Section A:								
Course Code	MAT285							
Course Title	Probability And Distributions							
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:**	Monsoon Semeste	Full Semster				
Check each box, when applicable, if the course covers one or more of the below listed attributes								
☐	**REALS**	☐	**VELS**	☐	**DISE**			
Prerequisites	Calculus I (MAT 101) Or Elementary Calculus (MAT 020) Or Mathematical Methods I (MAT 103) And Statistical Thinking And Probability Or Basic Probability & Statistics (MAT 084)							
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	Instructor's Approval
☐	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:	40	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
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.)
1. To introduce the concept of random variables and probability density function. 2 To introduce some special discrete snd continous distributions along with their real life applications. 3. To enable students to understand the concept of expectation and variance. 4. To introduce the concept of covariance and correlation between jointly distributed variables; 5. To introduce the law of large numbers and the central limit theorem.

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:

1. Able To Work With Discrete Random Variables; In Particular, To Understand The Bernoulli, Binomial, Geometric, And Poisson Distributions;
2. Able To Work With Continuous Random Variables. In Particular, Know The Properties Of Uniform, Normal, And Exponential Distributions;
3. Know What Expectation And Variance Mean And Be Able To Compute Them;
4. Understand The Law Of Large Numbers And The Central Limit Theorem;
5. Able To Compute The Covariance And Correlation Between Jointly Distributed Variables;
6. Able To Use Available Resources (The Internet Or Books) To Learn About And Use Other Distributions As They Arise.

Section F: State if course contributes to any skill development

Click Here To List Course Contribution To Skill Development

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

Random Variables: Definition of random variables: discrete and continuous, Probability Mass Function (PMF), Probability Density Function (PDF), Cumulative Distribution Function (CDF), Transformation of variables. [9 Hours]

Mathematical Expectation: Expectation of a random variable, theorems on expectation (addition and multiplication), Moment Generating Function (MGF), Jensen's Inequality, Markov's Inequality, Chebyshev's Inequality. [6 Hours]

Standard Probability Distributions: Binomial, Poisson, Geometric, Negative Binomial, Uniform, Normal, Exponential, Gamma. [9 Hours]

Joint Distributions and Related Concepts: Joint probability distributions, conditional expectations, product moments, covariance, correlation. [6 Hours]

Limit Laws and Theorems: Convergence in probability, convergence in distribution and their interrelations, Chebyshev's Inequality, Weak Law of Large Numbers and their applications, Central Limit Theorem and applications, De Moivre–Laplace Theorem. [9 Hours]

Sampling Distributions and Order Statistics: Sampling distributions with their applications, order statistics and their distributions. [6 Hours].

Add additional sheet(s), if required

Section H: Text Book(s), Reference book(s) and any other study material

1. Sahoo, P. (2013). Probability and mathematical statistics. University of Louisville.
2. A First Course in Probability by Sheldon Ross, 6th edition, Pearson.
3. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon Ross, 2nd edition, Harcourt Academic Press.
4. John E. Freund's Mathematical Statistics with Applications by I. Miller & M. Miller, 7th edition, Pearson, 2011.
5. Hogg, R. V., McKean, J. W., & Craig, A. T. (2013). Introduction to mathematical statistics. Pearson Education India.
6. Wasserman, L. (2004). All of statistics: A concise course in statistical inference. Springer Science & Business Media.

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	30.00	Retake of Graded Component	Prohibited: No Gen AI	other info
☐	End Sem Exam	40.00	I grade awarded on approval from De	Prohibited: No Gen AI	other info
☐	Quiz(s)	20.00	Retake of Graded Component	Prohibited: No Gen AI	other info
☐	Assignment(s)	10.00	Does not contribute if missed this co	Prohibited: No Gen AI	other info
☐	Lab	0.00	Please Select	Please Select	other info
☐	Project	0.00	Please Select	Please Select	other info
☐	Case Studies	0.00	Please Select	Please Select	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.		
☐	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	

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):	Dr Dipti Dubey Prof XYZ Prof ABC			**Section(s)**	Dlist Sections L1, L2, L3
Office Location	A111n K 120 L 325	**Tel. Extension***	187	**Email:**	dipti.dubey@snu.edu.in abc@snu.edu.in xyz@snu.edu.in
About the Instructor(s):					

***** - Optional

Section L: Office Hours
Please let the students know the day(s) and time slot(s) for any consultation. You may update this at the start of the semester.

Section M: Any other information
Any other information you would like to specify in relation to the above course