Department of Computer Science & Technology

(Cyber Security)

Details of Lesson Plan

S. No.	Particulars	Details
1.	Course Name	Engineering Mathematics-II
2.	Course Code	BSC-201
3.	Academic Year	2024-25
4.	Semester	2nd
5.	Number of Lesson plans	32
6.	Faculty Assigned	Dr Pallavi Sharma

Pallavi

Faculty Signature

Lesson Plan No. 1.1	Course Name: Engineering Mathematics-II Topic: Probability spaces, conditional probability and independence	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: • a.Articulate the concept of Probability, Event and Sample Space of an experiment. • b. Solve the different problems of Probability. • c. Apply the concept of probability in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz.
Teaching Development	1. **Introduction** (5 minutes) • Ask questions When we toss a coin what is the chance of appearing head ? When we toss two dice what is the chance of appearing 8 ? • Introduce the concept of Probability. • Talk about its applications in day to day life. • Introduce the formal definition of Probability by NPTEL https://nptel.ac.in/content/storage2/courses/108106083/lecture4_probability_spaces.pdf • Highlight the important characteristics of the Probability. 2. **Development** (5 minutes) a. Random Experiment ,Sample Space and Event - Introduce the concept of Sample Space and even. b. Conditional Probability -Introduce the concept of Conditional Probability. Exercise (30 minutes) – -Do various problems on finding the Sample Space and events of a random experiment - Do various problems on finding the conditional probability of a random Experiment.
Closure	• Summarize the Lesson Learning Outcomes and get affirmation from students on these. • Suggested Reading https://nptel.ac.in/content/storage2/courses/108106083/lecture4_probability_spaces.pdf • Homework • Given some questions on Conditional Probability to solve. Spend 5 minutes to wrap up and consolidate the learning.

Lesson Plan No. 1.2	Course Name: Engineering Mathematics-II Topic: Discrete random variables, Independent random variables and Expectation of Discrete Random Variables,	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Discrete random variables, expectation of discrete random variables b. Solve the different problems of Binomial distribution. c. Apply the concept of Binomial distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -If you flip a fair coin 5 times, what is the probability of getting exactly 3 heads? -In a multiple-choice exam with 4 options per question, if you guess the answers to 8 questions, what is the probability of getting at least 6 correct? • Introduce the concept of Binomial distribution. • Talk about its applications in day to day life. • Introduce the formal definition of Binomial Distribution by NPTEL • https://freevideolectures.com/course/4271/nptel-advanced-engineering-mathematics/46 • https://www.youtube.com/watch?v=wmt7QWvg8g • Highlight the important characteristics of the Binomial Distribution. 2. **Development** (5 minutes) a. Random Experiment ,Sample Space and Event - Introduce the concept of Binomial distribution. b. Introduce the various parameters of Binomial distribution. 3. Exercise (30 minutes) – -Do various problems on finding the Probability of success using Conditional Probability - Do various problems on finding the probability of failure of an event of random experiment.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading http://digimat.in/nptel/courses/video/111106112/L19.html 3. Homework • Given some questions on Binomial Distribution to solve. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 1.3	Course Name: Engineering Mathematics-II Topic: The multinomial distribution and Poisson approximation to the binomial distribution	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: 1. Articulate the concept of multinomial distribution and Poisson approximation to the binomial distribution 2. Solve the different problems of Poisson distribution 3. Apply the concept of Poisson distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -How many car accidents will occur at a particular intersection in a given hour? -What is the likelihood of receiving a certain number of phone calls within a specific minute at a call center? • Introduce the concept of Poisson distribution. • Talk about its applications in day to day life. • Introduce the formal definition of Poisson distribution by NPTEL • https://freevideolectures.com/course/4271/nptel-advanced-engineering-mathematics/46 • https://www.youtube.com/watch?v=4PKibEU40HM • Highlight the important characteristics of the Poisson distribution. 2. **Development** (5 minutes) a. Introduce the concept of Poisson distribution. b. Introduce the various parameters of Poisson distribution. 3. Exercise (30 minutes) – -Do various problems on finding the Probability using Poisson distribution - Do various problems on finding the probability of failure of an event of random experiment.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading http://digimat.in/nptel/courses/video/111106112/L19.html 3. Homework • Given some questions on Poisson distribution to solve. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 1.4	Course Name: Engineering Mathematics-II Topic: Infinite sequences of Bernoulli trials and sums of independent random variables	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: 1. Understand the concept of infinite sequences of Bernoulli trials. 2. Identify and describe the properties of sums of independent random variables. 3. Apply the concepts of convergence in probability and almost sure convergence to infinite sequences.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) 2. Ask questions • When you flip a fair coin, what are the possible outcomes for each flip? • Is each coin flip an independent Bernoulli trial? • If you flip a coin five times, what is the probability of getting exactly three heads? 3. Development (5minutes) • Define Bernoulli trials and discuss their characteristics. • Introduce the concept of independence between trials. • Discuss how infinite sequences of Bernoulli trials can model various processes. • Introduce the formal definition of Probability by NPTEL https://nptel.ac.in/courses/111/104/11110407. • https://www.coursehero.com/file/96038036/lecture17pdf/ 3.Introduction to Sums of Random Variables (5 minutes): • Introduce the concept of the sum of independent random variables. • Discuss scenarios where sums arise naturally (e.g., adding multiple dice rolls). 4. Exercise (20 minutes) – -Do various problems on finding the Bernoulli trials. - Do various problems on finding the sum of independent random variables

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. **2.** Suggested Reading https://nptel.ac.in/content/storage2/courses/108106083/lecture15_Sums_of_RVs.pdf
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 1.5	Course Name: Engineering Mathematics-II Topic: Moments and Variance of a binomial and Poisson Distribution	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: 1. Articulate the concept of Moments and Variance of a binomial and Poisson Distribution 2. Solve the different problems of Moments and Variance of a binomial and Poisson Distribution 3. Apply the concept of Moments and Variance of a binomial and Poisson Distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -Imagine you are planning a birthday party, and you expect 80% of the invited guests to attend. Calculate the mean and variance of the number of guests attending if you invited 50 people. -In a manufacturing process, each item has a 95% chance of passing quality control. If you produce 100 items, find the mean and variance of the number of items that pass quality control. • Introduce the concept of Moments and Variance. • Talk about its applications in day to day life. • Introduce the formal definition of Moments and Variance by NPTEL • https://www.digimat.in/nptel/courses/video/117104117/L01.html • https://onlinecourses.nptel.ac.in/noc22_ma27/preview • Highlight the important characteristics of the Poisson distribution. 2. **Development** (5 minutes) a. Introduce the various parameters required for calculating the moments of poisson and binomial distribution 3. Exercise (30 minutes) – -Do various problems on finding moments about mean and origin of Binomial and Poisson Distribution.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading http://digimat.in/nptel/courses/video/111106112/L19.html https://www.digimat.in/nptel/courses/video/117104117/L01.html 3. Homework • Given some questions on Poisson distribution to solve. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 1.6	Course Name: Engineering Mathematics-II Topic: Correlation coefficients	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: 1. Articulate the concept of Correlation Coefficients 2. Solve the different problems of Skewness and Kurtosis. 3. Apply the concept of Skewness and Kurtosis in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions o Discuss how people's weight changes over time. If more people are losing weight than gaining, it creates a negatively skewed distribution, and vice versa. o Discuss the probability distributions of a fair six-sided dice and a fair coin toss. The dice has higher kurtosis with its sharper peak, while the coin toss has lower kurtosis. • Introduce the concept of Skewness and Kurtosis. • Talk about its applications in day to day life. • Introduce the formal definition of Skewness and Kurtosis by NPTEL • https://www.youtube.com/watch?v=VudrNXCYJt4 • Highlight the important characteristics of the Poisson distribution. 2. **Development** (10 minutes) a. Introduce the concept of Skewness and Kurtosis. b. Introduce the various parameters of Skewness and Kurtosis. c. https://www.youtube.com/watch?v=VudrNXCYJt4 3. Exercise (30 minutes) – -Do various problems on finding the Skewness and Kurtosis -Do various problems on finding the probability of failure of an event of random experiment.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading http://digimat.in/nptel/courses/video/111106112/L19.html 3. Homework • Given some questions on Correlation coefficients to solve. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 1.7	Course Name: Engineering Mathematics-II Topic: Chebyshev's Inequality	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: 1. Articulate the concept of Chebyshev's Inequality and Markov's Inequality 2. Solve the different problems of Chebyshev's Inequality . 3. Apply the concept of Chebyshev's Inequality in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz.
Teaching Development	1. **Introduction** (5 minutes) • Ask questions Suppose you have a set of exam scores for a class. Chebyshev's Inequality can be explained by stating that, regardless of the shape of the score distribution, a certain percentage of students will fall within a certain number of standard deviations from the mean. This helps in understanding the dispersion of scores and the likelihood of students falling within a specific range. • Introduce the concept of Chebyshev's Inequality. • Talk about its applications in day to day life. • Introduce the formal definition of Chebyshev's Inequality by NPTEL • https://www.youtube.com/watch?v=tgrZsDgzuZ4 • Highlight the important characteristics of the Chebyshev's Inequality. 2. **Development** (10 minutes) a. Introduce the concept of Chebyshev's Inequality and Markov's Inequality. b. Introduce the various parameters of Chebyshev's Inequality. c. link 3. Exercise (30 minutes) – -Do various problems on finding the Chebyshev's Inequality and Markov's Inequality

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading http://digimat.in/nptel/courses/video/111106112/L19.html 3. Homework • Given some questions on Chebyshev's Inequality to solve. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2.1	Course Name: Engineering Mathematics-II Topic: Continuous random variables and their properties	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of continuous random variable in Probability, Event and Sample Space of an experiment. b. Solve the different problems of Probability by using concept of continuous random variable c. Apply the concept of probability in day to day life
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) Ask questions o Age, weight, Height, Temperature related to what? o What is normal distribution? -Introduce the concept of continuous random variable . -Talk about its applications in day to day life. -Introduce the formal definition of continuous random variable by NPTEL o https://nptel.ac.in/courses/111/104/111104079/ https://www.youtube.com/watch?v=tD71ga-rAJw https://www.youtube.com/watch?v=UftY0e2ilM4 o https://nptel.ac.in/courses/111/104/111104032/ 2. Highlight the important characteristics of the Probability. 3. **Development** (5 minutes) Random Experiment, Sample Space and Event. Introduce the concept of Sample Space and even. 4. Continuous Random variable and probability distribution. o -Introduce the concept of continuous random variable. 5. Exercise (30 minutes) – o -Do various problems on finding the continuous random variable.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://nptel.ac.in/courses/111/104/111104079/ • Given some questions on probability by using continuous random variable . Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2.2	Course Name: Engineering Mathematics-II Topic: Distribution functions and densities	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Distribution functions and densities. b. Solve the different problems of Distribution functions and densities by using concept of continuous random variable c. Apply the concept of Distribution functions and densities in day to day life
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions Imagine you are modeling the number of customers arriving at a store every hour. What type of probability distribution would you use, and why? Consider a scenario where the weight of a fruit in a basket is a random variable. What type of distribution would you associate with this continuous random variable? - Introduce the concept of Distribution functions and densities. - Talk about its applications in day to day life. - Introduce the formal definition of Distribution functions and densities by NPTEL o https://nptel.ac.in/courses/111/104/111104032/ 2. Highlight the important characteristics of the Distribution functions and densities. 3. **Development** (5 minutes) a. Distribution functions and densities. - Introduce the concept of probability distribution and densities . - Introduce the concept of Cummultive distribution function. 4. Exercise (30 minutes) – o -Do various problems on probability distribution and densities o -Do various problems on finding the value of Cummultive distribution.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://nptel.ac.in/courses/111/104/111104032/ Given some questions on Cummultive distribution function and Probability distribution functions Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2.3	Course Name: Engineering Mathematics-II Topic: Normal, exponential and gamma densities	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Normal, exponential and gamma densities. b. Solve the different problems of If the average time between customer service requests is 10 minutes, what is the probability that the next request will occur within the next 5 minutes? by using concept of continuous random variable c. Apply the concept of Normal, exponential and gamma densities in day to day life
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions o If the waiting time for a customer involves two sequential processes, each with a gamma distribution with a mean of 15 minutes and shape parameter of 2, what is the total expected waiting time? o If the average time between customer service requests is 10 minutes, what is the probability that the next request will occur within the next 5 minutes? - Introduce the concept of Normal, exponential and gamma densities. - Talk about its applications in day to day life. - Introduce the formal definition of Normal, exponential and gamma densities by NPTEL https://www.youtube.com/watch?v=qvUT68tG_bo o https://www.youtube.com/watch?v=QEpGoo-CnnE **2.** Highlight the important characteristics of Normal, exponential and gamma densities 3. **Development** (5 minutes) a. Normal Distribution and densities. - Introduce the concept of Normal distribution and densities . - Introduce the concept of Exponential distribution. - Introduce the concept of Gamma distribution and densities. 4. Exercise (30 minutes) – -Do various problems on Normal, exponential and gamma densities.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://nptel.ac.in/content/storage2/courses/111104032/module2/lecture10.pdf Given some questions on Cummultive distribution function and Probability distribution functions Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2.4	Course Name: Engineering Mathematics-II Topic: Bivariate distributions and their properties	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Bivariate distributions and their properties. b. Solve the different problems of Bivariate distributions. c. Apply the concept of Bivariate distributions in day to day life
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions If the waiting time for a customer involves two sequential processes, each with a gamma distribution with a mean of 15 minutes and shape parameter of 2, what is the total expected waiting time? If the average time between customer service requests is 10 minutes, what is the probability that the next request will occur within the next 5 minutes? - Introduce the concept of Bivariate distributions. - Talk about its applications in day to day life. - Introduce the formal definition of Bivariate distributions by NPTEL https://www.youtube.com/watch?v=h-8hJN74O7g ○ http://www.infocobuild.com/education/audio-video-courses/mathematics/ProbabilityAndStatistics-IIT-Kharagpur/lecture-39.html 2. Highlight the important characteristics of Bivariate distributions 3. **Development** (5 minutes) a. Normal Distribution and densities. - Introduce the concept of Bivariate distributions and densities . - Introduce the properties of Bivariate distributions.. 4. Exercise (30 minutes) – -Do various problems on Normal, exponential and gamma densities.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://nptel.ac.in/content/storage2/courses/108106083/lecture15_Sums_of_RVs.pdf Given some questions on Bivariate distributions. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2.5	Course Name: Engineering Mathematics-II Topic: Distribution of sums and quotients, conditional densities and Bayes' rule	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Bayes Rule. b. Solve the different problems related to Bayes' Rule. c. Apply the concept of Bayes' Rule in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -Imagine you take a medical test that is 99% accurate. The prevalence of the disease in the population is 1%. If you test positive, what is the probability that you actually have the disease? -You check the weather forecast, and it predicts an 80% chance of rain tomorrow. However, the weather app has been accurate only 70% of the time in the past. What is the probability that it will rain tomorrow given the app's prediction? - Introduce the concept of conditional densities and Bayes' rule. - Talk about its applications in day to day life. - Introduce the formal definition of Distribution of sums and quotients, conditional densities and Bayes' rule by NPTEL https://nptel.ac.in/content/storage2/courses/108106083/lecture15_Sums_of_RVs.pdf https://www.nptelvideos.com/video.php?id=610 2. Highlight the important characteristics of conditional densities and Bayes' rule 3. **Development** (5 minutes) a. Conditional densities and Bayes' rule. - Introduce the concept of conditional densities and Bayes' rule . - Introduce the concept of Distribution of sums and quotients, conditional densities and Bayes' rule . .

	4. Exercise (30 minutes) – -Do various problems on Distribution of sums and quotients, conditional densities and Bayes' rule.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://nptel.ac.in/content/storage2/courses/108106083/lecture15_Sums_of_RVs.pdf 3. Given some questions on Distribution of sums and quotients, conditional densities and Bayes' rule. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.1	Course Name: Engineering Mathematics-II Topic: Measures of Central tendency: Moments, skewness and Kurtosis	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Moments, skewness and Kurtosis. b. Solve the different problems related to Moments, skewness and Kurtosis. c. Apply the concept of Moments, skewness and Kurtosis in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions Is the distribution of daily traffic jam durations positively skewed, meaning shorter or longer-than-average traffic jams are more common? Are the durations of your weekly workout sessions positively skewed, suggesting shorter sessions are more common, or negatively skewed, indicating longer sessions are typical? - Introduce the concept of skewness and Kurtosis. - Talk about its applications in day to day life. - Introduce the formal definition of skewness and Kurtosis rule by NPTEL https://www.youtube.com/watch?v=XaHFNhHfXwQ ○ https://nptel.ac.in/courses/110/107/110107114/ 2. Highlight the important characteristics of skewness and Kurtosis 3. **Development** (5 minutes) - skewness and Kurtosis - Introduce the concept of moments, relation between moments about mean and origin .. 4. Exercise (30 minutes) – -Do various problems on skewness and Kurtosis.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://nptel.ac.in/courses/110/107/110107114/ Given some questions on skewness and Kurtosis. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	• Reflective Questions (What, Why, Who?). Allow students to answer and discuss. • Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.2	Course Name: Engineering Mathematics-II **Topic:** Probability distributions. Binomial, Poisson and Normal	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of binomial distribution. b. Solve the different problems related to binomial distribution. c. Apply the concept of binomial distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -If a basketball player has a 60% free-throw success rate and takes 15 free throws, what is the probability of making exactly 10 of them? -In an online store, the probability of a visitor making a purchase is 0.2. If 100 people visit the site, what is the probability that at least 25 of them make a purchase?e more common, or negatively skewed, indicating longer sessions are typical? - Introduce the concept of binomial distribution. - Talk about its applications in day to day life. - Introduce the formal definition of binomial distribution by NPTEL ○ https://www.youtube.com/watch?v=6x1pL9Yov1k 2. Highlight the important characteristics of binomial distribution. 3. **Development** (5 minutes) - binomial distribution - Introduce the concept of trials. 4. Exercise (30 minutes) – -Do various problems on binomial distribution.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://egyankosh.ac.in/bitstream/123456789/12303/1/Unit-14.pdf Given some questions on skewness and Kurtosis. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.3	**Course Name: Engineering Mathematics-II** **Topic:** Probability distributions. Binomial, Poisson and Normal	**Course No.: BSC-201**

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of normal distribution. b. Solve the different problems related to normal distribution. c. Apply the concept of normal distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - Imagine a company produces a certain item, and the quality control measurements for that item follow a normal distribution. How can this information be useful for the company in terms of setting quality standards? - Introduce the concept of normal distribution. - Talk about its applications in day to day life. - Introduce the formal definition of normal distribution by NPTEL ○ https://www.youtube.com/watch?v=6x1pL9Yov1k 2. Highlight the important characteristics of normal distribution. 3. **Development** (5 minutes) - Introduce the concept of mean, median and mode of Normal distribution. 4. Exercise (30 minutes) – -Do various problems on normal distribution.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://egyankosh.ac.in/bitstream/123456789/12303/1/Unit-14.pdf Given some questions on normal distribution. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.4	**Course Name: Engineering Mathematics-II** **Topic:** Probability distributions. Binomial, Poisson and Normal	**Course No.: BSC-201**

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Poisson distribution. b. Solve the different problems related to Poisson distribution. c. Apply the concept of Poisson distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -If a call center receives an average of 10 calls per hour, what is the probability that they will receive at least 15 calls in the next hour? -If you receive an average of 8 spam emails per day, what is the probability of receiving exactly 5 spam emails tomorrow? - Introduce the concept of Poisson distribution. - Talk about its applications in day to day life. - Introduce the formal definition of Poisson distribution by NPTEL o Link 2. Highlight the important characteristics of Poisson distribution. 3. **Development** (5 minutes) - Introduce the concept of mean, median and mode of Poisson distribution. 4. Exercise (30 minutes) – -Do various problems on Poisson distribution.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://egyankosh.ac.in/bitstream/123456789/12303/1/Unit-14.pdf Given some questions on Poisson distribution. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.5	Course Name: Engineering Mathematics-II Topic: Evaluation of statistical parameters for Binomial, Poisson, Normal, Gamma distributions.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Evaluation of statistical parameters for Binomial and Pisson distribution. b. Solve the different problems related to statistical parameters for Binomial and Poisson distribution. c. Apply the concept of Binomial and Poisson distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - A factory produces light bulbs, and 95% of them meet the quality standards. If a sample of 20 bulbs is randomly selected, what is the probability that at least 18 bulbs meet the quality standards? In a school, 70% of students pass a difficult exam. If a teacher has 25 students in their class, what is the probability that exactly 20 students pass the exam? - Introduce the concept of statistical parameters for Binomial and Poisson distribution. - Talk about its applications in day to day life. - Introduce the formal definition of statistical parameters for Binomial and Poisson distribution by NPTEL o https://onlinecourses.nptel.ac.in/noc21_ma74/preview o 2. Highlight the important characteristics of statistical parameters for Binomial distribution. 3. **Development** (5 minutes) - Introduce the concept of statistical parameters for Binomial distribution. - Calculate the mean, median by Statistical approach for

	binomial distribution. 4. Exercise (30 minutes) – -Do various problems on statistical parameters for Binomial distribution.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://onlinecourses.nptel.ac.in/noc21_ma74/preview Given some questions on evalution of statistical parameters for Binomial and Poisson distribution. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.6	Course Name: Engineering Mathematics-II Topic: Evaluation of statistical parameters for Binomial, Poisson, Normal, Gamma distributions.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Evaluation of statistical parameters for Normal and Gamma distribution. b. Solve the different problems related to statistical parameters for Normal and Gamma distribution. c. Apply the concept of Normal and Gamma distribution in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - A factory produces light bulbs, and 95% of them meet the quality standards. If a sample of 20 bulbs is randomly selected, what is the probability that at least 18 bulbs meet the quality standards? In a school, 70% of students pass a difficult exam. If a teacher has 25 students in their class, what is the probability that exactly 20 students pass the exam? - Introduce the concept of statistical parameters for Binomial and Poisson distribution. - Talk about its applications in day to day life. - Introduce the formal definition of statistical parameters for Normal and Gamma distribution by NPTEL ○ https://www.youtube.com/watch?v=6x1pL9Yov1k 2. Highlight the important characteristics of statistical parameters for Normal and Gamma distribution. 3. **Development** (5 minutes) - Introduce the concept of statistical parameters for Normal and Gamma - Calculate the mean, median by Statistical approach for Normal and Gamma distribution.

	4. Exercise (30 minutes) – -Do various problems on statistical parameters for Normal and Gamma distributions.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://nptel.ac.in/content/storage2/courses/111104032/module2/lecture10.pdf Given some questions on evalution of statistical parameters for Binomial and Poisson distribution. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.7	Course Name: Engineering Mathematics-II Topic: Correlation, and regression – Rank correlation.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Correlations and its types . b. Solve the different problems on Coefficients of correlations. c. Apply the concept of correlations in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -In a transportation study, the correlation between the distance of a commute and the time it takes is calculated to be 0.9. What does this correlation value imply about the relationship between distance and travel time? - Introduce the concept of Correlations and its types. - Talk about its applications in day to day life. - Introduce the formal definition of Correlations and its types by NPTEL - https://nptel.ac.in/courses/111105042 https://www.youtube.com/watch?v=0WejW9MiTGg ○ https://www.youtube.com/watch?v=_WM8vzYSQhs 2. Highlight the important characteristics of Correlations and its types. 3. **Development** (5 minutes) - Introduce the concept of Correlations and its types - Calculate Coefficients of correlation using Spearman's rank correlations method. 4. Exercise (30 minutes) – -Do various problems on Correlations and its types.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading • https://nptel.ac.in/content/storage2/courses/111104042/module2/lecture20.pdf Given some questions on evalution of Correlations and its types. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3.7	Course Name: Engineering Mathematics-II Topic: Correlation, and regression – Rank correlation.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Regression, regression lines and properties of regression coefficients. b. Solve the different problems on lines of regression and regression coefficients. c. Apply the concept of lines of regression and regression coefficients in day to day life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - A business finds a regression coefficient of 0.9 between advertising expenses and sales. What insights can be gained regarding the effectiveness of advertising in driving sales? -In a workplace, the regression line modeling the relationship between the hours of training an employee receives and their productivity has a slope of 1.2. What does this suggest about the effect of additional training hours on productivity? - Introduce the concept of Correlations and its types. - Talk about its applications in day to day life. - Introduce the formal definition of lines of regression and regression coefficients by NPTEL https://nptel.ac.in/courses/111105042 2. Highlight the important characteristics of lines of regression and regression coefficients. 3. **Development** (5 minutes) - Introduce the concept of lines of regression and regression coefficients - Calculate Coefficients of regression using Karl Pearson rank correlations method. 4. Exercise (30 minutes) –

	-Do various problems on Coefficients of regression.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://egyankosh.ac.in/bitstream/123456789/12287/1/Unit-10.pdf Given some questions on Coefficients of regression. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4.1	Course Name: Engineering Mathematics-II **Topic:** Statistical Hypothesis Testing.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of testing of Statistical Hypothesis. b. Solve the different problems on standard error sampling distributions. c. Apply the concept of hypothesis testing for single population proportion.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - The average number of likes on posts with hashtags is different from posts without hashtags. Analyze data from posts with and without hashtags, and perform a hypothesis test on the mean likes. - Introduce the concept of hypothesis testing for single population proportion. - Talk about its applications in day to day life. - Introduce the formal definition of hypothesis testing for single population proportion by NPTEL https://www.nptel.ac.in/noc/courses/noc16/SEM1/noc16-ch03/ • Highlight the important characteristics of hypothesis testing for single population proportion 2. **Development** (5 minutes) - Introduce the concept of hypothesis testing for single population proportion - Apply the concept of hypothesis testing for single population mean. 4. Exercise (30 minutes) – -Do various problems on hypothesis testing for single population proportion.

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://nptel.ac.in/content/storage2/courses/103106120/LectureNotes/Lec3_1.pdf Given some questions on hypothesis testing for single population proportion. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4.2	Course Name: Engineering Mathematics-II Topic: Standard Error, Testof significance, Errors in Sampling.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Standard Error, Testof significance, Errors in Sampling b. Solve the different problems on Standard Error, Testof significance, Errors in Sampling. c. Apply the concept of Standard Error, Test of significance, Errors in Sampling in day today life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - You conducted a survey to estimate the average amount of coffee consumed per day in your city. Explain how the standard error of the mean can help you understand the precision of your estimate. -A company claims that their new health supplement increases energy levels. You conducted a study to test this claim. Describe the process of conducting a significance test to determine if there is evidence to support the company's claim. -A political poll is conducted to estimate the percentage of voters supporting a particular candidate. Discuss the potential consequences of a sampling error in this political poll and how it might affect the election predictions. - Introduce the concept of Standard Error, Test of significance, Errors in Sampling. - Talk about its applications in day to day life. - Introduce the formal concept Standard Error, Test of significance, Errors in Sampling by NPTEL https://www.youtube.com/watch?v=14PQawp_rjk • Highlight the important characteristics of Standard Error, Test of significance, Errors in Sampling

	2. **Development** (5 minutes) - Introduce the concept of Standard Error, Test of significance, Errors in Sampling - Apply the concept of Standard Error, Test of significance, Errors in Sampling 4. Exercise (30 minutes) – -Do various problems on hypothesis testing for single population mean
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://egyankosh.ac.in/bitstream/123456789/20962/1/Unit-2.pdf - Given some question on Standard Error, Test of significance, Errors in Sampling .. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4.3	Course Name: Engineering Mathematics-II **Topic:** Two- tail and One-tail Test of Hypothesis.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Two- tail and One-tail Test of Hypothesis. b. Solve the different problems on Two- tail and One-tail Test of Hypothesis c. Apply the concept of Two- tail and One-tail Test of Hypothesis.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - A marketing team believes that a new advertising campaign will increase sales by at least 20%. Discuss why a one-tail test would be appropriate to assess the impact of the advertising campaign on sales. - A company introduces a new productivity training program for its employees. When would you use a one-tail test to determine if the training program has a significant effect on employee productivity? - Introduce the concept of Two- tail and One-tail Test of Hypothesis. - Talk about its applications in day to day life. - Introduce the formal concept of Two- tail and One-tail Test of Hypothesis by NPTEL https://www.youtube.com/watch?v=14PQawp_rjk • Highlight the important characteristics of Two- tail and One-tail Test of Hypothesis 2. **Development** (5 minutes) - Introduce the concept of Two- tail and One-tail Test of Hypothesis

	4. Apply the concept of Two- tail and One-tail Test of Hypothesis Exercise (30 minutes) – -Do various problems on Two- tail and One-tail Test of Hypothesis
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://nptel.ac.in/content/storage2/courses/downloads/1101070o0/Assignment-5_noc18_mg31_89.pdf - Given some question on Two- tail and One-tail Test of Hypothesis. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4.4	**Course Name: Engineering Mathematics-II** **Topic:** Tests of Significance for Attributes, Tests of Significance for Variables.	**Course No.: BSC-201**

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Tests of Significance for Attributes, Tests of Significance for Variables. b. Solve the different problems on Tests of Significance for Attributes, Tests of Significance for Variables c. Apply the concept of Tests of Significance for Attributes, Tests of Significance for Variables.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions - A company claims that changing the color of their ad button from blue to red will significantly increase the click-through rate. Outline the steps you would take to conduct a significance test for this attribute and assess the impact of the color change. - A survey is conducted to determine if there is a significant difference in customer satisfaction between two product versions. Describe the process of conducting a significance test for attributes in this context and how it informs the company about product performance. - Introduce the concept of Tests of Significance for Attributes, Tests of Significance for Variables. - Talk about its applications in day to day life. - Introduce the formal concept of Tests of Significance for Attributes, Tests of Significance for Variables. https://www.youtube.com/watch?v=lja270ZlEUU - https://www.youtube.com/watch?v=zmyh7nCjmsg • Highlight the important characteristics of Tests of Significance for Attributes, Tests of Significance for Variables 2. **Development** (5 minutes)

	4. Introduce the concept of Tests of Significance for Attributes, Tests of Significance for Variables Exercise (30 minutes) – -Do various problems on Tests of Significance for Attributes, Tests of Significance for Variables
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://www.westga.edu/academics/research/vrc/assets/docs/tests_of_significance_notes.pdf https://www.mgkvp.ac.in/Uploads/Syllabus/Statistics_114.pdf - Given some question on Tests of Significance for Attributes, Tests of Significance for Variables. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4.4	Course Name: Engineering Mathematics-II **Topic:** Tests of Significance for Small Samples- t-distribution and its application.	Course No.: BSC-201

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Tests of Significance for Small Samples- t-distribution and its application. b. Solve the different problems on Tests of Significance for Small Samples- t-distribution c. Apply the concept of T distributions in day today life.
Teaching Aids (if any)	a. Chalk & talk b. Use of Google quiz assignment tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) • Ask questions -You are comparing the average scores of students from two different schools on a standardized test. Explain how the t-distribution is relevant when comparing the means of these two groups and why it's preferred over the normal distribution. - A factory produces widgets, and you want to assess if the average weight of the widgets differs from the industry standard. How does the t-distribution play a role in determining whether the mean weight of the widgets is significantly different from the standard? Introduce the concept of t-distribution,. - Talk about its applications in day to day life. - Introduce the formal concept of t-distribution by NPTEL - https://www.youtube.com/watch?v=zmyh7nCjmsg • Highlight the important characteristics of t-distributions. 2. **Development** (5 minutes) 4. Introduce the concept of t-distributions Exercise (30 minutes) – -Do various problems on t-distributions

Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://www.westga.edu/academics/research/vrc/assets/docs/tests_of_significance_notes.pdf https://www.mgkvp.ac.in/Uploads/Syllabus/Statistics_114.pdf - Given some question on t-distributions. Spend 5 minutes to wrap up and consolidate the learning. .
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents