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QF01/0408-4.0E	**Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Mathematics Department**

Study plan No.	**2022/2021**	University Specialization	**Bachelor of Mathematics**
Course No.	**0101442**	Course name	**Mathematical Statistics**
Credit Hours	**3**	Prerequisite/ Co-requisite	**0101341**

Course type	☐ MANDATORY UNIVERSITY REQUIREMENT	☐ UNIVERSITY ELECTIVE REQUIREMENTS	☐ FACULTY MANDATORY REQUIREMENT	☐ Support course family requirements	✓ Mandatory requirements	☐ Elective requirements
Teaching style	☐ Full online learning		☐ Blended learning		✓ Traditional learning	
Teaching model	☐ 1 Synchronous: 1 asynchronous		☐ 1 face to face : 1 asynchronous		✓ 2 Traditional	

Faculty member and study divisions' information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail

Division number	Time	Place	Number of students	Teaching style	Approved model

Brief description

Sampling distribution, Estimation theory, Method of moments, Method of maximum likelihood, Point estimation, Unbiased estimators, Consistency, Efficiency, Sufficiency, Completeness, Cramer Rao theorem. UMVUE, Interval estimation and hypothesis testing about the parameters.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	1) Introduction to Probability and Mathematical Statistics, 2nd edition. By Bain,Lee, J. and Engelhardt, Max. Publisher Duxbury Press 1987. 2) Mathematical Statistics with applications , 7th edition. By Dennis Wackerly, William Mendenhall and Richard Scheaffer, Publisher Thomson. Brooks /Cole 2008.
Supportive learning resources (Books, databases, periodicals, software, applications, others)	1) Modern Mathematical Statistics with Applications. By Devore, Jay,L. and Berk, Kenneth,N. Publisher Thomson Brooks/Cole 2007. 2) Mathematical Statistics with applications, seventh edition, By Miller & Miller. Pearson Prentice Hall (2004). 3) Introduction to Mathematical Statistics,5th edition. By Hogg, Robert, V. and Craig,Allan,T. Publisher: Prentice-Hall 1995.
Supporting websites	• https://www.youtube.com/channel/UCNADIwCkYj4pXH8blfIVOqw
The physical environment for teaching	✓ Class room ☐ labs ☐ Virtual educational platform ☐ Others
Necessary equipment and software	

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Supporting people with special needs	
For technical support	

Course learning outcomes (S = *Skills, C= Competences K= Knowledge,*)

No.	Course learning outcomes	The associated program learning output code
Knowledge		
K1	Setting up the probability of distributions.	MK1
K2	Predicting the point estimate of the parameters.	MK2
K3	Select the best point estimate.	MK3
K4	Predicting the interval estimate of the parameters.	MK3
K5	Designing the test of hypothesis of the parameter.	MK4
Skills		
S1	Classify the estimate of parameters according to properties.	**MS1**
S2	Estimate the sample size.	**MS2**
S3	Explain a decision about the hypothesis.	**MS3**
Competences		
C1	Finding the relation between the theory of probability and applied statistics.	**MC2**
C2	Develop the individual's ability to communicate and interact with other mathematical courses.	**MC2**

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First/Second exam	30%	30%	**30%**	30%
Participation / practical applications	0	0	**20%**	30%
Asynchronous interactive activities	30%	30%	**0**	0
Final exam	40%	40%	**50%**	40%

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style	Reference
1	Brief Review of probability distributions of discrete and continuous random variables.	Lecture	
2	Random samples and sampling distributions, statistics.	Lecture	266-273
3	Sampling distributions of the sample mean and sample variance.	Lecture	266-273
4	Point estimation. Unbiased estimators, Consistency, Efficiency.	Lecture	318-330
5	Sufficiency, Method of Moments, Method of Maximum likelihood.	Lecture	331-342
6	Interval estimation. The estimation of means.	Lecture	354-358

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7	Estimation of difference between means, Estimation of proportions. First Exam	Lecture	358-360
8	Estimation of difference between means, Estimation of proportions.	Lecture	360-363
9	Estimation of difference between proportions. Estimation of variances and ratio of two variances.	Lecture	364-369
10	Solving various problems depending of the estimations. Hypothesis testing. z- Test of the mean.	Lecture	375-376 403-406
11	t- Test of the mean, traditional method. P-value method.	Lecture	403-406
12	Tests concerning difference between means. Second Exam	Lecture	406-409
13	Tests concerning proportions.	Lecture	412-417
14	Tests concerning variances.	Lecture	409-412
15	Solving various problems depending of hypothesis testing.	Lecture	418- 422
16	**Final Exam**		