

**H.U. INSTITUTE OF HEALTH SCIENCES
COURSE SYLLABUS**

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| PROGRAM NAME | | BIOSTATISTICS | | | |
| CODE | BIS 606 | TITLE | PROBABILITY THEORY | | |
| LECTURER (S) | | PROF. ERGUN KARAĞAĞOĞLU, PhD PINAR ÖZDEMİR GEYİK, PhD ERDEM KARABULUT, PhD | | | |
| TYPE | <input type="checkbox"/> COMPULSORY <input checked="" type="checkbox"/> SELECTIVE | LANGUAGE | <input checked="" type="checkbox"/> TURKISH <input type="checkbox"/> ENGLISH | LEVEL | <input checked="" type="checkbox"/> MASTER OF SCI. <input type="checkbox"/> DOCTORATE <input type="checkbox"/> PREREQ. PREP. |

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| THEORETICAL (HRS/WK) | 2 | PRACTICAL (HRS/WK) | 0 | H.U. CREDIT | 2 | ECTS CREDIT | 5 |
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| WHAT IS THE IMPORTANCE OF THIS COURSE IN THE PROGRAM'S LEARNING OBJECTIVES | | | | | | | |
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| PRE-REQUISITE(S) | NONE | | | | | | |
| COURSE OBJECTIVES | Basic probability concepts and definitions are taught especially to the students graduated from undergraduate programs other than statistics. Basic knowledge on probability that may be needed in MSc. and PhD courses are given to the students by teaching the definitions and basic properties of random variables, probability distributions, probability density functions and probability distribution functions. Various analyses are made on different software programs about the topics included in the course outline. The knowledge of the students on probability is improved by assignments. A term project is given to every student that should be presented both orally and written at the end of the semester. | | | | | | |
| LEARNING OUTCOMES AND ACQUIRED COMPETENCES | Students of this course will have basic knowledge of probability theory which constitutes the basis of statistics and acquire sufficient knowledge of probability that will be required in MSc and PhD courses. | | | | | | |
| COURSE CONTENT | Sets, Venn Diagrams, Permutation, Combination, Random Variables, Probability Distribution Functions, Probability Density Functions, Conditional Probability, Dependent-Independent Events, Bayes' Theorem and its applications, Concept of Expected Value and Moment Generating Functions | | | | | | |
| COURSE SCHEDULE | <table border="1"> <tr> <td>Week 1</td> <td>Sets</td> </tr> <tr> <td>Week 2</td> <td>Permutation, Combination and Binomial Theorem</td> </tr> <tr> <td>Week 3</td> <td>Concepts of Probability (Random Event, Sample Space, Events and events space, Basic theorems of probability)</td> </tr> </table> | Week 1 | Sets | Week 2 | Permutation, Combination and Binomial Theorem | Week 3 | Concepts of Probability (Random Event, Sample Space, Events and events space, Basic theorems of probability) |
| Week 1 | Sets | | | | | | |
| Week 2 | Permutation, Combination and Binomial Theorem | | | | | | |
| Week 3 | Concepts of Probability (Random Event, Sample Space, Events and events space, Basic theorems of probability) | | | | | | |

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| | Week 4 | Concepts of Probability (Conditional Probability, Independent Events, Probabilities of Outcomes in Sample Space, Bayes' Theorem) |
| | Week 5 | Random variables (Definition of random variables, expected value and variance of a random variable, Discrete random variables and Continuous random variables) |
| | Week 6 | Random variables (Distribution functions, Conditional probability, Transformation of random variables) |
| | Week 7 | Expected values and Moments (Expected value, Expected value of a random variable function, Variance of random variables, Moments and Moment generating functions) |
| | Week 8 | Expected values and Moments (Characteristic functions, Probability density functions, Conditional expected values, conditional variance) |
| | Week 9 | Discrete Distributions (Bernoulli, Binomial and Poisson Distributions) |
| | Week 10 | Discrete Distributions (Geometric, Negative Binomial and Hypergeometric Distributions) |
| | Week 11 | Continuous Distributions (Uniform and Normal Distribution) |
| | Week 12 | Continuous Distributions (Exponential, Gamma, Beta and Cauchy Distribution) |
| | Week 13 | Joint Distributions (Joint probability functions, Joint distribution functions, Marginal probability and distribution functions) |
| | Week 14 | Joint Distributions (expected value of a joint random variable function, Independent random variables, Cross-Products moments, Moment generating function of two random variables, Correlation coefficient, conditional distributions) |
| | Week 15 | Student Presentations and Discussion |
| SUGGESTED COURSE MATERIAL | 1) İnal, C., Günay, S.Olasılık ve Matematiksel İstatistik. 3. Basım. H.Ü. Fen Fakültesi Basımevi. 1993. 2) Balakrishnan, N., Charalambides, CH. A., Koutras, M.V. Probability and Statistical Models with Applications. Chapman and Hall, 2001. | |
| TEACHING METHODS | Students are encouraged to participate in the course by discussions following the theoretical classes. Students' capability of individual problem solving and interpreting is improved by use of related software. | |
| ASSESSMENT METHODS | Participation in lectures (%10), Presentations (%20), Midterm exam (%30) and Final exam (%40). | |

