H.U. INSTITUTE OF HEALTH SCIENCES
COURSE SYLLABUS

PROGRAM NAME			BIOSTATISTICS		
CODE	BIS 621	**TITLE**	DESIGN OF EXPERIMENTS		
LECTURER (S)			PROF. ERGUN KARAAĞAOĞLU, PhD ASSOC. PROF. OSMAN SARAÇBAŞI, PhD INSTRUCTOR ERDEM KARABULUT, PhD		
TYPE	☐ COMPULSORY ☒ SELECTIVE	**LANGUAGE**	☒ TURKISH ☐ ENGLISH	**LEVEL**	☒ MASTER OF SCI. ☐ DOCTORATE ☐ PREREQ. PREP.

THEORETICAL (HRS/WK)	3	**PRACTICAL (HRS/WK)**	0	**H.U. CREDIT**	3	**ECTS CREDIT**	7

WHAT IS THE IMPORTANCE OF THIS COURSE IN THE PROGRAM'S LEARNING OBJECTIVES		
PRE-REQUISITE(S)	BIS535 and/or BIS735	
COURSE OBJECTIVES	Sources of bias and variability in experiments, randomization, constraints regarding randomization, types of experiment designs, and analysis methods of different designs of experiments are the main topics of the course. The course is carried out by theoretical lectures given by the lecturer, presentations of the students, practice on sample problems and discussions.	
LEARNING OUTCOMES AND ACQUIRED COMPETENCES	Students of the course will be able to determine and select the optimum experimental design that is appropriate to the goals of the research and that minimizes the experimental error. They will be able to build, apply and analyze the related models.	
COURSE CONTENT	Principles of design of experiments, randomization, experimental bias and replication, methods of reducing/eliminating bias, single factor experiments, block designs, Latin-square designs, Greco-Latin square designs, factorial designs, cross-over designs, partial replications and missing data situations.	
COURSE SCHEDULE	Week 1	Definitions, sources of experimental errors, randomization and constraints of randomization
	Week 2	Single factor, unconstrained completely randomized design. Analysis of Variance.
	Week 3	Single factor, unconstrained completely randomized design. Assumptions, tests of assumptions, and cases when the assumptions are not met.
	Week 4	Single factor, unconstrained completely randomized design. Nonparametric methods

	Week 5	Randomized complete block design. Parametric and nonparametric methods.
	Week 6	Randomized incomplete block design.
	Week 7	Latin-square and graeco-latin square designs.
	Week 8	Factorial designs. Concept of interaction.
	Week 9	Fixed effects, random effects and mixed effects models.
	Week 10	Factorial designs, 2n factorial design.
	Week 11	Factorial designs, 3n factorial design.
	Week 12	Cross-over designs. 2 periods, 2 treatments cross-over designs.
	Week 13	Cross-over designs. k periods, n treatments cross-over designs
	Week 14	Analysis of Covariance
	Week 15	General discussion
SUGGESTED COURSE MATERIAL	1. Montgomery, DC., Design and Analysis of Experiments, John Wiley and Sons, Inc., New York, 1984. 2. Mason, RL., Gunst, RF., Hess, JL., Statistical Design and Analysis of Experiments, John Wiley and Sons, Inc., New York, 1989. 3. Diaz, AG., Phillips, DT., Principles of Experimental Design and Analysis. Chapman and Hall, London, 1985. 4. Hicks, CR., Fundamental Concepts in the Design of Experiments. 2nd. ed., Holt, Rinehart and Winston, New York, 1973. 5. Conover, WJ., Practical Nonparametric Statistics. 2nd ed., John Wiley and Sos Inc., New York, 1982.	
TEACHING METHODS	Lectures given as a conference by the lecturer and the seminars and presentations presented by students in the following weeks are supported by discussions on the topics and examples from different fields.	
ASSESSMENT METHODS	Participation in class discussions (10%), presentations (25%), mid-term exam (25%), final exam (40%).	