SHIV NADAR
INSTITUTION OF EMINENCE DEEMED TO BE
— UNIVERSITY —
DELHI NCR

Section A:										
Course Code		MAT 185								
Course Title		Statistical Thinking And Probability								
Course Credits		4	**No. of Contact Hours/week**	**L:**	3	**T:**	1	**P:**	0	
School	Natural Sciences									
Offered By	Mathematics									
Method of Instruction:		In Person		**Offered in:**		Spring Semester		Full Semster		
Check each box, when applicable, if the course covers one or more of the below listed attributes										
☒	**REALS**		☐	**VELS**			☒	**DISE**		
Prerequisites	None									
List The Courses Which May Be Like This Course. So, If A Student Has Already Done A Course From This List, They Should NOT Register For This Course, I.E. It's A Negative List										
Fill this, if applicable: A Similar Course Was Offered With Code .... In Year										

NOTE:

Section B:This course is offered as (use checkbox) for which Programs				
☒	Major Core for:	B.Sc. Mathematics	Not required	
☐	Major Elective for:	Enter The Name Of the Program(S) For Which This Is a Major Elective	Instructor's Approval	
☒	UWE for:	All	Not required	
☐	Project /UG Thesis / Internship	Any Other Information	Instructor's Approval	
☐	CCC for:	Choose a Category	Instructor's Approval	
☐	Specialization (If applicable)	Mention The Specialization	Instructor's Approval	
☐	Minor (If applicable)	Mention The Minor(S)	Instructor's Approval	
Estimated No. of Seats:		100	Estimated Number of Sections	1

Section C: State the Program Learning Goals of the Major Degree Program mapped to the Core Course (Applicable to Major Core courses only)
PLG1
PLG2
PLG3,PLG4

Section D: State the Course Objectives / Aim (Specific details of what the course intends to achieve in terms of student knowledge and ability. Items should begin with phrases such as "To provide students with …", "To enable students to …", "To develop students' skills in …" and so on.)

• To provide students with an intuitive understanding of data, variation, and uncertainty.
• To enable students to classify types of data and apply appropriate summary techniques.
• To develop students' skills in organizing and visualizing data using tabular and graphical tools.
• To introduce the foundational principles of probability and equip students with basic probability rules and counting techniques.
• To encourage statistical reasoning and critical thinking using real-life datasets.

Section E: State the Learning Outcomes (A list of what students will know or be able to do as a result of successfully completing the course. Should be expressed as knowledge, skills, or attitudes.)

On successful completion of the course, students will be able to:

• Distinguish Between Qualitative And Quantitative Data, And Apply Appropriate Measures.
• Summarize Datasets Using Descriptive Measures Such As Mean, Median, Mode, And Standard Deviation.
• Visualize Data Using Histograms, Box Plots, And Ogives.
• Apply Principles Of Probability, Including Conditional Probability And Bayes' Theorem.
• Use Combinatorial Techniques To Solve Basic Probability Problems.

Section F: State if course contributes to any skill development

Elementary skills for data science

Section G: Module-wise Curriculum Content (Syllabus, Lab work, Project, Term paper, Group work, etc.)

Module 1: Data Types and Measurement Scales (8 hours)
•Types of data: quantitative vs qualitative, attributes
•Scales of measurement: nominal, ordinal, interval, ratio
•Tabular and graphical representation: frequency tables, bar graphs, pie charts, histograms, ogives, and box plots
Module 2: Descriptive Statistics (8 hours)
•Measures of central tendency: mean, median, mode
•Measures of dispersion: range, quartile deviation, mean deviation, standard deviation
•Coefficient of variation
•Measures of shape: skewness and kurtosis
Module 3: Exploring Relationships in Data (8 hours)
•Scatter plots
•Correlation: simple, partial (up to 3 variables), rank correlation
•Introduction to regression: least squares principle, simple linear regression
Module 4: Combinatorial Techniques (6 hours)
•Fundamental principle of counting
•Factorial notation and identities
•Permutations (with and without repetition), combinations
•Circular permutations
•Multinomial coefficients
Module 5: Introduction to Probability (9 hours)
•Random experiments, sample space, events
•Classical, empirical, and axiomatic definitions of probability
•Algebra of events: union, intersection, complements
•Conditional probability and independence
•Laws of addition and multiplication
•Theorem of total probability
•Bayes' theorem and applications
Experiments / Case Studies
•Data summarization and visualization using Microsoft Excel
•Hands-on tasks with real-world datasets (e.g., rainfall data, population data, student performance data)
•Exploratory analysis and correlation for economic/health indicators
•Basic probability modeling through card and dice experiments (virtual)

Add additional sheet(s), if required

Section H: Text Book(s), Reference book(s) and any other study material
1.Agresti, A., & Franklin, C. (2017). Statistics: The art and science of learning from data (4th ed.). Pearson. 2.Montgomery, D. C., & Runger, G. C. (2010). Applied statistics and probability for engineers. John wiley & sons. 3.Moore, D. S., McCabe, G. P., & Craig, B. A. (2009). Introduction to the Practice of Statistics Vol. 4. New York: WH Freeman.

Course Description Form
Monsoon 2025

Section I: Please fill in all the rows for the applicable rows. For evaluation component not included in the list, use the last two rows and mention the evaluation component in the corresponding last column. Please see the NOTE below this box for the prorate policy.

	Component	Weightage %	Missed Graded Component Policy	Use of Gen AI policy	Any Other Information
☒	Mid Sem Exam	25.00	Assign marks on a Prorated bas	Prohibited: No Gen AI allowed	prorating only with appropriate permission
☒	End Sem Exam	40.00	I grade awarded on approval fro	Prohibited: No Gen AI allowed	other info
☒	Quiz(s)	5.00	Choose the best n from m comp	Prohibited: No Gen AI allowed	other info
☒	Assignment(s)	10.00	Assign marks on a Prorated bas	Conditional: Access allowed on	other info
☒	Lab	10.00	Retake of Graded Component	Prohibited: No Gen AI allowed	other info
☐	Project	0.00	Please Select	Please Select	other info
☒	Case Studies	10.00	Assign marks on a Prorated bas	Permitted: access allowed for G	other info
☐	Group Discussion	0.00	Please Select	Please Select	other info
☐	Any Other Component	0.00	Please Select	Please Select	other info
☐	Any Other Component	0.00	Please Select	Please Select	other info
	Total **Weightage** (%)	100.00			

Note:
a) While you may mark multiple evaluation components for pro-rate. However, if a particular student misses multiple evaluations, *not more than 20% of the evaluation can be prorated for that student*.
b) *The best n out of m: Please make sure that n < m.*
c) *Award of 'I' grade is applicable only in the case of the End-term Exam. Additionally, end-term exams or final assessments cannot be prorated or waived*.
d) *Individual faculty can decide the prorate policy for each component.*
e) *'None' as an option can only be used in exceptional cases, for example lab evaluated by an external expert*

Section J: Grading Policy (*Tick the one You intend to follow*)			
☒ **Relative** Grading	Students Scoring Above 90 Will Be Awarded An 'A' Grade. For All Other Scores, Relative Grading Will Be Applied.		None
☐ Absolute Grading	**Grade**	**Range** (*replace M's appropriately*)	
	A	M1 <= marks <= M2	Please Mention The Rounding Off Policy And Any Other Information
	A⁻	M1 <= marks <= M2	
	B	M1 <= marks <= M2	
	B⁻	M1 <= marks <= M2	
	C	M1 <= marks <= M2	
	C⁻	M1 <= marks <= M2	
	D	M1 <= marks <= M2	
	E	M1 <= marks <= M2	
	F	M1 <= marks <= M2	

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Section K: Details about instructors teaching this course. For multiple instructors in a course, mention each name once after the other					
Name of the Instructor(s):	Prof XYZ Prof ABC			**Section(s)**	L1 L1, L2, L3
Office Location	K 120 L 325	**Tel. Extension***	458	**Email:**	qazi.jamal@snu.edu.in abc@snu.edu.in xyz@snu.edu.in
About the Instructor(s): Click Here To Enter About 250 Words about each instructor teaching the course`					

* - Optional

Section L: Office Hours
You may update this at the start of the semester.

Section M: Any other information
Microsoft Excel will be used throughout the course for data organization, visualization, and basic statistical analysis. Students will gain hands-on experience applying concepts to real-world datasets using Excel.