the basics of JSON (JavaScript Object Notation). **CO 9:** Learn the JSON grammar and structure. **CO 10:** Learn to create and use JSON objects.	
8	**Course Outcomes (OC):** **OC 1:** Create structured HTML documents using HTML 5. **OC 2:** Apply CSS for text and link styling. **OC 3:** Implement responsive design with CSS. **OC 4:** Demonstrate proficiency in creating visually appealing web pages. **OC 5:** Grasp fundamental Internet concepts and applications. **OC 6:** Implement JavaScript events and event handlers for interactive web pages. **OC 7:** Apply jQuery effects to enhance user experience. **OC 8:** Understand the basics of JSON and its data structures. **OC 9:** Create, parse, and persist JSON data. **OC 10:** Integrate JSON and HTML effectively in web development.	
9	**Modules: -** **Module 1:**	
	1. **Internet and the World Wide Web:** What is Internet? Applications of Internet, internet related concepts. 2. **HTML 5**: Getting started with HTML, Doctypes, Headings, Paragraphs, Text Formatting, Anchors and Hyperlinks, Lists, Tables, Comments, Classes and IDs, Linking Resources, Images, Image Maps. 3. **HTML OTHER ELEMENTS:** Input Control Elements, Forms, Div Element, Sectioning Elements, Navigation Bars, Label Element, Output Element, Void Elements, Media Elements, Progress Element, Selection Menu Controls, Embed, IFrames, SVG, Canvas, Tabindex. 4. **CSS**: Implementing Styles using CSS – Stylesheets, Formatting Text and Links using CSS, CSS Selectors, Changing Background, Adding Border, Margin and Padding, Setting Dimensions, Using Inline Container to mark up a part of a text.	**15 Hrs**

	Module 2:	
	1. Java Script Events and Event Handlers: HTML Events, DOM Events, DOM Event Listener, onAbort, onBlur, onChange, onClick, onDblClick, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onReset, onResize, onSelect, onSubmit, onUnload, Form Validation Example. **2. jQuery**: Introduction, Syntax, Selectors, Events, Effects, Hide/Show, Fade, Slide, Animate, stop(), Callback, Chaining, HTML, Get, Set, Add, Remove, CSS Classes, css( ), Dimensions. **3. JSON**: Introduction, JSON Grammar, JSON Values, JSON Tokens, Syntax, JSON vs XML, Data Types, Objects, Arrays, Creating JSON, JSON Object, Parsing JSON, Persisting JSON, Data Interchange, JSONHTM, JSONP.	**15 Hrs**
10	**Online References:** **1.** https://www.w3schools.com/ **2.** https://www.tutorialspoint.com/index.htm **3.** https://www.javatpoint.com/	
11	**Reference Books** **1.** Web Design with HTML, CSS, JavaScript and JQuery, by Jon Duckett, Paperback, 1st Edition, 2014 **2.** HTML 5 Black Book, by DT Editorial Services, Paperback, 2nd Edition, 2016 **3.** Beginning JSON, by Ben Smith, Apress, 1st Edition, 2015 **4.** Web Design: The Complete Reference, by Thomas Powell, TMH, 2009	
12	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**
13	**Continuous Evaluation through:** Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	**Format of Question Paper: External Examination (30 Marks)– 1 hr duration**
14	**Format of Question Paper:** (**Semester End Examination : 30 Marks. Duration:1 hour)** Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

Name of the Course: Graph Theory

Sr.No.	Heading	Particulars
1	**Description the course:**	• **Introduction:** Graph Theory, a discipline within discrete mathematics, is a crucial study of interconnected systems. In today's world, where relationships define structures, the Graph Theory course offers a key understanding of these connections, making it highly relevant. • **Relevance and Usefulness:** The Graph Theory course is relevant across diverse fields as it provides a theoretical foundation for comprehending complex relationships and structures. This course is useful for modeling and analyzing relationships within systems, offering insights applicable to various domains. From optimizing networks to solving real-world problems, it equips individuals to navigate interconnected structures. • **Applications:** Graph Theory finds application in computer science, social sciences, logistics, and biology, playing a crucial role in algorithm design, network optimization, and problem-solving within interconnected systems. • **Interest and Connection with Other Courses:** The Graph Theory course is intellectually stimulating for individuals curious about understanding patterns, relationships, and network dynamics. It appeals to those interested in unravelling the complexity of interconnected systems. Establishing a meaningful link with computer science and mathematics courses, Graph Theory serves as a foundation for understanding algorithms, data structures, and network design. • **Demand in the Industry:** As industries increasingly rely on data analysis and network optimization, professionals with expertise in Graph Theory are in high demand. Employers seek individuals capable of applying graph-based models to solve complex problems. • **Job Prospects:** Completing the Graph Theory course opens doors to roles in software development, network analysis, data science, and research, reflecting the valuable skill set acquired in understanding and modeling relationships.
2	**Vertical:**	Skill Enhancement Course(SEC)
3	**Type :**	Theory
4	**Credits :**	2 credits (1 credit = 15 Hours work in a semester)
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives (CO):**	

	CO 1: Develop a Fundamental Understanding of Graph Structures. **CO 2:** Master Graph Algorithms and Optimization Techniques. **CO 3:** Apply Graph Theory to Real-World Problems. **CO 4:** Explore Advanced Topics in Graph Theory. **CO 5:** Develop Proficiency in Graph Visualization and Representation.	
8	**Course Outcomes (OC):** **OC 1:** Learners should demonstrate a deep understanding of graph structures, including knowledge of vertices, edges, and the different types of graphs. **OC 2:** Learners will gain proficiency in applying graph algorithms and optimization techniques. **OC 3:** Learners should be capable of modeling complex systems, identifying relationships, and using graph-based models to address practical challenges. **OC 4:** Learners will delve into advanced topics within graph theory, including topics such as network flows, graph colouring, and spectral graph theory. **OC 5:** Learners should be able to use graph visualization tools, comprehend different graph representations, and communicate graph-based insights clearly to diverse audiences.	
9	**Modules: -** **Module 1:**	
	1. GRAPHS AND DIGRAPHS: Introduction, Graph Isomorphism, Subgraphs, 1Degrees, Indegrees, and Outdegrees, Adjacency Matrices and Incidence Matrices, Degree Vectors of Simple Graphs **2. Connectivity**: Paths. Circuits, and Cycles, Connected Graphs and Digraphs, Trees and Spanning Trees, Strong Orientations of Graphs **3. Eulerian and Hamiltonian Graphs:** Eulerian Graphs and Digraphs, Hamiltonian Graphs and Digraphs, Tournaments. **4. Optimization Involving Trees**: Minimum Weight Spanning Trees, Maximum Weight Branching's, Minimum Weight arborescence's, Matroids and the Greedy Algorithm **5. Shortest Path Problems:** Two Shortest Path Algorithms, The Steiner Network Problem, Facility Location Problems	**15 Hrs**
	Module 2:	
	1. Flow and Connectivity and Combinatorics: Flows in Networks and Menger's Theorem, More on Connectivity, Some Applications to Combinatorics **2. Matchings and Factors**: More on Matchings, The Optimal Assignment Problem, The Traveling Salesperson Problem (TSP), Factors, Factorizations, and the Petersen Graph, **3. Graph Embeddings**: Planar Graphs and Duality, Hamiltonian Plane Graphs, Maximum Flow in Planar Networks, Graphs on Surfaces (An Informal Treatment) Colourings of Graphs: Vertex Colouring of Graphs, Edge Colouring of Graphs, Colouring of Planar Graphs	**15 Hrs**

<table>
<tr><td>10, 11</td><td colspan="2">Reference Books
1. Schaum's Outline of Graph Theory: Including Hundreds of Solved Problems, by V. K. Balakrishnan, McGraw-Hill Education, 1997
2. A Textbook of Graph Theory, R. Balakrishnan, K. Ranganathan, Springer, 2nd Edition, 2012
3. Introduction to Graph Theory, by Richard J. Trudeau, Dover, 1st Edition, 2013
4. Introduction to Graph Theory, by Douglas Brent West, Prentice Hall, 1st Edition, 2010
5. Graph Theory, by Frank Harary, Addison-Wesley, 1st Edition, 2010
6. Basic Graph Theory, by Md. Saidur Rahman, Springer, 1st Edition, 2017</td></tr>
<tr><td>12</td><td>Internal Continuous Assessment: 40%</td><td>Semester End Examination: 60%</td></tr>
<tr><td>13</td><td>Continuous Evaluation through:
Class test of 1 of 15 marks
Class test of 2 of 15 marks
Average of the two: 15 marks

Quizzes/ Presentations/ Assignments: 5 marks
Total: 20 marks</td><td>Format of Question Paper: External Examination (30 Marks)– 1 hr duration</td></tr>
<tr><td>14</td><td colspan="2">Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)
Q1: Attempt any two (out of four) from Module 1 (15 marks)
Q2: Attempt any two (out of four) from Module 2 (15 marks)</td></tr>
</table>

QUESTION PAPER PATTERN

(External and Internal)

<table>
<tr><td rowspan="4">I</td><td colspan="2">A Theory of 2 credits is evaluated for a total of 50 Marks</td></tr>
<tr><td>Internal Continuous Assessment:</td><td>40%[20 Marks]</td></tr>
<tr><td colspan="2">Continuous Evaluation through:
Class test of 1 of 15 marks
Class test of 2 of 15 marks
Average of the two: 15 marks

Quizzes/ Presentations/ Assignments: 5 marks
Total: 20 marks</td></tr>
<tr><td colspan="2">External Semester End Examination: 60% [30 Marks]</td></tr>
<tr><td colspan="3">Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)
Q1: Attempt any two (out of four) from Module 1 (15 marks)
Q2: Attempt any two (out of four) from Module 2 (15 marks)</td></tr>
<tr><td rowspan="4">II</td><td colspan="2">A Practical of 2 credits is evaluated for a total of 50 Marks</td></tr>
<tr><td>Internal Continuous Assessment:</td><td>40%[20 Marks]</td></tr>
<tr><td colspan="2">Continuous Evaluation through:
Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.</td></tr>
<tr><td colspan="2">Semester End Examination: 60%[30 Marks]</td></tr>
<tr><td colspan="3">Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination (30 Marks)
Practical Slip:
Q1. From Module 1 13 marks
Q2. From Module 2 12marks
Q3. Journal and Viva 05 marks</td></tr>
</table>

Examination and Standard of Passing:

Regulations regarding the scheme of exams, number of credits and standard of passing will be as prescribed by the University of Mumbai.

A student is said to have passed if he/she secures 40% of marks allotted in each head of passing. External evaluation of 30 marks and Internal evaluation of 20 marks are treated as separate heads of passing.

The Ten Point Grading System prescribed by the University of Mumbai will be as follows:

Letter Grades and Grade Points

Semester GPA/ Program CGPA Semester/ Program	**% of Marks**	**Alpha-Sign / Letter GradeResult**	**Grade Points**
9.00-10.00	90.0-100	O (Outstanding)	10
8.00-<9.00	80.0-<90.0	A+ (Excellent)	9
7.00-<8.00	70.0-<80.0	A (Very Good)	8
6.00-<7.00	60.0-<70.0	B+ (Good)	7
5.50-<6.00	55.0-<60.0	B (Above Average)	6
5.00-<5.50	50.0-<55.0	C (Average)	5
4.00-<5.00	40.0-<50.0	P (Pass)	4
Below 4.00	Below 40	F (Fail)	0
Ab (Absent)	-	Absent	0

This syllabus is applicable to IDOL students as well, w.e.f. 2025-26.

Appendix B

Justification for B.Sc. (Data Science)

1.	Necessity for starting the course:	**There is a growing importance of data in today's digital age. t equips individuals with the skills and knowledge needed to extract valuable insights from data, drive innovation, and address complex challenges across diverse industries**
2.	Whether the UGC has recommended the course:	**Yes**
3.	Whether all the courses have commenced from the academic year 2024-2025	**To be implemented from 2024-2025 onwards**
4.	The courses started by the University are self-financed, whether adequate number of eligible permanent faculties are available?:	**Self-financed** **Yes. Some experts are called as visiting faculties**
5.	To give details regarding the duration of the Course and is it possible to compress the course?:	**4 years. Not possible to compress the program**
6.	The intake capacity of each course and no. of admissions given in the current academic year:	**60 seats for one division. Admissions will be held from 2024-2025 onwards**
7.	Opportunities of Employability / Employment available after undertaking these courses:	**B.Sc in Data Science opens up a variety of opportunities and high employability in today's data-driven economy. As organizations continue to recognize the value of data in gaining a competitive edge, individuals with a B.Sc in Data Science are well-positioned for diverse and rewarding career opportunities.**

Sign of Chairperson
Dr. Mrs. R. Srivaramangai
Ad-hoc BoS (Data Science)

Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science & Technology

Sign of Offg. Dean,
Prof. Shivram S. Garje
Faculty of Science & Technology

AC – 20/04/2024
Item No. – 6.7 Sem. II (7b)

As Per NEP 2020

University of Mumbai

Syllabus for
Basket of Minor

Board of Studies in Statistics	
UG First Year Programme	
Semester - II	
Title of Paper	**Credits 2/ 4**
I) Statistical Methods-II	**Credits 2**
II)	
III)	
From the Academic Year	**2024-25**

Semester-II
Minor-II
Name of the course: Statistical Methods-II

Sr. No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to :**	Introduction: Statistical methods-II course is focuses on to equip students with basic theory of continuous probability distributions, basic theory of estimation and testing of hypothesis concept. Students will learn basic continuous distribution such as exponential, uniform and normal distribution and their application in real life problems. Also student will learn to find estimate and estimator by method of estimation and test statistics. This course will be useful for science, humanity and commerce faculty also. This course will be applicable to various fields to analyze their data. This course is focuses practical as well as theoretical aspects of basic statistics along with subjects from psychology, Economics, sociology, commerce, Computers, Mathematics, IT etc. There is growing demand for highly skilled statisticians in the 21st century in many fields including government, banking sector, health sciences, veterinary sciences, agricultural sciences, business, and social sciences etc
2	**Vertical :**	Minor
3	**Type :**	Theory
4	**Credit**:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted**:	50 Marks

7	**Course Objectives**: Students will be able to, 1. Understand the fundamental concepts of continuous probability distributions. 2. Study the concept of estimate and estimator. 3. Understand the concept of testing of hypothesis and large sample test
8	**Course Outcomes**: **Students Should be able to,** 1. Explain the continuous probability distributions such as Uniform, Exponential, Normal distributions and apply to real life applications. 2. Compute mean, variance and standard deviations for continuous probability distributions. 3. Apply testing of hypothesis technique to solve statistical problems.

9	**Modules**:-	**Lectures**
	Module 1: Continuous Probability Distributions	
	• Concept of continuous random variable, probability density function and its properties. Cumulative distribution functions of continuous random variables and its properties. • Definition and derivation of mean, variance and median of Uniform and Exponential distributions. Memory less property of Exponential distribution. i. Normal distribution. Properties of Normal distribution (without proof). ii. Normal approximation to Binomial and Poisson distribution (statement only). iii. Properties of Normal curve. Use of normal tables.	10
	Module 2: Estimation	**10**
	• Sampling from a distribution: Concept of a statistic, parameter ,estimate and estimator, sampling distribution of statistic. • Concept of bias and standard error of an estimator. • Central Limit theorem (statement only).and properties on Expectation and variance of random variables with proof. • Joint probability mass function of two discrete random variables. • Marginal and conditional distributions. • Covariance and Coefficient of Correlation. Independence of two random variables. • Sampling distribution of sample mean and sample proportion. (For largesample only)	

	• Standard errors of sample mean and sample proportion. • Point and Interval estimate of single mean, single proportion from sample of large size. • Point and interval estimate of difference between two means and proportions.	
	Module 3: Testing of Hypothesis and Large Sample Test	**10**
	Testing of hypothesis: • Concept of hypothesis • Simple and composite hypothesis • Null and alternate hypothesis • Test statistic, Critical region, Types of error, Level of significance and power of the test. **Large sample tests:** • For testing specific value of population mean • For testing specific value in difference of two means • For testing specific value of population proportion • For testing specific value of difference of population proportion(development of critical region is not expected)	

11	**Reference Books** **Reference Books** 1. Saxena S., Kapoor J. N., Mathematical Statistics, Sultan Chand & Sons, Delhi, 2010 2. Gupta S. P, Statistical Methods, Sultan Chand and Sons, New Delhi, 2002 3. Kapoor V. K, Gupta S. C, Fundamental of Mathematical Statistics, S Chand & Sons, Delhi, 2008 4. Grewal P. S. Methods of Statistical Analysis, Sterling Publishers, 1990 5. Mukhopadyay P., An Introduction to the theory of Probability, World Scientific Publishing Company,2011 1. Mukhopadhyay P. An Introduction to the Theory of Probability, World Scientific Publishing Company, 2011. 2. Grewal P. S, Methods of Statistical Analysis, Sterling Publishers,

	1990 3. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons 4. Agarwal B. L, Basic Statistics, New Age International P Ltd. Delhi, 2015

Format of Question Paper:

Internal Continuous Assessment: (20 marks)

Assignment/viva Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	**Class Test**	**Total**
05	15	20

Semester End Examination: (30 marks)

Semester End Examination will be of 30 marks of 01 hour duration covering entire syllabus of the semester. All questions are Compulsory.

Theory Question Paper Pattern:

Q 1	Attempt any one question out of two questions (Module I and II)	Max. marks: 10
Q 2	Attempt any two questions out of three questions (Module I)	Max. marks: 10
Q 3	Attempt any two questions out of three questions (Module II)	Max. marks: 10

Sign of the BOS Chairman
Dr. Santosh Gite
Board of Studies in Statistics

Sign of the Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science & Technology

Sign of the Offg. Dean
Prof. Shivram S. Garje
Faculty of Science & Technology

AC – 20/04/2024
Item No. – 7.7 Sem. II (5a)

As Per NEP 2020

University of Mumbai

Syllabus for Basket of Open Electives	
Ad- hoc Board of Studies in B. Com. (Management Studies)	
UG First Year Programme	
Semester	**II**
Title of Paper	**Credits 2/ 4**
Leadership Management	**2**
From the Academic Year	**2024-25**

Sr. No.	Heading	Particulars
1	**Description the course:** **Including but not limited to:**	Management is not only an essence in all fields but it is a prevalent tool in the hands of corporates to governments. From planning to controlling and from budgeting to reporting, all managerial elements are the most essential parts of daily life. So the learners need to know about all aspects from rural development to creating artificial intelligence. They will understand how to develop India, one of the fifth most powerful economies in the world. It is expected that the learners should learn how to develop our economy and management for the future generation from these managerial facets.
2	**Vertical :**	Major/Minor/Open Elective /Skill Enhancement / Ability Enhancement/Indian Knowledge System (Choose By √)
3	**Type :**	Theory / Practical
4	**Credit**:	2 credits
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted**:	50 Marks
7	**Course Objectives**: 1. To acquaint the learners with basic fundamentals of leadership. 2. To orient & apply the theoretical & practical perspective of leadership in the changing dynamics of the society.	

8	**Course Outcomes**: 1. Generate social sensitization among youth of the nation. 2. Students will explore various leadership theories and their applications in real-world scenarios 3. Learner should develop effective communication skills for leading and motivating teams 4. Analyze the dynamics of teamwork and foster a collaborative work environment

9	**Modules**: -
	Module 1: Leaders & Leadership
	a) Definition of Leader & leadership, Traits/qualities of a successful leader, Skill sets required for an effective leader – Role of communication in leadership. b) Leadership Styles – Women as Leaders - Time Management & Leadership – Tools & techniques for effective time management.
	Module 2: Theories & Trends in Leadership
	a) Theories of Leadership – Great Man Theory of Leadership – Trait Theory of Leadership- Transactional & Transformational Leadership Theory. b) Leadership Training – Concept – Need for leadership - Youth Leadership - Principles of youth leadership – Social leadership – Need, Success stories of successful business & social leaders.
10	**Text Books:** ● *Ramaswamy. V S & Namakumari. S, MARKETING MANAGEMENT-PLANNING IMPLEMENTATION AND CONTROL, Macmillan Business Books, New Delihi, 2002, Hall Of India, New Delhi,*

11	**Reference Books:** ● Khanna, S.S. Human resource Management (Text and Cases). S. Chand, New Delhi. ● Chhabra, T.N.,Human Resource Management, Dhanpat Rai & Co., Delhi. ● Aswathappa K.,Human Resource Management ata McGraw, Hill, New Delhi. ● Robbins, Stephen P. Organisational Behaviour. Pearsons Education, New Delhi ● Leadership and Self-Deception: Getting Out of the Box by The Arbinge ● Dare to Lead by Brené Brown ● Multipliers: How the Best Leaders Multiply Intelligence, Influence, and Capability of Others by Liz Wiseman ● The Management Challenge by Manfred Kets de Vries ● High-Output Management by Andrew Grove	
12	**Internal Continuous Assessment: 40%**	**External, Semester End Examination Individual Passing in Internal and External Examination : 60%**
13	**Continuous Evaluation through:** Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	
14	**Format of Question Paper:** for the final examination **External Paper Pattern (30 Marks)** Q1. Case Study Analysis 10 Marks Q2. Answer the following (Any One) 10 marks A Or B Q3. Answer the following (Any One) 10 Marks A Or B	

Sign of the BOS Chairman **Prof. Dr. Kanchan Fulmali** **BOS in BMS**	**Sign of the Offg. Associate Dean** **Dr. Ravikant Balkrishna Sangurde** **Faculty of Commerce**	**Sign of the Offg. Associate Dean** **Prin. Kishori Bhagat** **Faculty of Management**	**Sign of the Offg. Dean** **Prof. Kavita Laghate** **Faculty of Commerce & Management**

AC – 20/04/2024
Item No. – 7.7 Sem. II (5a)

As Per NEP 2020

University of Mumbai

Syllabus for Basket of Open Electives	
Ad- hoc Board of Studies in B. Com. (Management Studies)	
UG First Year Programme	
Semester	**II**
Title of Paper	**Credits 2/ 4**
Marketing Mix - II	**2**
From the Academic Year	**2024-25**

Sr. No.	Heading	Particulars
1	**Description the course:** **Including but not limited to:**	Management is not only an essence in all fields but it is a prevalent tool in the hands of corporates to governments. From planning to controlling and from budgeting to reporting, all managerial elements are the most essential parts of daily life. So the learners need to know about all aspects from rural development to creating artificial intelligence. They will understand how to develop India, one of the fifth most powerful economies in the world. It is expected that the learners should learn how to develop our economy and management for the future generation from these managerial facets.
2	**Vertical :**	Major/Minor/Open Elective /Skill Enhancement / Ability Enhancement/Indian Knowledge System (Choose By √)
3	**Type :**	Theory / Practical
4	**Credit**:	2 credits
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted**:	50 Marks
7	**Course Objectives**: 1. To facilitate the students to understand the importance and the relevance of place and promotion in today's marketing environment. 2. To understand the need & application of place and promotion as the marketing mix variables. 3. To understand how to effectively make use of place and promotion to improve sales.	

8	**Course Outcomes**: 1. Students will understand thoroughly place and promotion as marketing mix variables so as to solve marketing problems. 2. Learner should apply and analyze place and promotion marketing mix skills in marketing manager. 3. Learners should evaluate and create marketing strategy with place and promotion as an important marketing

9	**Modules**:-
	Module 1: Place/ Physical Distribution
	a) Channels of distribution – meaning – factors affecting channel selection-types of marketing channels, Functions of Distribution Channel b) Physical distribution - Importance of distribution in developing country- Middlemen- Importance, Types- selection and managing dealers- Distribution Channels Management - Importance, types
	Module 2: Promotion Mix
	a) Promotion – Meaning definition - Characteristics, Significance, Types, Role of promotion in marketing, Promotional strategies b) Promotion mix - Components, Factors affecting the promotion mix , Building skills for effective promotion in marketing management, Sales promotion- Meaning -Types
10	**Text Books:** ● ***K.S. Chandrasekar, MARKETING MANAGEMENT TEXT AND CASES, Tata McGraw-Hill Publication, New Delhi.2010, Govindarajan*** ● ***MARKETING MANAGEMENT CONCEPTS, CASES, CHALLENGES AND TRENDS, Prentice Hall of India, New DelhI. 2009 Philip Kotler*** ● ***MARKETING MANAGEMENT- ANALYSIS PLANNING AND CONTROL, Prentice Hall of India, New Delhi, Ramaswamy. V S & Namakumari. S***

11	**Reference Books:** ● ***MARKETING MANAGEMENT-PLANNING IMPLEMENTATION AND CONTROL, Macmillan Business Books, New Delihi, 2002*** ● ***Fundamentals of Marketing, Tata-McGraw Hill, New Delhi. Stanton, Etzel, Walker*** ● ***McCarthy, E.J., Basic Marketing: A managerial approach, Irwin, New York. Stanton, Etzel, Walker***	
12	**Internal Continuous Assessment: 40%**	**External, Semester End Examination Individual Passing in Internal and External Examination : 60%**
13	**Continuous Evaluation through:** Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.(at least 3)	
14	**Format of Question Paper:** for the final examination **External Paper Pattern (30 Marks)** Q1. Case Study Analysis 10 Marks Q2. Answer the following (Any One) 10 marks A Or B Q3. Answer the following (Any One) 10 Marks A Or B	

Sign of the BOS Chairman **Prof. Dr. Kanchan Fulmali** **BOS in BMS**	**Sign of the Offg. Associate Dean** **Dr. Ravikant Balkrishna Sangurde** **Faculty of Commerce**	**Sign of the Offg. Associate Dean** **Prin. Kishori Bhagat** **Faculty of Management**	**Sign of the Offg. Dean** **Prof. Kavita Laghate** **Faculty of Commerce & Management**

AC – 20.04.2024
Item No. – 5.6 (N) Sem II (5a)

As Per NEP 2020

University of Mumbai

Syllabus for Basket of AEC	
Board of Studies in HINDI	
UG First Year Programme	
Semester	**II**
Title of Paper	**Credits**
हिन्दी भाषा : कौशल के आधार	**2**
From the Academic Year	**2024-25**

Sr. No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to :**	**हिन्दी भाषा : कौशल के आधार** हिंदी राजभाषा होने के साथ-साथ भारत में बोलीजने वाली एक प्रमुख भाषा है। भारत के अधिकांश निवासी और यहां तक कि भारत के बाहर बसनेवाले भारतवंशी भी अपने दैनिक आपसी वार्तालाप, कार्य-व्यवहार में हिंदी भाषा का ही प्रयोग करते हैं। विश्व की प्रमुख पांच भाषाओं के अंतर्गत हिंदी का अस्तित्व है, इस दृष्टि से हिंदी को लेकर विभिन्न प्रकार के कौशल सीखे और सिखाए जा सकते हैं। विद्यार्थियों के लिए हिंदी एक सामान्य भाषा होने के साथ विशेष भाषा तब बन जाती है जब वह हिंदी के माध्यम से अपने कौशल में अभिवृद्धि करें, हिंदी के माध्यम से रोजगार के कई अवसरों को प्राप्त करें। इस दृष्टि से पाठ्यक्रम अत्यंत लाभवर्धक और उपयोगी सिद्ध होगा। हिंदी भाषा में कौशल विकास की असीम संभावनाएं हैं और कौशल के विभिन्न आयाम जुड़े हुए हैं जो अलग-अलग दिशाओं में देखे जा सकते हैं। पाठ्यक्रम विद्यार्थियों में लेखन, वाचन कौशल की अभिवृद्धि करने के साथ रोजगारपरक अवसर प्रदान करता है।
2	**Vertical :**	Open Elective
3	**Type :**	Theory
4	**Credit**:	2 credits (1 credit = 15 Hours for Theory in a semester)
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted**:	50 Marks
7	**Course Objectives**: (List some of the course objectives) 1. विद्यार्थियों को लेखन, वाचन कौशल का ज्ञान देना एवं रोजगार के अवसरों से जोड़ना। 2. विद्यार्थियों को लेखन, वाचन कौशल से परिचय करते हुए अभिव्यक्ति की शैलियों का विकास करना। 3. विद्यार्थियों को भाषण कला के विविध रूपों को समझाना, मौलिकता में अभिवृद्धि लाना एवं विशेषज्ञता दिलाना। 4. विद्यार्थियों को श्रवण कौशल की विशेषताओं से परिचय कराते हुए श्रवण कौशल के लाभों से अवगत कराना।	

8 **Course Outcomes**: (List some of the course outcomes)

CO-1) विद्यार्थियों को लेखन, वाचन कौशल के ज्ञान प्राप्ति के साथ मौलिक अभिव्यक्ति में बदलाव आएगा।

CO-2) विद्यार्थियों का लेखन, वाचन कौशल द्वारा मानसिक विकास होगा, पठन-शक्ति, शैली का विकास होगा।

CO-3) विद्यार्थियों को लेखन, भाषण कौशल से भाषिक-शक्ति, शैलियों का संवर्धन होगा विशेषज्ञता आएगी।

CO-4) विद्यार्थियों को लेखन, वाचन, श्रवण, भाषण कौशल की विशेषताओं और उपयोगिता का ज्ञान प्राप्त होगा।

9 **Modules**:-

इकाई	पाठ	व्याख्यान संख्या
इकाई -1	1. लेखन कौशल का अर्थ एवं स्वरूप 2. लेखन कौशल की उपयोगिता एवं महत्व 3. लेखन कौशल की विधियाँ 4. लेखन कौशल के भेद एवं विशेषताएँ 5. वाचन कौशल का अर्थ, स्वरूप एवं विशेषताएँ 6. वाचन कौशल की उपयोगिता 7. वाचन कौशल की विधियाँ एवं विशेषताएँ	व्याख्यान- 15 क्रेडिट- 01
इकाई -2	8. भाषण कौशल का अर्थ एवं स्वरूप 9. भाषण कौशल का महत्व एवं उपयोगिता 10. भाषण कौशल की विशेषताएँ 11. भाषण कौशल की विधियाँ 12. श्रवण कौशल का अर्थ एवं स्वरूप 13. श्रवण कौशल का महत्व एवं उपयोगिता 14. श्रवण कौशल की विशेषताएँ	व्याख्यान- 15 क्रेडिट- 01

10 **संदर्भ ग्रंथ सूची** -

1. हिंदी भाषा शिक्षण के विविध आयाम - प्राध्यापक डॉ. राठौर, किनले एडिशन
2. अभिनव पत्र लेखन - डॉ अनिल सिंह
3. हिंदी के व्यावहारिक रूप - डॉ संतोष मोटवानी, परिदृश्य प्रकाशन, मुंबई
4. हिंदी भाषा लेखन कौशल - गुलीबाबा पब्लिकेशन प्राइवेट लिमिटेड

11	**Internal Continuous Assessment: 40%**	**External, Semester End Examination 60% Individual Passing in Internal and External Examination**
12	**Continuous Evaluation through:** **<u>मूल्यांकन प्रारूप</u>** ***आंतरिक मूल्यांकन- 20- अंक*** रचनात्मक कार्य, प्रकल्प इत्यादि- 10 अंक, कक्ष शिक्षण के दौरान सहभागिता इत्यादि - 05 अंक अकादमिक, व्यावसायिक एवं कौशल संवर्धन गतिविधियाँ- 05 अंक कुलयोग -**20 अंक**	
13	**Format of Question Paper:** ***बाह्य मूल्यांकन- लिखित परीक्षा- 30- अंक*** ***परीक्षा अवधि- 01 घंटा*** ***निम्नलिखित तीन में से किन्हीं दो प्रश्नों के उत्तर लिखिए*** ***30 अंक*** कुलयोग- **30 अंक**	

Sign of the BOS Chairman
Name of the Chairman
Name of the BOS

Sign of the Offg. Associate Dean
Name of the Associate Dean
Name of the Faculty

Sign of the Offg. Dean
Name of the Offg. Dean
Name of the Faculty

AC – 24/11/2023
Item No. – 8.2 (N) -3

As Per NEP 2020

University of Mumbai

Title of the Course Law related to Intellectual Property Rights

Semester – Sem I

Syllabus for Two Credit

(With effect from the academic year 2024-25)

Law related to Intellectual Property Rights	
PROGRAM	**BA /BSc/ BCom**
SEMESTER	I
COURSE TITLE	Law related to Intellectual Property Rights
VERTICLE /CATEGORY	E (Value Education Course)
COURSE LEVEL	50
COURSE CODE	
COURSE CREDIT	2
HOURS PER WEEK THEORY	2
HOURS PER WEEK PRACTICAL/TUTORIAL	

COURSE OBJECTIVE
Learners will be enabled with the knowledge of the branch of the law thatrights given to persons over the creation of their minds. They usually givethe creator an exclusive right over the use of his/her creation for a certain period. To impart knowledge on identification of diverse types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP. Learners will be able to recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development. To facilitate students to identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development

COURSE OUTCOME
CO1: Learners will be able to study development and reform of intellectual propertyright institutions and their impact on creativity and innovation.
CO2: Learners will be able to critically analyze the principles of Tortious liability, develop familiarization of process of Intellectual Property Management (IPM) andvarious approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy
CO3: Learners will be well equipped with the expensive characteristics of judicialtrend related to IPR and the remedies provided under the mechanism set up by the Government Convention of IPR

ORGANISATION OF THE COURSE		
UNIT NO	COURSE UNITS	HOURS PERWEEK
1	Nature, Concept and forms of Intellectual Property and Patents	10
2	Patents and Trade Marks	10
3	Copy Rights and Geographical Indicators	10
	TOTAL HOURS	30

COURSE DESIGN

UNIT TITLE	OUTCOME	DESCRIPTION	PEDAGOGICAL APPROACH
Intellectual Property: Meaning,Nature and Significance	Learners will understand the concept of IPR andanalyze the conceptof liabilities.	Nature& Concept of Intellectual Property,General Principles of IP	Lecture and seminar method,Case laws
Various forms ofIntellectual Properties:	Learners will be ableacquire the knowledge of the fundamentals of Intellectual property right and judicial perspective towards persons and properties.	Copyright, Patent, Trademark, Design, Geographical indication, Semi-Conductor and Plantvariety	Lecture and seminar method,Case laws
Major international instruments relatingto the protection of Intellectual Properties:	Learners will be ableto evaluate the process of IPR mechanism set by thegovernment.	The Paris Convention,1883, the Berne Convention, 1886,The WIPO Convention, 1967,The TRIPS Agreement, 1994 andrecent amendments.	Lecture and seminar method,Case laws

CONTINUOUS ASSESSMENT TESTS (CAT) & SEMESTER END EXAMINATION (SEE)			
NATURE OF ASSESSMENT	**MARKS**	**METHODOLOGY**	**COURSE OUTCOME**
CAT 1*	10	Online Quiz, Open booktest, Class test, Assignment and Viva	CO1
CAT 2*	10	Online Quiz, Open booktest, Class test, Assignment and Viva	CO1, CO2
CAT 3*	10	Online Quiz, Open booktest, Class test, Assignment and Viva	CO3
SEE	30	Four questions of 10 markseach (from each course unit), to be attempted any 3, 10 marks may be subdivided into two sub questions of 5 marks	CO1, CO2,CO3

***Any two.**

Practical Activities and Aspect ofthe Course	Analysis of landmark cases, Field visit patent office, Visit to Trademark office,Workshop on IPR.

ESSENTIAL READINGS	W.R.Cornish and D. Llewelyn, Intellectual Property: Patents, Copyrights, Trademarks and Allied Rights, Sweet& Maxwell. P. Narayanan, Intellectual Property Law, Eastern Law House

ADDITIONAL READINGS	V.K. Ahuja, Law Relating to Intellectual Property Rights, LexisNexis

Syllabus Drafting Committee -

Dr. Rajeshri N.Varhadi, Professor and In-Charge Director
(UMLA)Dr. Gouri Gargate, Professor of IIT Kharagpur.
Dr. Swati Rautela, Professor and Head Department of
Law.Dr. Sanjay Jadhav, Associate Professor
Department of Law.
Prof. Uma Nehare, Assistant Professor, University of Law Academy.

Signature:
Prof. Kavita Laghate
Chairman of Board of Studies in Value Education

AC – 24/11/2023
Item No. – 8.4 (N) - 3

As Per NEP 2020

University of Mumbai

Title of the Program

Co-Curricular Course
NATIONAL SERVICE SCHEME

SEM I & SEM II

Syllabus for Two Credit

(With effect from the academic year 2024-25)

UNIVERSITY OF MUMBAI
National Service Scheme

1.1 Preamble:
Students in the National Service Scheme are better able to comprehend all the most recent ideas. These courses include an Introduction to National Service Scheme that covers the concept of social services, which are a variety of public services meant to offer support and help to targeted specific groups, most often the underprivileged. They could be offered by individuals, autonomous, private entities, or under the management of a government body.

1.2 Objectives of the Course:
1. To Introduce National Service Scheme to learners and explain how it is used in current social studies.
2. To make the students aware of the need of having a foundation in social science and NSS.
3. To introduce students to social concepts and issues in society, as well as to get involved in resolving social issues.

1.3 Learning Outcomes of the Course: The students will be able to
1. The course will help students comprehend the foundations of the National Service Program.
2. To understand the unique camping program.
3. Students will learn about the regular activities of NSS.

1.4. Programme Specific Outcomes:
1. Students will be familiar with NSS fundamentals and history, particularly as they pertain to social work.
2. Students will recognize NSS and its ongoing operations.

1.5 Programme Outcomes:
1. Students will comprehend fundamental ideas and facts about the National Service Program.
2. Students will learn the essentials of NSS-related procedures.
3. Students will learn social work skills (such as Voter Awareness, Campus Cleanup, Tree Plantation, and Rallies).

1.6 Modes of Internal Evaluation: Assignment, Tutorial, Presentation, MCQs via Google, Field Visits, any other suitable mode along with marks for Attendance of the students.

UNIVERSITY OF MUMBAI
Semester II
NSS CC
Sub: - Leadership and Community Engagement

Credits: 02 **Marks: 50**

Unit Number	SEMESTER 2 Title of the Unit	No. of Lecture	No. of Credits
1	**Leadership & Personality development:** Meaning, definition, qualities, and characteristics of a Leader. Meaning of personality, Dimensions of personality. Personality and Leadership nexus. Universal Human Values and Ethics for youths Sustainable Development Goals	15	
2	**Activity Based Programmes** (Suggestive list given below. Colleges can plan various social activities for learners and make a detailed report) Activities can be conducted throughout the academic year .Evaluation will be based on record keeping of the attendance of the learner. **Shramadhan – P**lantation, Cleaning, Watering, Weeding, Any other activities. **Awareness Programmes –** Seminar, Workshops, Celebration of National and International days, Personality Development Programmes, Group Activities, etc., Rally,Visit to Adopted villages, SwatchathaProgramme, Visit and Conserving Ancient monuments and heritage site, Socio Economic Survey of village/slum, Nature Camp, Environmental Education, Women Empowerment Programme, Health Camps, Blood grouping awareness and Blood donation, Legal awarenessProgramme, Literacy Programme, Water Conservation Programme,One Day Special Camp in a village (preferably in adopted village/Adopted areas/Slums/MR Schools etc).	30	

Note:
1. Above Paper will be exempted if the learner is involved in NSS as Volunteer and Successfully completes 60 hours in each Semester.
2. If learner as a NSS Volunteer attends any Camps at National/State/University/District/ College Special Camp will be exempted from either Sem II OR Sem IV Paper provided they produce Certificate of Participation or Attendance in Camp certified by the Programme Officer.

Evaluation Pattern

Internal Assessment

Assessment Criteria	Marks
Assignment / Project / Quiz/Presentations	**10**
Attendance, Class and Activity Participation	**10**
Total	**20**

External Assessment
Question Paper Pattern

Time: 1:00 Hours **Total Marks: 30**

Introduction:-*1. All questions are compulsory.*
2. Figure to the Right indicates full marks.
3.Draw neat labeled drawings wherever necessary.

Q.1) Rewrite the following by choosing the correct options given below (with four alternatives) 6 Objectives question of 1 mark each **06 marks**.

1. a) b) c) d)
2. a) b) c) d)

Q.2) Short Notes . (Any Two out of Four) **06marks**

1.
2.
3.
4.

Q.3) Answer the following questions (Any Three out of Five) **18 marks**

1.
2.
3.
4.
5.

References:

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University of Mumbai

Website – mu.ac.in
Email id - dr.aams@fort.mu.ac.in
aams3@mu.ac.in

Academic Authorities,
Meetings &Services (AAMS)
Room No. 128, M. G. Road, Fort,
Mumbai – 400 032.
Tel. 022-68320033

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Category- I University Status awarded by UGC

No. AAMS_UGS/ICC/2024-25/ 219 Date: 31st January, 2025

CIRCULAR:-

Attention of all the Principals of the Affiliated Colleges, Directors of the Recognized Institutions and the Head University Departments is invited to this office Circular No. AAMS_UGS/ICC/2024-25/04 dated 11th June, 2023 relating to the NEP UG & PG Syllabus.

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular at its meeting held on 23rd November, 2024 and subsequently passed by the Board of Deans at its meeting held on 30th December, 2024 **vide** item No. 8.1 (N) have been accepted by the Academic Council at its meeting held on 27th January, 2025 **vide** item No. 8.1 (N) and that in accordance therewith to introduce 2 Credit Programme Co-Curricular Course Foundation and Exploration of Performing Fine Arts Sem II as per appendix (NEP 2020) with effect from the academic year 2024-25.

(The said circular is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
31st January, 2025

(Dr. Prasad Karande)
REGISTRAR

To,

The Principals of the Affiliated Colleges, Directors of the Recognized Institutions and the Head, University Departments.

AC 8.1 (N) /27/01/2025

Copy forwarded with Compliments for information to:-

1) The Chairman, Board of Deans,
2) The Dean, Faculty of Interdisciplinary,
3) The Chairman, Ad-hoc Board of Studies in **N.C.C./N.S.S./Sports Co-Curricular**,
4) The Director, Board of Examinations and Evaluation,
5) The Director, Department of Students Development,
6) The Director, Department of Information & Communication Technology,
7) The Director, Centre for Distance and Online Education (CDOE), Vidyanagari,
8) The Deputy Registrar, Admissions, Enrolment, Eligibility & Migration Department (AEM).

Copy forwarded for information and necessary action to :-	
1	The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Dept)(AEM), dr@eligi.mu.ac.in
2	The Deputy Registrar, Result unit, Vidyanagari drresults@exam.mu.ac.in
3	The Deputy Registrar, Marks and Certificate Unit,. Vidyanagari dr.verification@mu.ac.in
4	The Deputy Registrar, Appointment Unit, Vidyanagari dr.appointment@exam.mu.ac.in
5	The Deputy Registrar, CAP Unit, Vidyanagari cap.exam@mu.ac.in
6	The Deputy Registrar, College Affiliations & Development Department (CAD), deputyregistrar.uni@gmail.com
7	The Deputy Registrar, PRO, Fort, (Publication Section), Pro@mu.ac.in
8	The Deputy Registrar, Executive Authorities Section (EA) eau120@fort.mu.ac.in He is requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to the above circular.
9	The Deputy Registrar, Research Administration & Promotion Cell (RAPC), rapc@mu.ac.in
10	The Deputy Registrar, Academic Appointments & Quality Assurance (AAQA) dy.registrar.tau.fort.mu.ac.in ar.tau@fort.mu.ac.in
11	The Deputy Registrar, College Teachers Approval Unit (CTA), concolsection@gmail.com
12	The Deputy Registrars, Finance & Accounts Section, fort draccounts@fort.mu.ac.in
13	The Deputy Registrar, Election Section, Fort drelection@election.mu.ac.in
14	The Assistant Registrar, Administrative Sub-Campus Thane, thanesubcampus@mu.ac.in
15	The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan, ar.seask@mu.ac.in
16	The Assistant Registrar, Ratnagiri Sub-centre, Ratnagiri, ratnagirisubcentre@gmail.com
17	The Director, Centre for Distance and Online Education (CDOE), Vidyanagari, director@idol.mu.ac.in
18	Director, Innovation, Incubation and Linkages, Dr. Sachin Laddha pinkumanno@gmail.com
19	Director, Department of Lifelong Learning and Extension (DLLE), Dlleuniversityofmumbai@gmail.com

Copy for information :-	
1	P.A to Hon'ble Vice-Chancellor, vice-chancellor@mu.ac.in
2	P.A to Pro-Vice-Chancellor pvc@fort.mu.ac.in
3	P.A to Registrar, registrar@fort.mu.ac.in
4	P.A to all Deans of all Faculties
5	P.A to Finance & Account Officers, (F & A.O), camu@accounts.mu.ac.in

To,

1	The Chairman, Board of Deans pvc@fort.mu.ac.in
2	**Faculty of Humanities,** **Dean** 1. Prof.Anil Singh Dranilsingh129@gmail.com **Associate Dean** 2. Dr.Suchitra Naik Naiksuchitra27@gmail.com 3.Prof.Manisha Karne mkarne@economics.mu.ac.in
	Faculty of Commerce & Management, **Dean** 1. Dr.Kavita Laghate kavitalaghate@jbims.mu.ac.in **Associate Dean** 2. Dr.Ravikant Balkrishna Sangurde Ravikant.s.@somaiya.edu 3. Prin.Kishori Bhagat kishoribhagat@rediffmail.com

	Faculty of Science & Technology **Dean** 1. Prof. Shivram Garje ssgarje@chem.mu.ac.in **Associate Dean** 2. Dr. Madhav R. Rajwade Madhavr64@gmail.com 3. Prin. Deven Shah sir.deven@gmail.com
	Faculty of Inter-Disciplinary Studies, **Dean** 1.Dr. Anil K. Singh aksingh@trcl.org.in **Associate Dean** 2.Prin.Chadrashekhar Ashok Chakradeo cachakradeo@gmail.com
3	Chairman, Board of Studies,
4	The Director, Board of Examinations and Evaluation, dboee@exam.mu.ac.in
5	The Director, Board of Students Development, dsd@mu.ac.in@gmail.com DSW direcotr@dsw.mu.ac.in
6	The Director, Department of Information & Communication Technology, director.dict@mu.ac.in

AC – 27/01/2025
Item No. – 8.1

As Per NEP 2020

University of Mumbai

Syllabus for Basket of OE	
Ad- hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular	
UG First Year Programme - Co-Curricular Course	
Semester	**II**
Title of Paper	**Credits**
Foundation and Exploration of Performing Fine Arts	**2**
From the Academic Year	**2024-25**

Semester II
As per NEP 2020

Foundation and Exploration of Performing and Fine Arts

Syllabus for Two Credits Programme

With effect from Academic Year 2024-2025

Aims and Objectives

- To study the foundation and essentials of performing arts.
- To understand the chronicles of Indian Artistry.
- To comprehend the modern art forms.
- To explore various career opportunities in fine arts.

Learning Outcomes

The course will enable the learner to

- Identify and trace the historical evolution of Indian performing and fine arts.
- Analyze the transition from traditional to modern art forms in performing arts.
- Identify and describe a range of career paths in the fine and performing arts.

Modules at Glance

Semester I

Module No.	Unit	Content	No. of Hours
1	I	Foundation of Performing Arts	08
	II	Essential Skill Sets in Performing Arts	07
2	III	Chronicles of Indian Artistry	08
	IV	Contemporary and Modern Art	07
Total No. of Hours			**30**

Module No.	Unit	Content
1	**I**	**1.1 Foundation of Performing Arts** • Introduction to Performing Arts • Historical Evolution and Cultural Significance of Performing Arts • Basic Elements of Performing Arts
	II	**1.2 Essential Skill Sets in Performing Arts** • Character Development and Analysis

		• Emotional Exploration and Expression • Fundamentals of Voice Modulation and Projection • Improvisation Skills • Scene Study and Script Interpretation • Career Options in Performing Arts
2	**III**	**2.1 Chronicles of Indian Artistry** • Indus Valley Civilization • Folk and Tribal Art Forms • Impact of Aesthic Art on Sacred Architecture • Revival and Preservation of Ancient Indian Art
	IV	**2.2 Contemporary and Modern Art** • Modern Trends in Indian Art • Eminent Contemporary Artists of India • Career Options in Fine Arts

Scheme of Evaluation

The Scheme of Examination shall be of 50 marks. It will be divided into Internal Evaluation (20 marks) and Semester End Examination (30 Marks).

Semester I (50 Marks - 2 Credits)

Internal Evaluation (20 Marks)

Sr. No.	Particulars	Marks
1	Presentation **OR** Project **OR** Assignment	15
2	Participation in Workshop / Conference / Seminar (as decided by the Teacher) **OR** Participation in Online Workshop / Conference / Seminar (as decided by the Teacher) **OR** Field Visit **OR** Attendance	5

Semester End Examination (30 Marks)

Question No.	Particulars	Marks
1	**Objective Type Questions (All Units)**	06
2	**Descriptive Question(s) on Unit I** The Question may be divided into sub questions: Attempt any 2 out of 4 (Each of 3 Marks)	06
3	**Descriptive Question(s) on Unit II** The Question may be divided into sub questions: Attempt any 2 out of 4 (Each of 3 Marks)	06
4	**Descriptive Question(s) on Unit III** The Question may be divided into sub questions: Attempt any 2 out of 4 (Each of 3 Marks)	06
5	**Descriptive Question(s) on Unit IV** The Question may be divided into sub questions: Attempt any 2 out of 4 (Each of 3 Marks)	06
Total		30

Reference Books

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University of Mumbai

Website – mu.ac.in
Email id - dr.aams@fort.mu.ac.in
aams3@mu.ac.in

Academic Authorities,
Meetings &Services (AAMS)
Room No. 128, M. G. Road, Fort,
Mumbai – 400 032.
Tel. 022-68320033

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No. AAMS_UGS/ICC/2024-25/234 Date: 14th February, 2025

CIRCULAR:-

Attention of all the Principals of the Affiliated Colleges, Directors of the Recognized Institutions and the Head University Departments is invited to this office Circular No. AAMS_UGS/ICC/2024-25/04 dated 11th June, 2023 relating to the NEP UG & PG Syllabus.

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular at its meeting held on 06th February, 2025 has been accepted by the Hon'ble Vice Chancellor as per the powers confirmed upon him under Section 12 (7) of the Maharashtra Public Universities Act, 2016 and that in accordance therewith syllabus of **Co-Curricular Course Introduction to Sports, Physical Literacy, Health and Fitness & Yog Sem II** as per appendix (NEP 2020) with effect from the academic year 2024-25.

(The said circular is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
14th February, 2025

(Dr. Prasad Karande)
REGISTRAR

To,

The Principals of the Affiliated Colleges, Directors of the Recognized Institutions and the Head, University Departments.

BOS/06/02/2025

Copy forwarded with Compliments for information to:-

1) The Chairman, Board of Deans,
2) The Dean, Faculty of Interdisciplinary,
3) The Chairman, Ad-hoc Board of Studies in **N.C.C./N.S.S./Sports Co-Curricular**,
4) The Director, Board of Examinations and Evaluation,
5) The Director, Department of Students Development,
6) The Director, Department of Information & Communication Technology,
7) The Director, Centre for Distance and Online Education (CDOE), Vidyanagari,
8) The Deputy Registrar, Admissions, Enrolment, Eligibility & Migration Department (AEM).

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3	The Deputy Registrar, Marks and Certificate Unit,. Vidyanagari dr.verification@mu.ac.in
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12	The Deputy Registrars, Finance & Accounts Section, fort draccounts@fort.mu.ac.in
13	The Deputy Registrar, Election Section, Fort drelection@election.mu.ac.in
14	The Assistant Registrar, Administrative Sub-Campus Thane, thanesubcampus@mu.ac.in
15	The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan, ar.seask@mu.ac.in
16	The Assistant Registrar, Ratnagiri Sub-centre, Ratnagiri, ratnagirisubcentre@gmail.com
17	The Director, Centre for Distance and Online Education (CDOE), Vidyanagari, director@idol.mu.ac.in
18	Director, Innovation, Incubation and Linkages, Dr. Sachin Laddha pinkumanno@gmail.com
19	Director, Department of Lifelong Learning and Extension (DLLE), Dlleuniversityofmumbai@gmail.com

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1	P.A to Hon'ble Vice-Chancellor, vice-chancellor@mu.ac.in
2	P.A to Pro-Vice-Chancellor pvc@fort.mu.ac.in
3	P.A to Registrar, registrar@fort.mu.ac.in
4	P.A to all Deans of all Faculties
5	P.A to Finance & Account Officers, (F & A.O), camu@accounts.mu.ac.in

To,

1	The Chairman, Board of Deans pvc@fort.mu.ac.in
2	**Faculty of Humanities,** **Dean** 1. Prof.Anil Singh Dranilsingh129@gmail.com **Associate Dean** 2. Dr.Suchitra Naik Naiksuchitra27@gmail.com 3.Prof.Manisha Karne mkarne@economics.mu.ac.in
	Faculty of Commerce & Management, **Dean** 1. Dr.Kavita Laghate kavitalaghate@jbims.mu.ac.in **Associate Dean** 2. Dr.Ravikant Balkrishna Sangurde Ravikant.s.@somaiya.edu 3. Prin.Kishori Bhagat kishoribhagat@rediffmail.com

	Faculty of Science & Technology **Dean** 1. Prof. Shivram Garje ssgarje@chem.mu.ac.in **Associate Dean** 2. Dr. Madhav R. Rajwade Madhavr64@gmail.com 3. Prin. Deven Shah sir.deven@gmail.com
	Faculty of Inter-Disciplinary Studies, **Dean** 1.Dr. Anil K. Singh aksingh@trcl.org.in **Associate Dean** 2.Prin.Chadrashekhar Ashok Chakradeo cachakradeo@gmail.com
3	Chairman, Board of Studies,
4	The Director, Board of Examinations and Evaluation, dboee@exam.mu.ac.in
5	The Director, Board of Students Development, dsd@mu.ac.in@gmail.com DSW direcotr@dsw.mu.ac.in
6	The Director, Department of Information & Communication Technology, director.dict@mu.ac.in

BOS - 06/02/2025
12 (7) of M.P.U.A. 2016
Item No. - 1

As Per NEP 2020

University of Mumbai

Syllabus for Sports Co-Curricular Vertical - 6	
Board of Studies in NCC/NSS/Sports Co-Curricular	
UG First Year Programme	
Semester	**II**
Title of Paper	**Credits**
I) Sports, Physical Literacy, Health and Fitness & Yog	**2**
From the Academic Year	**2024-25**

Semester II

1.1 Preamble:

India is growing rapidly as a global super-power. To face the challenges of the century and to keep up with the pace of the world, maintaining health is of prime importance. Giving thrust to healthy society, Physical Education, Sports, Health & fitness and Yoga are of great significance in today's world. The Government of India insists on Physical Fitness, Mental Health and Overall Development of Personality for every citizen. In these lines, the Government has launched Fit India Movement, Khelo India, TOPS and National Sports Day, International Day of Yoga etc. These initiatives have given impetus and awareness among general public, professional and academicians. However, creating efficient and skilled human resource in the field of Physical Education, Sports and Yoga is identified as the need of the hour. Thus, the Governments of India and Government of Maharashtra have included Physical Education, Sports and Yoga as a key area under the NEP 2020.

1.2 Objectives of the Course:

1. To understand the importance of Physical Education, Sports, & Physical Activity
2. To increase participation of students in various games and sports and fitness activities
3. To develop the physical as well as mental health through physical activity
4. To create interest regarding sports , physical fitness to inculcate healthy habits for lifelong

1.3 Program outcomes:

By the end of the program the students will be able to:

1. The student will participate in various games, sports and physical activities and they will also learn the technical and tactical experience of it.
2. Students will understand the importance and benefits of participation in any fitness activity or sports.
3. Own choice based activities will be the stress buster for the students and this will inculcate healthy habits in the students
4. Students will able to organize, plan activities and will develop administrative qualities through these events
5. Students acquire the knowledge of Physical Education, Sports and Yoga and understand the purpose and its development.
6. The student learns to plan, organize and execute sports events.
7. Student will learn theoretical and practical aspects of game of his choice to apply at various levels for teaching, learning and coaching purposes efficiently.
8. Student acquires the knowledge of opted games, sports and yoga and also learns the technical and tactical experience of it.
9. Student will learn to apply knowledge of Physical fitness and exercise management to lead better quality life.
10. Students will understand and learn different dimension of active life style.

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1.4 Programme Duration: The structure of the Credit Couse in Sports has two semesters in total covering a period of two years i.e. 2 credits in each semester till the fourth semester as per the guidelines of NEP 2020.

1.5 Modes of Internal & External Evaluation: Students will submit a hard copy of the report of total 60 hours spent for semester II in any physical activities/ training sessions/ Sports events/ yoga/ adventure activities/ any sports/ gym or pilates / to the teacher. Students will be evaluated on the basis of activities participated for the semester II.

1.6 Modules at Glance – Semester II

Module No.	Unit	Content	No. of Practical Hours
1	I	**Importance of Physical Education and Sports**	15
	II	**Participation in any physical activities**	15
2	III	**Volunteering in any sports events or fitness events**	15
	IV	**Participation in University or any other Sports competitions**	15
Total No. of Hours			**60**

Module No.	Unit	Content
1	**I**	**1.1 Importance of Physical Education and Sports & Yoga** • Development of physical health as well as mental health through Physical Activities. • Group Sports & Fitness Activities • Fitness activities conducted by any sports/fitness instructor such as Yoga, Zumba, Aerobics etc.
	II	**1.2 Participation in any Physical activities** • Participation in any sports practice sessions conducted by our college/ any club / any institution • Completion of any Yoga/ Pilates/ Gym course/ any fitness related course • Participation in any other physical activities of the interest of student
2	**III**	**2.1 Volunteering in any sports events or fitness events** • Volunteering done in sports or fitness events organized by the college • Volunteering in any other fitness or sports activities organized by NGO or local clubs
	IV	**2.2 Participation in University or any other Sports competitions** • Participation in University Intercollegiate/ Inter Zonal / West Zone/ All India / National / State tournaments organized by University of Mumbai or State or District Sports Federation • Participation in any other intra college competition organized by college • Participation in any recognized Sports or Fitness competitions

Scheme of Evaluation

The Scheme of Examination shall be of 50 marks. It will be divided into Internal Evaluation (20 marks) and Semester End Examination (30 Marks).

Students will submit a brief report of 60 hours spent for Semester II in any of the physical activities along with geo tagged photo, receipt, sports training session's attendance, course certificates, etc. Report should include the explanation of the following questions. A report can have multiple physical activities done for the completion of 60 hours per semester. For eg. A student can enroll himself/ herself in Yoga/ Gym and any sport simultaneously and can give proof of the attendance for the same in the report. A student must complete 60 hours in any physical activity. Students should also enroll themselves as volunteers for any sports and fitness events held in the college.

1. Why did the student select a physical activity mentioned in the report?
2. What were the benefits and experience after the completion of the 60 hours of physical activity?
3. What were the challenges faced by the student during the activity?
4. Geotagged photos of the activity clicked in the beginning, during and on the last day of the activity.
5. Enrollment receipts, ID card, certificate of the activity.
6. Conclusion remark by the student.

Semester II (50 Marks - 2 Credits)

Internal Evaluation (20 Marks)

Sr. No.	Particulars	Marks
1	Presentation **OR** Project **OR** Assignment **(Students must include the Geo Tagged photos, Enrolment receipt, Certificate etc. in the report)**	10
2	Volunteering in any Sports / Fitness activities conducted by college or local clubs or NGO	10

Semester End Examination (30 Marks)

Question No.	Particulars	Marks
1	VIVA Conducted by teacher/ Sports In charge/ Sports Director regarding participation in Physical / Sports / Fitness activities / Fitness or Yoga Course completed by students **OR** Participation in Sports Competitions Conducted by University at State or National Level (Students who have represented Mumbai University or College at Intercollegiate / Inter Zonal / West Zone Inter University / All Indi Inter University/ International tournament) Students who have represented in the above mentioned competitions should be exempted from VIVA and should be evaluated on the basis of his/ her performance in the above mentioned competitions.	30
Total		30

References –

1. Bucher, C. A. (n.d.) Foundation of physical education. St. Louis: The C.V. Mosby Co. Deshpande, S.H. (2014). Physical Education in Ancient India. Amravati: Degree college of Physical education.
2. Mohan, V. M. (1969). Principles of physical education. Delhi: Metropolitan Book Dep. Nixon, E. E. & Cozen, F.W. (1969). An introduction to physical education. Philadelphia: W.B. Saunders Co.
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4. Coalter, F. (2013) Sport for Development: What game are we playing? .Routledge.
5. Singh Hardayal (1991), Science of Sports Training, DVS Publication, New Delhi
6. Muller, J. P.(2000). Health, Exercise and Fitness. Delhi : Sports.
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11. D.M Jyoti, Yoga and Physical Activities (2015) lulu.com3101, Hills borough, NC27609, United States
12. D.M Jyoti, Athletics (2015) lulu.com3101, Hills borough, NC27609, United States

AC –28/06/2024

Item No. – 5.7 (N)

University of Mumbai

Syllabus for Extension Work in Vertical VI - CC	
Board of Studies in Extension Work	
UG First Year Program	
Semester	**II**
Title of Paper	**Credit**
Extension Work	**2**
From the Academic Year	**2024-25**

Introduction

The National Education Policy (NEP) 2020 is a comprehensive framework introduced by the Government of India to revamp the country's education system. It has replaced the previous National Policy on Education, which has aim to ensure universal access to quality education from preschool to higher education, including vocational education. NEP 2020 emphasizes a more holistic, multidisciplinary, and flexible curriculum which lay emphasis on conceptual understanding rather than rote learning allowing students to choose subjects across disciplines without strict boundaries.

The National Education Policy (NEP) 2020 of India addresses the role of higher education institutions in fostering community engagement and extension work. It highlights the social responsibility of higher education institutions towards their communities. It encourages institutions to engage with local communities, address societal challenges, and contribute to sustainable development. The policy promotes the implementation of outreach programs by higher education institutions to disseminate knowledge, provide services, and support community development. These programs may include literacy campaigns, career development programs, social issues awareness programs, health and hygiene initiatives, skill development workshops, and technology-oriented activities. The policy suggests integrating extension work into the curriculum of higher education programs. This allows learners to gain practical experience, develop leadership skills, and contribute to community development while pursuing their studies. It recognizes incentives to encourage active engagement in community service and extension activities.

Overall, NEP 2020 recognizes the significant role of higher education institutions in promoting community engagement, social responsibility, and sustainable development through extension work. By integrating extension activities into their mission and operations, institutions can contribute to building inclusive and resilient societies.

Extension work in the context of education refers to the activities and programs conducted by educational institutions to engage with communities, address societal needs, and promote social development.

Aim of Extension Work under NEP:

- Extension work aims to identify and address the specific needs and challenges faced by communities. NEP 2020 encourages higher education institutions to engage with local communities and contribute to their development by offering programs and services that

address social needs, such as literacy programs, health awareness campaigns, and vocational training.

- Extension work aims to empower communities by providing them with the knowledge, skills, and resources they need to address their own requirements and improve their quality of life.

Key objectives of Extension Work under NEP:

- To ensure equal access to quality education and educational opportunities to aspirants.
- To support the government initiatives in achieving universal foundational literacy and numeracy as per sustainable development program.
- To organize remedial programs to address the learning breaches among the youth and provide unending education opportunities.
- To offer more holistic, multidisciplinary, and flexible curricular activities with an emphasis on conceptual understanding and personality development.
- To offer a wide range of activities & promote critical thinking, creativity, and innovation.
- To provide aspirants with multiple pathways for skill development and employment.
- To implement outreach programs to disseminate knowledge, provide services, and support community development.

Extension Work Activities:

Extension Work activities introduced by DLLE are a crucial aspect of the educational environment, offering multifaceted benefits that extend beyond academic learning. Many extension activities focus on social issues, sustainability, and environmental conservation. These activities educate the communities on sustainable practices which promote inclusivity and social justice. These activities focus especially on training women in various skills, including entrepreneurship and digital literacy through various vocational skill-oriented projects offered by the department. These activities have significantly contributed to skill development among community members, leading to improved employment opportunities and personality development. Learners participate in extension work activities as part of their curriculum, to gain practical experience and to contribute to community development. Thus, engaging in extension work fosters a sense of social responsibility and civic engagement among the learners and facilitators.

THE EXTENSION DIMENSION (Reach to Unreached)

The college students are enrolled for extension work projects and perform various activities for the **social awareness based on various issues / problems in the society such as Save Girl Child, Pollution, Aids, Global Warming, Environment, Tree Plantation, Importance of Education, Illiteracy, Child Labour, Dowry Deaths, Malnutrition, Watershed Management and so many.** The students are creating awareness about these social problems / issues through various activities such as Street Play, Exhibition, Poster Making, Songs, Speech, Survey, Elocution, and participation in Seminar & Conferences. For this purpose, students are going to remote areas and involve the community and make them aware of our role in eradicating social problems faced by the society and trying to convince the people human duties as an ideal citizen.

To facilitate the sensitization of the student to the socio-cultural realities, the Department offers extension work projects encompassing social issues for the student. There are many Extension Work Projects being offered by the department under the two different units for enhancing the employability and IT skills of the student. The projects are given below for which the details are available on DLLE website at www.mudlle.ac.in

I) Vocational Career Oriented Projects

1. Career Project [CP]
2. Industry Orientation Project [IOP]
3. Anna Poorna Yojana [APY]
4. Skill Development (SD)

II) Community Oriented Projects

1. Population Education Club (PEC)
2. Survey Research
3. Education for All (EFA- NIOS, IDOL)
4. Environment Education
5. Civic Sense (CS)
6. Consumer Guidance

Given below are the activities / programs to be conducted by the colleges as a part of Extension Work as enlisted topics. The learner will focus on enlisted topics and participate in following activities during Semester II in this academic year.

ACTIVITIES FOR SEMESTER II = 2 Credits

Sr. No.	Unit	No. of Lectures
1.	Organising & Participation in Training Session Every learner should attend the orientation / training session organised by their college for orientation of annual extension work program. Attendance is compulsory. **In this session the learners will be oriented about the activities to be conducted during the semester followed by question-and-answer session.** The learner must read resource material and guideline carefully and plan his / her activities for the semester during academic year.	2 Lectures
2.	Participation in Project /Activities (as given below) **In this session learners will be oriented about any 5 Topics selected by college (preferably which are not taken in Semester 1) for awareness under Extension Work. The college may select more than 5 topics if the enrolment of learners is more than 200. The learners will participate in activities based on these topics selected by college.)** 1. Maharashtra Policy for women. 2. Status of women in India. / Women achievers of modern India 3. Banking procedures. 4. Legal procedures. 5. Violence against women / Laws protecting women/ Inheritance laws. 6. Child Labour. 7. Environment- pollution and its effect / Save Trees and Natural Resources 8. Water Harvesting.	22 Lectures including guidance for practice session, preparations and actual conduct of program.

	9. Pollution (Noise pollution / industrial pollution etc.) 10. Issues related to LGBT. 11. HIV –AIDS / Covid 19 etc. 12. Consumer Awareness (Act 2019), Need and Importance 13. E-waste management 14. Stress and Harassment. 15. Global warming 16. Importance of Ethics and Values 17. Old Age Homes / Status of Senior Citizens 18. Distance Education Opportunities 19. First Aid Awareness 20. Voting rights / Human Rights **Learners will be oriented and motivated to participate in minimum four activities given below based on above topics:** 1. Seminar /conferences, discussion sessions, debate, rallies 2. Competitions (essay/creative writing, elocution, poster/ video/ rangoli making etc. – Minimum 2 competitions) 3. Extension Work group activities of other groups in the college. 4. Prepare your PPT, design your posters / charts. 5. Survey / short term academic courses / innovative programs. 6. Field visit / field work / case studies / developing innovative engineering models / projects 7. Participation in Street Plays 8. Event / hospitality / human resource management program /assignment 9. Novel formulation development (pharmacy), 10. Self-medication survey (pharmacy), **Learners are required to prepare <u>short videos (duration 3-4 minutes)</u> of the activity where the college will organize such competition.**	

	The learners will be oriented about various career development opportunities in University of Mumbai, and schemes of student development by the Government. **<u>Learners will be oriented and given an opportunity for:</u>** - Script writing / Direction for street play. - Composing / Singing (Songs, Powada) - Playing Musical Instrument during the event. - Participation in various college and university level competitions. - Participate in Cultural Performance / Organising Committee for Festival / Programs / Event Management.	
3	<u>Participation Video / Stage Performance / Assignment / Report Writing and submission</u> - Present your report / video during the college program. - All learners enrolled in Extension Work can make activity video or stage performance (3-4 minutes duration) creating awareness about any social issues / topics enlisted here followed by assignment / report writing as per format. - **College will organise a program in the hall / classroom for all learners and give them an opportunity** to present their assignment / report with PPT / video presentation followed by question answer session / test / interview by the college.	6 Lectures including guidance for practice session, preparations and actual conduct of program.

Evaluation Pattern

<u>Internal Assessment</u>

Sr. No.	Assessment Criteria	Maximum Marks
1	Attendance, punctuality, completion of hours, participation in programs, presentations and feedback.	10
2	Proficiency in required skill sets, overall performance, submission of written report / assignments and expected development.	10
	Total	20 Marks

External Assessment

(Based on Extension Work guidelines and five enlisted topics chosen by the college.)

Question Paper Pattern

Time: 1.00 Hours **Total Marks 30**

Instructions: 1. All questions are compulsory.

2. Figures to the right indicate maximum marks.

Q.1. Rewrite the following statement by choosing correct alternative given below. - 06 Marks (6 statements. One mark each)

Q.2. Write short Notes On (Any Two out of Four) - 06 Marks

Q.3. Answer the following questions. (Any Three out of Five) - 18 Marks

References:

- Guidelines for Extension Work published by Department of Lifelong Learning and Extension, University of Mumbai.
- Agricultural Extension: Principles and Methods" by "Ray V. Herren (2008)
- Agricultural Extension by G. S. R. Murthy (2010)
- Introduction to Agricultural Extension by S. S. Acharya (2015)
- Agricultural Extension in Developing Countries by R. W. Snapp (2012)
- Extension Communication and Management by B. M. Panda (2016)

Sign of BOS Chairman **Prof. Kunal Jadhav** **Ad-hoc Board of Studies in Extension Work**	**Sign of the Offg. Associate Dean** **Dr. Suchitra Naik** **Faculty of Humanities**	**Sign of the Offg. Associate Dean** **Dr. Manisha Karne** **Faculty of Humanities**	**Sign of the Dean** **Prof. Dr. Anil Singh** **Faculty of Humanities**