AC – 28/03/2025
Item No. – 6.9 (N)

As Per NEP 2020

University of Mumbai

Syllabus for Major Vertical – 1 & 4		
Name of the Programme – B.Sc. (Information Technology)		
Faulty of Science and Technology		
Board of Studies in Information Technology		
U.G. Second Year Programme	**Exit Degree**	**U.G. Diploma in Information Technology**
Semester		**III & IV**
From the Academic Year		**2025-26**

University of Mumbai

(As per NEP 2020)

Sr. No.	Heading	Particulars
1	**Title of program** **O:_____**	**B.Sc. (Information Technology)**
2	**Exit Degree**	**U.G. Diploma in Information Technology**
3	**Scheme of Examination** **R: _____**	NEP 40% Internal 60% External, Semester End Examination Individual Passing in Internal and External Examination
4	**Standards of Passing** **R: _____**	**40%**
5	**Credit Structure** **R. SU-510C** **R. SU-510D**	**Attached herewith**
6	**Semesters**	**Sem. III & IV**
7	**Program Academic Level**	**5.00**
8	**Pattern**	**Semester**
9	**Status**	**New**
10	**To be implemented from Academic Year**	**2025-26**

Sd/-	**Sd/-**	**Sd/-**
Sign of the BOS Chairman **Dr. Srivaramangai R** **BOS in Information Technology**	**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**

Under Graduate Diploma in Information Technology

Credit Structure (Sem. III & IV)

(B. Sc.)- Major & Minor

	R. SU-510C									
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 Python Programming DATA STRUCTURES Operating System Major Practical 3	…	4	2	VSC:2, APPLIED MATHEMATICS	AEC:2	FP: 2 CC:2	22	
5.0	**R. SU-510D**									**UG Diploma 88**
	IV	8 Core Java Software Engineering Computer Networks Major Practical 4	…	4	2	SEC:2 Computer Graphics OR Mobile Programming	AEC:2	CEP: 2 CC:2	22	
	Cum Cr.	28		10	12	6+6	8+4+2	8+2+2	88	
Exit option; Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credits core NSQF course/ Internship 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]

Sem. - IV

Vertical – 1
Major

Title of Paper :Core Java

Sr.No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to:**	Core Java course focuses on teaching students how to design, develop, and maintain software applications using the Java programming language. The course covers fundamental to advanced concepts of Java, enabling students to understand object-oriented programming (OOP) principles, data structures, algorithms, and real-world application development.
2	**Vertical :**	Major
3	**Type :**	Theory
4	**Credits :**	2 credits (1 credit = 15 Hours for Theory in a semester, Total 30 hours)
5	**Hours Allotted :**	30 Hr
6	**Marks Allotted:**	50
7	**Course Objectives(CO):** **CO 1:** Understand and Apply Object-Oriented Programming (OOP) Concepts. **CO 2:** Identify the key components of a class and object in Java, including attributes (fields), methods, and constructors. **CO 3:** Apply sound software engineering principles in Java by organizing code into classes and methods with proper access control identifiers **CO 4:** Use tools and techniques like unit testing, as well as IDE debugging tools to find and fix issues within Java programs. **CO 5.** Effectively use Java's collection framework (e.g., Lists, Sets, Maps) to manage and process groups of related objects. **CO 6.** Use OOP concepts in designing and building solutions to real-world problems, ensuring the application is modular, maintainable, and reusable.	
8	**Course Outcomes (OC):** OC1. Understand the basics of Java and its runtime environment. OC2. Be proficient in using Java's data types, control flow statements, and OOP principles such as classes, inheritance, and exception handling. OC3. Creating own classes and objects OC4. Develop mini projects using Class, Interface and exception handling	
9	**Modules:-** **Module 1:**	
	Introduction to Java Programming-History of Java and its Evolution,Features of Java (Platform Independence, Object-Oriented),Data Types and Variables,Operators Constants and Literals,Type Casting **Decision Making and Loops** :If-else Statements,Switch Statement, Loops (For, While, Do-While),Break and Continue Statements **Classes and Objects** :Array,ArraysString class and String methods, StringBuffer and StringBuilder, Object-Oriented Programming Concepts, Defining Classes and Creating Objects, Instance Variables and Methods, Constructors, this Keyword, super keyword, Types of Classes, Scope Rules, Access Modifier, constants, static members of a class, garbage collection.	**15 Hrs**

	Inheritance: Its types, Superclass and Subclass, Final classes and methods **Polymorphism**: Compile-time and Runtime Polymorphism	
	Module 2:	
	Interfaces: Defining and Implementing Interfaces,Abstract Classes and Methods,Multiple Interface Implementation **Packages**: Introduction to predefined packages, User Defined Packages, Access specifier, Java Built-in packages **Exception handling**- Try, Catch, and Finally Blocks, Throw and Throws Keywords **Introduction to Threads**: Creating and Running Threads,Thread Lifecycle	**15 Hrs**
10	**Books and References:** 1. Java: The Complete Reference Herbert Schildt MC-Graw HILL 12th EDITION 2022 2. Core Java, Volume I: Fundamentals Hortsman Pearson 9th 2013 3. Core Java, Volume II: Advanced FeaturesGary Cornell and Hortsman Pearson 8th 2008	
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) Or Q1: Attempt any three (out of five) from Module 1 (15 marks) Q2: Attempt any three (out of five) from Module 2 (15 marks)	

Title of Paper: Software Engineering

Sr.No	Heading	Particulars
1	**Description the course:** **Including but Not limited to:**	This course provides an in-depth understanding of Scrum, an Agile framework for developing, delivering, and sustaining complex products. Students will learn the principles and practices of Scrum, including roles (Scrum Master, Product Owner, Development Team), events (Sprint, Scrum Meetings), and artifacts (Product Backlog, Sprint Backlog, Increment). The course emphasizes hands-on exercises, real-world scenarios, and collaborative activities to master iterative development and enhance team productivity. By the end, learners will be equipped to implement Scrum in software engineering projects effectively and drive organizational agility.
2	**Vertical :**	Major
3	**Type :**	Theory
4	**Credits :**	2 credits (1 credit = 15 Hours for Theory in a semester, Total 30 hours)
5	**Hours Allotted :**	30
6	**Marks Allotted:**	50
7	**Course Objectives (CO):** **CO1:** Understand the core principles of Agile and the Scrum framework. **CO2:** Explore the high-level Scrum process and its key components. **CO3:** Develop skills in managing the Product Backlog effectively. **CO4:** Learn techniques for Sprint planning, execution, and tracking. **CO5:** Gain insights into Scrum-based project, quality, and risk management. **CO6:** Master the art of writing clear and actionable user stories.	
8	**Course Outcomes (OC):** **OC1:** Demonstrate a comprehensive understanding of Agile concepts and Scrum practices. **OC2:** Apply Scrum processes to effectively manage software development life cycles. **OC3:** Create and prioritize user stories for efficient Product Backlog management. **OC4:** Utilize metrics to evaluate and enhance Sprint performance and team productivity. **OC5:** Implement strategies for cost, customer, and risk management in Scrum projects. **OC6:** Formulate effective Sprint retrospectives to drive continuous improvement.	
9	**Module 1:**	
	Software and Software Engineering, Process Models, Introduction to Agile Concepts, All about Scrum, Scrum Process: High-Level View. Product Backlog Management, Sprint Planning, Writing Effective User Stories, Sprint Execution and Tracking, Sprint Review, Sprint Retrospectives	15 Hrs
	Module 2:	
	Measurements and Metrics in Scrum, Software Development Life Cycle and Waterfall Model, Project Management in Scrum and Waterfall, Quality Management in Scrum, Customer Management in Scrum, Risk Management in Scrum, Cost Management in Scrum.	15 Hrs

<table>
<tr><td>10</td><td colspan="2">Books and References:
1. “Agile Scrum”, Rama Bedarkar, Wiley, 1st, 2020
2. "Mastering Professional Scrum: A Practitioner's Guide to Overcoming Challenges and Maximizing the Benefits of Agility" by Stephanie Ockerman and Simon Reindl, Addison-Wesley Professional, 1st edition (2019).
3. "Scrum: A Pocket Guide" by Gunther Verheyen, Van Haren Publishing, 2nd edition (2019).
4. "Software in 30 Days" by Ken Schwaber and Jeff Sutherland, Wiley, 1st edition (2012).
5. "Scrum Insights for Practitioners: The Scrum Guide Companion" by Hiren Doshi, PracticeAgile Solutions, 1st edition (2016).
6. "A Scrum Book: The Spirit of the Game" by Jeff Sutherland and James O. Coplien, Pragmatic Bookshelf, 1st edition (2019).
7. "The Scrum Fieldbook: A Master Class on Accelerating Performance, Getting Results, and Defining the Future" by J.J. Sutherland, Random House Business, 1st edition (2019).</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)
Or
Q1: Attempt any three (out of five) from Module 1 (15 marks)
Q2: Attempt any three (out of five) from Module 2 (15 marks)</td></tr>
</table>

Title of Paper: Computer Networks

Sr.No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to:**	A course on **Computer Networks** typically focuses on the fundamental principles, technologies, and protocols that enable communication and data exchange between devices in various network environments.
2	**Vertical :**	Major
3	**Type :**	Theory
4	**Credits :**	2 credits (1 credit = 15 Hours for Theory in a semester, Total 30 hours)
5	**Hours Allotted :**	30
6	**Marks Allotted:**	50
7	**Course Objectives(CO):** 1. To understand the basic concepts in OSI Model,distinguishing Factors in TCP/IP ,IP addressing Schemes 2. Understand How the communication happens across the network 3. Understanding of various Routing protocol and their implementation	
8	**Course Outcomes (OC):** CO 1.Understanding the Transport layer protocols and their utilities CO 2.Various application layer protocols and their implementation CO3:Mailing Services and web services implementation	
9	**Modules:-** **Module 1:**	
	1. Introduction: OSI Model, TCP/IP Protocol Suite, IPV 4 Addresses and Protocol and IPV6 Addresses and Protocol 2. Address Resolution Protocol (ARP), Internet Control 3. Message Protocol Version 4 (ICMPv4), Mobile IP, 4. Unicast Routing Protocols (RIP, OSPF and BGP)	**15 Hrs**
	Module 2:	
	8. User Datagram Protocol (UDP), Transmission Control Protocol (TCP) 9. Host Configuration: DHCP, Domain Name System (DNS) 10. Remote Login: TELNET and SSH, File Transfer: FTP and TFTP ; World Wide Web and HTTP, 11. Electronic Mail: SMTP, POP, IMAP and MIME	**15 Hrs**
10	**Books and References:** **TCP/IP Protocol Suite, Behrouz A. Forouzan, 4th Edition, Tata McGrawHill** (Chapter 2, 5, 7, 26, 27, Chapter 8, 9, 10, 11, Chapter 14,15, Chapter 16, 18, 19, Chapter 20, 21, 22, Chapter 23, 25)	
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) Or Q1: Attempt any three (out of five) from Module 1 (15 marks) Q2: Attempt any three (out of five) from Module 2 (15 marks)

Title of Paper: Major Practical 4

Sr.No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to:**	Computer Networking Practical course focuses on providing hands-on experience with various networking concepts and techniques. Students typically practice configuring, troubleshooting, and testing network protocols and hardware in real-world scenarios. The practical component of this course emphasizes network setup, monitoring, and management skillsWireless Networks and Mobile Communications A Java Programming Practical course typically provides hands-on experience in writing, debugging, and executing Java programs. The goal is to help students become proficient in Java programming and apply theoretical concepts to solve real-world problems. The practical sessions in this course usually focus on programming skills and the application of Java principles in various scenario
2	**Vertical :**	Major
3	**Type :**	Practical
4	**Credits :**	2 credits (30 Hours of Practical work in a semester)
5	**Hours Allotted :**	30
6	**Marks Allotted:**	50 Marks
7	**Course Objectives(CO):** 1. Understand core Java programming concepts, including data types, control structures, and object-oriented programming principles. 2. Develop the ability to implement inheritance, polymorphism, interfaces, and abstract classes effectively. 3. Gain hands-on experience with exception handling, multithreading, and dynamic initialization. 4. Learn to apply Java programming to solve real-world problems, such as matrix operations and finding areas/volumes. 5. Enhance debugging and problem-solving skills using Java's rich standard libraries and features. 6. Basic foundation of LAN 7. various command line utilities to be tested 8. Practical implementation of IP Subnetting 9. Testing of various Routing Protocols	
8	**Course Outcomes (OC):** CO 1. Write efficient Java programs to perform arithmetic operations, manage control flow, and manipulate strings. CO 2. Demonstrate knowledge of object-oriented concepts by implementing inheritance, polymorphism, and interfaces. CO 3. Apply exception handling mechanisms to create robust Java applications. CO 4.1Implement multithreading and explore dynamic initialization for advanced Java programming.	

	CO 5. Solve computational problems, such as matrix operations and factorial calculation, using packages and Java constructs. CO 6. Implementation of utility protocols CO 7 Understanding Basic Security features CO 8 Network Traffic and Packet Analysis CO 9 Basic Understanding of Wireless Network	
9	**Module 1** 1. Write a program a. in Java to demonstrate Boolean value. b. Print a string 10 times using a for loop. c. Write a program in Java to evaluate a+b*c%d. 2. Write a program a. in Java to find the biggest element among three numbers using if else. b. Write a program in Java to find the biggest element among three numbers using the ternary operator. c. Write a program in Java to check the grade of marks using a switch case. 3. Write a program a. in Java to demonstrate dynamic initialization. b. Write a program in Java to create a class and access all data members and methods using the object and compute the area and perimeter of a circle. c. Write a program in Java to access member variables using the constructor. 4. Write a program a. in Java to multiply two matrices. b. Write a program in Java to calculate the area of a rectangle using single inheritance. c. Write a program in Java to demonstrate multilevel inheritance. 5. Write a program a. in Java to demonstrate hierarchical inheritance. b. Write a program in Java to find the area and perimeter of a circle using an abstract class. c. Write a program in Java to show that a private member of a class cannot be inherited. 6.Write a program a. in Java to find the volume of a box using this keyword. b. Write a program in Java to find the average of three numbers using the method overloading c. Write a program in Java to find average of three numbers using method overriding. d. Create a class figure. Create two subclasses rectangle and triangle. Find the area of a rectangle and half the area of the rectangle using the reference of the figure. 7.Write a program a. Create an interface area. Find the area of a circle. b. Write a program in Java to find the sum and average of three numbers using the super keyword. 12. Write a program	**30 Hrs**

	a. in Java to find the volume of a box using constructor overloading. b. Write a program in Java to demonstrate exception handling in case of variable/constant divided by zero. 13. Write a program in Java a. to implement multiple inheritance using the interface. b. Write a program in Java to check if a given string is palindrome or not. 14. Write a program in Java a. for sorting a given list of strings in ascending order. b. Write a program in Java to find the factorial of a number using the package. 15. Write a program in a. Java to import the package. b. Write a program in Java to implement thread. c. Write program to implement Flow, Grid and Border Layout using swing. d. Write program to demonstrate following events Action Mouse Key	
	Module 2	**30 Hrs**
	1. Configuring LAN setup a. Planning and Setting IP networks b. Configuring subnet c. Using, linux-terminal or Windows-cmd, execute following networking commands and note the output: ping, traceroute, netstat, arp, ipconfig, Getmac, hostname, NSLookUp, pathping, SystemInfo 2. IPv4 Addressing and Subnetting a. Given an IP address and network mask, determine other information about the IP address such as: a. Network address • Network broadcast address • Total b. number of host bits • Number of hosts b. Given an IP address and network mask, determine other information about the IP address such as: c. The subnet address of this subnet • d. The broadcast address of this subnet • e. The range of host addresses for this subnet • f. The maximum number of subnets for this subnet mask • g. The number of hosts for each subnet • h. The number of subnet bits •The number of this subnet 3. Configure Static IP routing using . 4. Configure IP routing using RIP. 5. Configuring Simple and multi-area OSPF 6. Configuring BGP protocol (Multi-Autonomous) 7. Configuring server and client. a. Configure DHCP b. Configure DNS c. Configure HTTP d. Configure Telnet e. Configure FTP 8.Configure basic security features for networks 9.Using Wireshark, network analyzer, set the filter for ICMP, TCP, HTTP, UDP, FTP and perform respective protocol transactions to show/prove that the	

	network analyzer is working 10.create a wireless network of multiple PCs using appropriate access point. 11.IPV6 Addressing Basics	
10 & 11	**Text Books& References Books :**	
	1. Java: The Complete Reference Herbert Schildt MC-Graw HILL 12th EDITION 2022 2. Core Java, Volume I: Fundamentals Hortsman Pearson 9th 2013 3. Core Java, Volume II: Advanced FeaturesGary Cornell and Hortsman Pearson 8th 2008 4. Cisco CCNA 200-301 Official Cert Guide	
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 totaling 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	

Vertical - 4

VSC

AC – 28/03/2025
Item No. – 6.3 (N) (5ab) Sem. III & IV

As Per NEP 2020

University of Mumbai

Syllabus for Minor Vertical 2 (Scheme-III)		
Faculty of Science.		
Board of Studies in Statistics.		
B.A. Second Year Programme Minor - Statistics		
Semester	**III & IV**	
Title of Paper	**Sem.**	**Total Credits 4**
I) Statistical Methods-I	**III**	**2**
II) Practical based on statistical Methods-I		**2**
Title of Paper		**Credits**
I) Statistical Methods-II	**IV**	**2**
II) Practical based on Statistical Methods-II		**2**
From the Academic Year		**2025-26**

Semester-IV
Minor
Statistical Method-II

Sr. No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to :**	**Introduction:** Statistical Methods-II paper covers basic concept of probability and probability distribution which is useful to gain in-depth knowledge of probability and standard discrete distributions of other than statistics students of same faculty.
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

Credit:2	**MINOR SUBJECT** **STATISTICAL METHODS-II**	No. of Hours:30
	CO2: 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. **OC2: 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.	
Unit	**Continuous Probability Distributions**	**Lectures**

I	• 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. • Normal distribution. Properties of Normal distribution (without proof). Normal approximation to Binomial and Poisson distribution (statement only). Properties of Normal curve. Use of normal tables.	**10**
Unit	**Estimation**	**Lectures**
II	• 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).	10
	• 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.	
Unit	**Testing of Hypothesis and Large Sample Test**	**Lectures**
III	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)	10

Reference Books

1. Agarwal B. L, Basic Statistics, New Age International P Ltd. Delhi, 2015
2. Saxena S., Kapoor J. N., Mathematical Statistics, Sultan Chand & Sons, Delhi, 2010
3. Gupta S. P, Statistical Methods, Sultan Chand and Sons, New Delhi, 2002
4. Kapoor V. K, Gupta S. C, Fundamental of Mathematical Statistics, S Chand & Sons, Delhi, 2008
5. Grewal P. S. Methods of Statistical Analysis, Sterling Publishers, 1990
6. Mukhopadyay P., An Introduction to the theory of Probability, World Scientific Publishing Company,2011

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

Semester-IV

Minor-II

Name of the course: Practical based on Statistical Methods -II

Sr. No.	Heading	Particulars
1	**Description the course :** **Including but Not limited to :**	**Introduction:** Statistical Methods-II paper covers basic concept of continuous probability distribution, estimation theory and hypothesis testing methods which is useful to gain in-depth knowledge of given concept for other than statistics students of same faculty.
2	**Vertical :**	Minor
3	**Type :**	Practical
4	**Credit**:	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	**Hours Allotted :**	60 Hours
6	**Marks Allotted**:	50 Marks

Credit: 2	**Minor Subject** **Practical on Statistical Methods-II**	No. of Hours: 60
	CO2: 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. **OC2: 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 andstandard deviations for continuous probability distributions. 3. Apply testing of hypothesis technique to solve statistical problems.	

	List of Practicals on Statistical Methods -II	
	1. Continuous Random Variable 2. Uniform and Exponential Distribution 3. Normal Distribution and application of central limit theorem 4. Point and Interval Estimation. 5. Testing of Hypothesis 6. Large Sample Test Practical's using EXCEL	**60**

Reference Books

1 Medhi J.: Statistical Methods, An Introductory Text, Second Edition, New Age International Ltd.

2 Agarwal B. L.: Basic Statistics, New Age International Ltd.

3 Spiegel M. R.: Theory and Problems of Statistics, Schaum'sPublications series. Tata McGraw-Hill.

4 Kothari C. R.: Research Methodology, Wiley Eastern Limited.

5 David S.: Elementary Probability, Cambridge University Press.

6 Hogg R. V. and Tannis E.P.: Probability and Statistical InferenceMcMillan Publishing Co. Inc.

7 Goon A. M., Gupta M. K., Dasgupta B.: Fundamentals of Statistics,Volume II : The World PressPrivate Limited, Calcutta.

8 Miller I. & Miller M (2006), John E. Freund's Mathematical Statistics with applications, 7th edition, Pearson Education Asia

9 Gupta, S. C. and Kapoor, V. K. (2002), Fundamentals of Mathematical Statistics, eighth Edition,Sultan Chand and Sons Publishers, New Delhi.

10 Gupta, S. C. and Kapoor, V. K. (2004), Fundamentals of Applied Statistics, Third Edition, SultanChand and Sons Publishers, New Delhi.

11 Sarma, K. V. S. (2001). Statistics Made it Simple: Do it yourself on PC.Prentce Hall of India,New D

Format of Practical Question Paper:
Internal Practical Continuous Assessment: (20 marks)

Journal	Assignment/Viva	Total
05	15	20

Semester End Practical Examination: (30 marks)

Semester End practical Examination will be of 30 marks of 01 hour duration covering all practical listed above of the semester. Examiners should frame questions for Q.1, Q.2 and Q.3. Each question carrying 10 marks. All questions are compulsory to solve.

Practical Question Paper Pattern:

Q 1	Max. marks: 10	All questions are compulsory.
Q 2	Max. marks: 10	
Q 3	Max. marks: 10	

A student must have a certified journal before appearing for the practical examination.

In case a student does not possess a certified journal, he/she is not qualified for journal 5 marks
For each paper minimum 75% of the practical must be completed to the journal certified.

Sd/-	**Sd/-**	**Sd/-**
Sign of the BOS Chairman	**Sign of the Offg. Associate Dean**	**Sign of the Offg. Dean**
Dr. Santosh Gite	**Dr. Madhav R. Rajwade**	**Prof. Shivram S. Garje**
Board of Studies in Statistics	**Faculty of Science & Technology**	**Faculty of Science & Technology**

SEC

Syllabus
B. Sc. (Information Technology)
(Sem.- IV)

Title of Paper: Computer Graphics

Sr.No	Heading	Particulars
1	**Description the course : Including but Not limited to:**	**Computer Graphics Practical** is a hands-on course designed to introduce students to the foundational principles of computer graphics, including 2D transformations, graphical modelling, and basic animations. The course focuses on applying mathematical concepts like translation, rotation, scaling, and shearing to create and manipulate graphical objects. Students will learn to use programming tools such as Python (Matplotlib, Pygame, OpenCV) or C/C++ libraries to implement these concepts. Through practical assignments, they will develop the skills to create simple 2D animations, simulate real-world objects, and design graphical scenes. The course bridges the gap between theoretical concepts and real-world applications, fostering creativity and problem-solving in visual computing.
2	**Vertical :**	Skill Enhancement Course
3	**Type :**	Practical
4	**Credits :**	2 credits (30 Hours of Practical work in a semester)
5	**Hours Allotted :**	30
6	**Marks Allotted:**	50 Marks
7	**Course Objectives(CO):** **CO1:** Introduce foundational concepts of 2D transformations, geometric modelling, and rendering techniques in computer graphics**.** **CO2:** Develop skills to apply 2D transformations (translation, rotation, scaling, shearing, reflection) and basic animations**.** **CO3:** Enable students to simulate real-world objects and create simple animations**.** **CO4:** Equip students to understand graphics pipelines, coordinate systems, and basic rendering principles**.** **CO5:** Foster creativity and logical thinking by implementing graphical scenes and animations.	
8	Course Outcomes (OC): OC1: Understand and apply 2D transformation matrices to graphical objects. OC2: Implement simple graphics primitives and manipulate them using transformations. OC3: Create basic 2D animations (e.g., bouncing ball, rotating shapes). OC4: Understand and utilize color models, coordinate systems, and graphical libraries. OC5: Develop basic graphical applications using lightweight tools and programming languages.	

9	**Module 1**	**30 Hrs**
	Module 1: Basic Setup and 2D Graphics Fundamentals 1. Installing Required Software • Objective: Install and configure Python, Matplotlib, OpenCV, or Pygame for computer graphics. • Task: Verify the installation and create a "Hello, Graphics!" window. 2. Drawing Basic Shapes • Objective: Draw lines, circles, rectangles, and polygons using graphical primitives. • Tool: Python with Matplotlib or OpenCV. 3. Line Drawing Algorithms • Objective: Implement the DDA (Digital Differential Analyzer) algorithm. • Tool: Python or C++. 4. Bresenham's Line Drawing Algorithm • Objective: Implement Bresenham's line drawing algorithm. • Tool: Python or C++. 5. Circle Drawing Algorithms • Objective: Implement the Midpoint Circle algorithm. • Tool: Python or C++. 6. Polygon Filling • Objective: Implement the boundary-fill and flood-fill algorithms. • Tool: Python or C++. 7. Translation Transformation • Objective: Shift a 2D object using translation matrices. • Tool: Python with Matplotlib. 8. Rotation Transformation • Objective: Rotate a 2D object about a fixed point or origin. • Tool: Python with Matplotlib. 9. Scaling Transformation • Objective: Scale a 2D object up or down using scaling matrices. • Tool: Python with Matplotlib. 10. Reflection Transformation • Objective: Reflect a 2D object across x-axis, y-axis, and diagonal. • Tool: Python with Matplotlib. 11. Shearing Transformation • Objective: Apply x-axis and y-axis shearing to a 2D object. • Tool: Python with Matplotlib. 12. Composite Transformations • Objective: Combine translation, rotation, and scaling on a 2D object. • Tool: Python with Matplotlib. 13. Clipping Algorithms • Objective: Implement the Cohen-Sutherland line clipping algorithm.	

	• Tool: Python or C++. 14. Window-to-Viewport Transformation • Objective: Map a 2D object from a window to a viewport. • Tool: Python or C++. 15. Basic Interactive Graphics • Objective: Create a simple interactive graphics program (e.g., moving a rectangle with arrow keys). • Tool: Python with Pygame.	
	Module 2	**30 Hrs**
	1. Simple Animation • Objective: Animate a moving ball across the screen. • Tool: Python with Pygame. 2. Bouncing Ball Animation • Objective: Create a bouncing ball with collision detection. • Tool: Python with Pygame. 3. Rotating Object Animation • Objective: Animate a rotating triangle or square. • Tool: Python with Pygame or Matplotlib. 4. Scaling Animation • Objective: Create an animation showing pulsating objects (grow/shrink). • Tool: Python with Matplotlib. 5. Multiple Object Animation • Objective: Animate multiple objects moving independently. • Tool: Python with Pygame. 6. Color Models • Objective: Experiment with RGB and HSI color models. • Tool: Python with OpenCV. 7. Bezier Curves • Objective: Draw and animate a Bezier curve. • Tool: Python with Matplotlib. 8. 2D Game Development Basics • Objective: Create a simple 2D game (e.g., a ball avoiding obstacles). • Tool: Python with Pygame. 9. Scene Creation • Objective: Design a basic 2D scene (e.g., a house, tree, and sun). • Tool: Python with Matplotlib. 10. Parallax Scrolling Animation • Objective: Implement parallax scrolling for a background in 2D graphics. • Tool: Python with Pygame. 11. Path Animation • Objective: Animate an object moving along a predefined path.	

	• Tool: Python with Matplotlib. 12. Collision Detection • Objective: Implement collision detection between 2D objects. • Tool: Python with Pygame. 13. Interactive Graphics with Mouse Input • Objective: Create an interactive program where shapes follow mouse clicks. • Tool: Python with Pygame. 14. Text Rendering • Objective: Render and animate text in a 2D graphical environment. • Tool: Python with Pygame. 15. Final Project • Objective: Combine multiple concepts to create a complete animated 2D scene. • Example: A car moving on a road with a rising sun and trees. Tool: Python with Matplotlib or Pygame	
10 & 11	**Reference and Text Books:** 1. Python Graphics: A Reference for Creating 2D and 3D Images, Bernard Korites, Apress, 2nd Edition 2023. 2. Computer Graphics from Scratch: A programmer's Introduction to 3D Rendering, Gabriel Gambetta, no starch press, 2021 3. 2D Computer Graphics: Modern C++ and Standard Library, Hakan Blomqvist, 2023	
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 totaling 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	

Syllabus
B. Sc. (Information Technology)
(Sem.- IV)

Title of Paper Mobile Programming

Sr.No	Heading	Particulars
1	**Description the course :** **Including but Not limited to:**	This course introduces the fundamentals of Flutter and Dart for building cross-platform mobile applications. Students will learn to create responsive user interfaces, manage app state, handle user inputs, and implement navigation and animations. The course also covers integrating APIs, working with databases, and deploying functional mobile apps for Android and iOS.
2	**Vertical :**	Skill Enhancement Course
3	**Type :**	Practical
4	**Credits :**	2 credits (30 Hours of Practical work in a semester)
5	**Hours Allotted :**	30
6	**Marks Allotted:**	50 Marks
7	**Course Objectives(CO):** **CO1:** Understand the fundamentals of Flutter and Dart programming for mobile app development. **CO2:** Learn how to set up the Flutter SDK and development environment. **CO3:** Develop skills to create basic Flutter applications using widgets like Text, Row, and Column. **CO4:** Explore the use of StatelessWidget and StatefulWidget for managing app states. **CO5:** Master the implementation of responsive UIs using MediaQuery and layouts. **CO6:** Gain knowledge of form creation, input handling, and validation in Flutter apps. **CO7:** Learn to navigate between screens and implement app navigation features like drawers. **CO8:** Understand how to use Flutter animations, including AnimatedContainer and FadeTransition. **CO9:** Explore database integration with APIs using packages like http and FutureBuilder. **CO10:** Build apps with themes, user interactions (e.g., taps and long presses), and custom styling.	

8	**Course Outcomes (OC):** **OC1:** Demonstrate the ability to configure Flutter and build a functional development environment. **OC2:** Create and run basic Flutter apps with appropriate UI components. **OC3:** Develop responsive and adaptive UIs for multiple screen sizes. **OC4:** Implement interactive features like counters, sliders, and switches in Flutter apps. **OC5:** Design and validate user input forms using TextFormField. **OC6:** Develop navigation flows between screens and integrate drawers for better usability. **OC7:** Create animations for smooth transitions and enhanced user experiences. **OC8:** Build applications that fetch and display data from public APIs asynchronously. **OC9:** Apply effective state management strategies to handle app states efficiently. **OC10:** Demonstrate the ability to debug, test, and optimize Flutter apps for deployment.	
9	**Module 1**	**30 Hrs**
	1. Install Flutter SDK on your computer and run the flutter doctor command to check your setup. 2. Create a "Hello, World!" Flutter application and run it on an emulator. 3. Modify the app's title and primary color in the MaterialApp widget. 4. Create a StatelessWidget that displays a greeting message. 5. Write a Dart program to calculate the sum of two numbers entered by the user. 6. Implement a Dart program that uses if-else statements to determine if a number is odd or even. 7. Demonstrate the use of a switch-case statement in Dart. 8. Write a program to print a multiplication table using a for loop. 9. Create a Flutter app with a Text widget that displays your name. 10. Build an app with a Column widget to arrange multiple Text widgets vertically. 11. Use a Row widget to arrange three buttons horizontally. 12. Create a Flutter app using Scaffold with an AppBar, Body, and a FloatingActionButton. 13. Create a simple counter app using StatefulWidget to increment and display a number. 14. Implement a TextField widget to accept user input and display it using a Text widget. 15. Design a Flutter app with a Container widget and customize its padding, margin, and color. Use the Stack widget to overlay a Text widget on an Image.	
	Module 2	**30 Hrs**
	1. Build a responsive UI using MediaQuery to adapt to different screen sizes. 2. Create a Flutter form with TextFormField widgets to accept a username and password. 3. Implement form validation to ensure the fields are not empty. 4. Add navigation between two screens in Flutter using the Navigator class.	

	5. Create a Drawer widget for app navigation with three menu options. 6. Display a list of items in a ListView widget. 7. Use the GridView widget to display a grid of images. 8. Add a GestureDetector to detect taps and display a message in the console. 9. Implement a LongPress event to change the color of a container. 10. Create a basic animation using the AnimatedContainer widget. 11. Implement a FadeTransition to animate the opacity of a widget. 12. Use a Slider widget to select a value between 0 and 100 and display the value. 13. Create a Switch widget to toggle between two themes (light and dark). 14. Use the http package to fetch and display data from a public API. Create a FutureBuilder widget to display data asynchronously.	
10 & 11	**Reference and Text Books:** 1. Mastering Flutter: A Beginner's Guide, by Sufyan bin Uzayr, CRC Press, 1st , 2023 2. Flutter for Beginners, by Alessandro Biessek, Packt Publishing, 1st edition (2019). 3. Flutter Cookbook, by Simone Alessandria, Packt Publishing, 2nd Edition, 2023 4. Beginning App Development with Flutter, by Rap Payne, Apress, 1st edition (2019). 5. Flutter Apprentice, by Michael Katz, Kevin David Moore, and Vincent Ngo, Kodeco, 1st edition (2021). 6. Flutter Complete Reference 2.0, by Alberto Miola, Independently published, 2nd edition (2023). 7. Flutter in Action, by Eric Windmill, Manning Publications, 1st edition (2020). 8. Programming Flutter, by Carmine Zaccagnino, O'Reilly Media, 1st edition (2020).	
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 totaling 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

QUESTION PAPER PATTERN
(External and Internal)

Internal Continuous Assessment: 40%	**Semester End Examination: 60%**
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
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) Or Q1: Attempt any three (out of five) from Module 1 (15 marks) Q2: Attempt any three (out of five) from Module 2 (15 marks)	

Practical Examination

Internal Continuous Assessment: 40%	**Semester End Examination: 60%**
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 totaling to 50 marks and can be converted to 20 marks.	30 marks practical exam of 2 hours duration
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	

Letter Grades and Grade Points:

Semester GPA/ Programme CGPA Semester/ Programme	% of Marks	Alpha-Sign/ Letter Grade Result	Grading Point
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 40.0	F (Fail)	0
Ab (Absent)	-	Ab (Absent)	0

Sd/-
Sign of the BOS Chairman
Dr. Srivaramangai R
BOS in Information Technology

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

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

AC – 20/05/2025

Item No. – 8.47 (N) Sem III& IV 1(b)

As Per NEP 2020

University of Mumbai

Syllabus for CC		
Ad- hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular		
UG First Year Programme – CC- Sports		
Semester	**III & IV**	
Title of Paper	**Sem**	**Credits**
Introduction to Sports Training & Tests and Measurement	**III**	**2**
Advanced Sports Training and Performance Evaluation	**IV**	**2**
From the Academic Year		**2025-26**

UNIVERSITY OF MUMBAI
SYLABUS FOR (NEP-2020)

CO-CURRICULAR COURSE IN SPORTS

Introduction to Sports, Physical Literacy, Health and Fitness and Yog

SEMESTER IV

(Syllabus to be implemented from, June 2025 onwards)

Course (Optional): Introduction to Sports, Physical Literacy, Health & Fitness and Yog

CBCS (Choice Based Credit System)
Second Year- Semester IV
Course Structure

Semester	Paper	Title of Paper	No of lecture (Theory)	Internal Evaluation (IE)	End Semester Evaluation	Total Marks	Credits
Fourth	CC	Advanced Sports Training and Performance Evaluation	30	20	30	50	02
Total	-	-	**30**	**20**	**30**	**50**	**02**

University of Mumbai
Semester IV
(w.e.f. June, 2025)

Sub:- Advanced Sports Training and Performance Evaluation

Preamble:

In an era where fitness and sports are pivotal to the holistic development of individuals, an understanding of sports training and performance evaluation is essential. This course bridges the gap between theoretical knowledge and its practical application in sports and fitness domains. Students will gain hands-on experience in training methodologies, measurement techniques, and assessment strategies to excel in their chosen field of sports and fitness.

Objectives of the Course:

- To impart practical skills in sports training and evaluation techniques.
- To encourage participation in various sports and fitness activities.
- To develop a scientific approach to training and performance assessment.
- To enhance organizational and leadership skills through event planning and volunteering.
- To foster a deeper understanding of training intensity, recovery, and testing protocols.

Program Outcomes:

By the end of the program, students will:

- Gain practical knowledge of sports training principles and methods.
- Develop the ability to conduct, evaluate, and interpret various fitness and skill-based tests.
- Learn to design and implement personalized and professional training programs.
- Acquire experience in organizing and volunteering in sports and fitness events.
- Understand the role of psychological, fitness, and skill tests in enhancing performance.

UNIVERSITY OF MUMBAI
Semester – IV
(w.e.f. June, 2025)
Sub:- Advanced Sports Training and Performance Evaluation
Credits: 02 Practical Lectures: 60 Marks:50

Module No.	Unit No	Title of the Unit	No. of Practical hours	No. of Credits
1	I II III	**Advanced Sports Training** **Fundamentals of Sports Training** • Warm-ups and cool-downs • Fitness training (strength, endurance, flexibility) • Group activities and game practice Training Methods Practical Sessions • Interval and circuit training sessions Time, Type) • Plyometric and weight training demonstrations • Fartlek & Continuous training sessions • Flexibility training session Basic Guidelines for Designing Exercise Plans and Training Schedules (Practically to be done by the students on peer groups formed by the Sports Incharge) • Current Health Status • Medical History • Level of Fitness • Training Load • Periodisation • Holistic/Integrated Approach • Person-Centred Approach • Training Intensity	10 15 5	1
		Total	**30**	**1**

UNIVERSITY OF MUMBAI
Semester – IV
(w.e.f. June, 2025)
Sub:- Advanced Sports Training and Performance Evaluation
Credits: 02 Practical Lectures: 60 Marks:50

Module No.	Unit No	Title of the Unit	No. of Practical hours	No. of Credits
1	I	**Performance Evaluation in Sports** **Practical sessions of Fitness & Skill testing (To be conducted by Coach/Fitness Instructor/Sports In charge/Any other P.E. Expert appointed by the College)**	10	
	II	• Practical demonstrations of fitness tests (e.g., Cooper's test, 12-minute run, flexibility tests) • Basic skill tests/modified skills tests for popular sports in the college campus.	15	
	III	**Practical sessions of Fitness & Skill testing** • Practical Testing Sessions • Skill-based tests: Dribbling, agility, passing (e.g., basketball, football) • Fitness tests: Speed, strength, and endurance measurements • Psychological Tests - Conducting motivation and stress assessments • Conduct of the above mentioned tests by students on the peer groups formed by Sports Incharge/ Sports Director of the college / Students Sport coordinator • Testing of the students must be held under the observation of Coach/ Fitness Instructor/ Sports In charge/Any other P.E. Expert appointed by the College Evaluation of the tests • Date analysis and reporting • Interpretation of test results • Writing of practical reports • Conclusion and recommendation	5	1
		Total	**30**	**1**

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 IV (50 Marks - 2 Credits) Internal Evaluation (20 Marks)

Sr. No.	Particulars	Marks
1	Conduct of the practical test and demonstration	15
2	Attendance of all practical sessions conducted for Sports Training and performance evaluation/ Sports practice training session conducted by the college	5

Semester End Examination (30 Marks)

Evaluation type	Particulars	Marks
VIVA	Viva on Advanced Sports training & testing methods and evaluation protocols	20
Submission of report	Submission of psychological or fitness testing reports	10
Total		30*

*Note - **OR**

- Participation in Sports Competitions Conducted by University of Mumbai Sports Department
  (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 & submission of report and should be evaluated on the basis of his/ her performance in the above mentioned competitions.

References -

1. Singh, Hardayal. *Science of Sports Training*. DVS Publication.
2. Bompa, Tudor. *Periodization: Theory and Methodology of Training*. Human Kinetics.
3. Sharma, J. P. *Principles of Sports Training*. Friends Publications.
4. Matveyev, L. P. *Fundamentals of Sports Training*. Progress Publishers.
5. Cooper, Kenneth H. *The Aerobics Program for Total Well-Being*. Bantam Books.
6. Clarke, Harrison. *Application of Measurement to Health and Physical Education*. Prentice Hall.
7. Fox, Edward L., and Donald K. Mathews. *The Physiological Basis of Physical Education and Athletics*. Saunders College Publishing.
8. Barrow, Harold M., and McGee, Rosemary. *A Practical Approach to Measurement in Physical Education*. Lea & Febiger.
9. Shephard, Roy J. *Fitness and Health*. Human Kinetics.
10. Verma, J. P. *A Textbook on Sports Statistics and Measurement*. Sports Publications.

Sd/-	**Sd/-**	**Sd/-**	**Sd/-**
Sign of the BOS Chairman Dr. Sunil Patil Ad-hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular	**Sign of the Offg. Associate Dean Dr. C.A.Chakradeo Faculty of Interdisciplinary Studies**	**Sign of the Offg. Associate Dean Dr. Kunal Ingle Faculty of Interdisciplinary Studies**	**Sign of the Offg. Dean Prof. A. K. Singh Faculty of Interdisciplinary Studies**

AC – 20/05/2025
Item No. – 8.47 (N) Sem III/IV 1(a)

As Per NEP 2020

University of Mumbai

Syllabus for CC		
Ad- hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular		
UG First Year Programme – National Service Course		
Semester	III & IV	
Title of Paper	Sem	Credits
Study of Indian Social Reformers	III	2
Youth and Disaster Management	IV	2
From the Academic Year		2025-26

UNIVERSITY OF MUMBAI

Semester IV

(w.e.f. June, 2025)

Sub: - NSS- Youth and Disaster Management

Credits: 02 **Lectures: 30** **Marks:50**

Unit Number	SEMESTER 4 Title of the Unit	No. of Lecture	No. of Credits
1	**Youth and Disaster Management-** Meaning and Types of Disasters – Natural and Man-Made disasters, preparedness, Disaster Risk reduction: Preparedness, Mitigation, Response, Relief, Rehabilitation, Reconstruction.	10	
2	**Project:**		
	• Project work is mandatory for all the students in IV semester.		
	• They can carry out project work under the supervision of the teacher in-charge of NSS and at the end of the semester a project report shall be presented and viva voce shall be conducted.		
	• The Project work can be carried out independently or in a group.		
	The project work shall be community based and selected preferably from the **adopted villages/ slums/ neighborhoods**.		
	Project Submission and Presentation VIVA-VOCE	20	

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.

NSS Project Report Format

(For Projects in Adopted Area / Village)

➢ Cover Page

- Name of the Institution
- Title of the Project (e.g., "Cleanliness Drive in XYZ Village")
- Name(s) of Student Volunteer(s)
- Name of Programme Officer
- Duration of the Project
- Date of Submission

➢ Certificate

- Issued by the Programme Officer/NSS Coordinator certifying the successful completion of the project.

➢ Acknowledgment

- Brief section to thank authorities, community members, NSS coordinators, peers, etc.

➢ Index

- A table listing all sections with corresponding page numbers.

1. Introduction
2. Profile of the Adopted Area / Village
3. Objectives of the Project
4. Planning and Preparation
5. Implementation of Activities
6. Outcomes and Impact
7. Challenges Faced
8. Feedback
9. Conclusion and Suggestions

➢ Annexures

- Photographs (with captions)
- Survey forms or questionnaires used
- Newspaper clippings (if any)
- Charts, posters, or flyers prepared

Sd/-	Sd/-	Sd/-	Sd/-
Sign of the BOS Chairman Dr. Sunil Patil Ad-hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular	**Sign of the Offg. Associate Dean Dr. C.A.Chakradeo Faculty of Interdisciplinary Studies**	**Sign of the Offg. Associate Dean Dr. Kunal Ingle Faculty of Interdisciplinary Studies**	**Sign of the Offg. Dean Prof. A. K. Singh Faculty of Interdisciplinary Studies**

AC – 20/05/2025

Item No. 8.47 (N) Sem III/IV 1(c)

As Per NEP 2020

University of Mumbai

Syllabus for CC		
Ad- hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular		
UG First Year Programme - Co-Curricular Course		
Semester	III & IV	
Title of Paper	Sem	Credits
Indian Theatre: Classical Roots and Contemporary Expressions	III	2
Integrated Theatre Production: Stage Craft, Costume, Music and Technology	IV	2
From the Academic Year		2025-26

Semester IV

As per NEP 2020

Integrated Theatre Production: Stage Craft, Costume, Music and Technology

Syllabus for Two Credits Programme

With effect from Academic Year 2025-2026

Aims and Objectives

- Theorize the semiotic and emotional functions of lighting and costume design within various theatrical traditions.
- Critically examine the historical evolution and theoretical paradigms of lighting and costume design in stagecraft.
- Explore the interplay between visual design elements and narrative dramaturgy in theatrical performance.
- Understand technical terminologies and design documentation processes from a theoretical perspective.
- Discuss the role of modern technologies (e.g., DMX, lighting consoles) and their theoretical implications on visual design aesthetics.
- Evaluate costume design strategies in relation to character psychology, period accuracy, and genre conventions.

Learning Outcomes

The course will enable the learner to

- **Define and describe** key theoretical concepts related to lighting and costume design in theatre.
- **Interpret** the narrative and symbolic meanings conveyed through visual design elements in performance.
- **Analyze** lighting and costume designs using appropriate theoretical and historical frameworks.
- **Discuss** the interrelationship between text, character, and design from a theoretical standpoint.
- **Compare and contrast** design practices across different theatrical genres and periods.
- **Evaluate** how technological advancements have influenced theoretical approaches to stage design.

Modules at Glance
Semester IV

Module No.	Unit	Content	No. of Hours
1	I	Stage Lighting Design and Documentation	07
	II	Principles and Practice of Costume Design	08
2	III	Background Music and Sound Design	07
	IV	Technological Tools in Theatre Production	08
Total No. of Hours			**30**

Module No.	Unit	Content

1	**I**	**Stage Lighting Design and Documentation**
		• Introduction to lighting as a narrative and emotional tool in theatre
		• Preparation and documentation:
		  o Lighting layout plan
		  o Ground plan
		  o Cue sheet making
		• Study of light placement, intensity, color, and timing
		• Introduction to modern lighting technology:
		  o Use of computerized and automated lighting systems (DMX, consoles, software)
		• Integration of lighting with sound and stage movement.

	II	**Principles and Practice of Costume Design** • Elements and principles of costume design: texture, silhouette, line, color, proportion • Costume construction techniques: fabric selection, stitching, pattern-making • Embellishment and ornamentation: embroidery, painting, appliqué • Costumes for theatrical styles: • Realistic/Representational theatre: historically and culturally accurate costume design • Stylized/Presentational theatre: symbolic, abstract, and thematic design approaches

2	**III**	**Background Music and Sound Design**
		• Objectives and importance of background music in theatre production.
		• Methods of using sound:
		  • Live performance effects vs. recorded effects
		  • Synchronizing sound with cues, lighting, and performance
		• Introduction to musical instruments used in theatre:

		• String instruments (e.g., sitar, violin) • Wind instruments (e.g., flute, shehnai) • Percussion instruments (e.g., tabla, drums) • Music cue sheets: structure, timing, and application in live performance.
	IV	**Technological Tools in Theatre Production** • Overview of sound equipment: microphones, mixers, speakers • Integration of computers and software in sound and music production • Use of digital platforms in cueing, editing, and managing technical aspects of performance • Case studies/examples from contemporary and traditional performances integrating modern technology.

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 IV (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

- Angeloglou, M. (1970). *A history of make-up*.
- Malvil, H. (n.d.). *Magic of makeup for stage*.
- Strenkovsky, S. (1937). *The art of make-up*. Frederick Muller.
- Pilbrow, R. (2008). *Stage lighting design: The art, the craft, the life*. Quite Specific Media Group.
- Dasgupta, G. N. (1986). *Guide to stage lighting*. Annapurna Dasgupta.
- Corry, P. (1958). *Lighting the stage*. Pitman.
- Welker, D. (1969). *Theatrical set design: The basic techniques*. Allyn and Bacon

Sd/-	**Sd/-**	**Sd/-**	**Sd/-**
Sign of the BOS Chairman Dr. Sunil Patil Ad-hoc Board of Studies in N.C.C./N.S.S./Sports Co-Curricular	**Sign of the Offg. Associate Dean Dr. C.A.Chakradeo Faculty of Interdisciplinary Studies**	**Sign of the Offg. Associate Dean Dr. Kunal Ingle Faculty of Interdisciplinary Studies**	**Sign of the Offg. Dean Prof. A. K. Singh Faculty of Interdisciplinary Studies**