TRƯỜNG ĐẠI HỌC FPT

DANANG CAMPUS

KẾ HOẠCH TRIỂN KHAI HỌC PHẦN

PLAN OF COURSE IMPLEMENTATION

1. **Tên học phần/***Course name: Probability & Statistics*
2. **Thời gian triển khai: Học kỳ: SPRING 2024 (16 slots Social Contructivism)**
3. ***Lịch triển khai môn học***

Week	Slot	Topic	Contents / Presentations (Rounds: 1, 2; Groups: A, B, C, D, E, F; 4 times / 1 group)	Action
01: 01/1	1	[1] Intro. [5] Descr.	1A_What is descriptive statistics? How should we numerically summarize the information in data? 2B_What are most useful graphical techniques in constructing and interpreting visual data displays? *[Stem&Leaf Diagrams, 6.3 Frequency Dist., Histograms, 6.4 Box Plots]*	P01[01]_
	2	[2] Probability	1C_Can we describe new events from combinations of existing events? What are important counting techniques used to analyze the random experiments? Give many examples! 2D_For discrete sample spaces consisting of equally outcomes, can we determine the probability of a joint event from the probabilities of the individual events comprised it? *[Sample Spaces, Events, Interpretations of Probability, Addition Rules]*	P02[02]_
02: 08/1	3		1E_Give the definition of conditional probabilities (examples)? Given the probabilities of an event under each of several conditions, how to recover the probability of the event? *[Conditional Probability, Multiplication and Total Probability Rules]* 2F_Can we find out the probability that a condition was present given an outcome? Can you give the definition of independence and some examples? *[Bayes' Theorem and Independence]*	P03[03]_
	4	[1, 2, 5]	**Teacher REVIEW** *[1, 2 and 5]* **with 30 multiple choice (MC) questions** **(1) Test 1.A (45 minutes, 30 questions:** *[1, 2 and 5]***)**	
03: 15/1	5	[3] Distributions of Discrete Random Variables	1B_What are discrete random variables? How many popular ways to describe probability distribution of a discrete random variable? What are two numbers often used to summarize a probability distribution for a random variable? Can we show them for a discrete uniform distribution? 2A_How to calculate the probability of k successes in a random experiment consists of n Bernoulli trials? What are the mean and the variance of a Binomial distribution? *[Bernouli trial, Binomial Distribution]*	P04[05]_
	6		1D_Is negative binomial distribution a generalization of a geometric distribution? What are the means and variances of geometric and negative binomial distributions? *[Geometric Distribution, Negative Binomial Distribution]* 2C_Does it exist or not a general formula for computing probabilities when samples are selected without replacement? What are the means and variances of hypergeometric distributions? *[Hypergeometric Distribution]*	P05[06]_
04: 22/1	7		1F_As the number of trials in a binomial experiment increases to infinity while its mean remains constant, what will it become? *[Poission distribution]*	P06[07]_
			Teacher REVIEW *[3]* **with 20 MC questions** **(2) Test 1.B (30 minutes, 20 questions:** *[3]***)**	
	8		1E_What is a continuous random variable? How to describe its probability distribution? What are two numbers often used to summarize a probability distribution for a continuous random variable? 2B_Give definition, probabily density function, cummulative probability function of a continuous uniform distribution? What are the mean and variance of a continuous uniform distribution?	P07[08]_
05: 25/1	9	[4] Distributions of Continuous Random Variables	1A_Describe a normal distribution? What is 3-sigma rule? How to calculate probabilities for standard normal distribution? Can we apply the method to find the probabilities associated with an arbitrary normal random variable? 2D_What are intimate connections between binomial, hypergeometric & Poisson dist.? Is it possible to use them to approximate hypergeometric & binomial probabilities?	P08[09]_
	10		1C_Can we describe the prob. distribution of the time/dist. between the events in a Poisson process? *[Exponent Distribution]*	P09[10]_
			Teacher REVIEW *[4]* **with 20 MC questions** **(3) Test 2.A (30 minutes, 20 questions:** *[4]***)**	
06: 19/2	11	[6] Point Estim	1F_What is a random sample? What is sampling distribution of sample mean? Give examples? *[Central limit theorem]* 2E_What is a point estimation? Show a point estimate for mean? Give some its properties?	P10[11]_
	12	[7] Confidence Intervals for 1 Sample	**Confidence Interval** **Confidence interval on the Mean of a Normal Distribution, variance known**	
07: 26/2	13		1A_When the sample is small and standard deviation is unknown, how to find a alpha-percent confidence interval on the mean of a normal distribution? 2B_It is often necessary to construct confidence intervals on a population proportion. How to do that?	P11[13]_
	14	[6, 7]	**Teacher REVIEW** *[6,7]* **with MC questions** **(4) Test 2.B (45 minutes, 30 questions:** *[6,7]***)**	
08: 04/3	15	[8] Test of Hypotheses for 1 Sample	**Hypothesis Testing** **Tests on the Mean of a Normal Distribution, variance known**	
	16		1C_In many if not most practical situations, variance will be unknown. Then, how to test hypothesis on the mean of a population? 2D_Many engineering decision problems involve hypothesis testing about population proportion. How to do that? *[Large-Sample CI for a Population Proportion]*	P12[16]_
09: 11/3	17		**P-value method for testing** **Teacher REVIEW** *[8]* **with 20 MC questions** **(5) Test 3 (30 minutes, 20 questions:** *[8]***)**	
	18	[7-8] 2 sampl	1E_Inference on the difference in Means of 2 Normal distribution, variance known or not 2F_Inference on the difference of two population proportions	P13[18]_
10: 18/3	19	[9] Regr-ession	**Empirical Models, Simple Linear Regression, Correlation** **Properties of the Least Squares Estimators, Hypothesis Tests in Simple Linear Regression**	
	20	[1-9]	**Student Self-REVIEW Progress Tests** **(6) FINAL QUIZ (60', 50q:** *[1]*-5, *[2]*-6, *[3]*-6, *[4]*-6, *[5]*-5, *[6]*-5, *[7]*-6, *[8]*-6, *[9]*-5**)**	
Assignments: A1 10%, A2 10%, CP 15% (group, discuss/edu: bonus); Tests: **T1 10%, T2 10%, T3 10%** (final quiz: bonus).				