DEPARTMENT OF BIOSTATISTICS
GRADUATE PROGRAM DIRECTORIES (MSc)

A. Program Name	Biostatistics
B. Degree Level (MSc./PhD.)	Master of Science
C. Chairman	Prof. Ergun Karaağaoğlu, PhD
D. Program Director	Prof. Ergun Karaağaoğlu, PhD
E. Name of the Degree Awarded	MSc Degree in Biostatistics
F. Program Aims	To educate biostatistics experts who: • have sufficient knowledge on research, • are able to improve in their fields, • easily communicate with people he/she is working with, • can fulfill his/her responsibilities both individually and as a team member, • are well-educated, intellectual, and reliant on ethical issues by means of a global biostatistics education.
G. Program Objectives	To educate students who: • have basic knowledge of theoretical biostatistics, • are able to apply biostatistical methods appropriately, and interpret results of their studies, • are able to plan, carry out, and finalize independent research in their fields, and • are able to use statistical software.

H. Faculty	
1	Prof. Ergun Karaağaoğlu, PhD
2	Prof. Reha Alpar, PhD
3	Assoc. Prof. Osman Saraçbaşı, PhD
4	Instructor, Erdem Karabulut, PhD
5	Instructor, Pınar Özdemir Geyik, PhD

I. Application Requirements	Graduate Studies Entrance Exam (LES):50, GMAT:475 or any equivalents
J. Duration of Program	2 Academic years +1 Academic year
K. Total Minimum Program Credits	24
L. Program Pre-requisites	Students who have Bachelor degree are accepted to apply to the program. Candidates of the program who do not have a Bachelor degree in statistics should complete one or two semesters of scientific preparation.

M. Courses Offered						
Code	**Title**	**Theoretical hrs.**	**Practical hrs.**	**H.U. Credits**	**ECTS**	**C/S***
BIS 600	Thesis work	4	0	0	30	C
BIS 601	Seminar	0	2	0	5	C
BIS 602	Health and Medical Terminology	3	0	3	5	C
BIS 603	Statistical Computing I	2	2	3	7	C
BIS 604	Research Methods in Health Sciences	2	2	3	7	C
BIS 605	Biostatistics	3	0	3	7	C
BIS 606	Probability Theory	2	0	2	5	S
BIS 607	Matrix Algebra	2	0	2	5	S
BIS 608	Advanced Biostatistical Analysis	3	0	3	7	S
BIS 615	Sampling	3	0	3	7	C
BIS 620	Logistic Regression	3	0	3	7	S
BIS 621	Experiment Design	3	0	3	7	S
BIS 627	Statistical Methods for Rates and Proportions	3	0	3	7	S
BIS 637	Statistical Methods Specific to Health Sciences	3	0	3	7	C
BIS 654	Linear Regression Analysis	3	0	3	7	S
*C/S: Compulsive/Selective						

N. Pre-requisite courses from other departments	TEB 501 Medical Terminology as a substitute for BIS540, Health and Medical Terminology.
O. Main Requirements for Comprehensive Exam	NA
P. Thesis Work Satisfaction Criteria	To complete at least 24 credits and BIS501 Seminar successfully
R. Thesis Defence Satisfaction Criteria	None

S. Learning Outcomes
DEVELOPMENT OF KNOWLEDGE AND UNDERSTANDING

Knowledge base

- A successful graduate from the program is expected:
  - to take responsibility in planning, conducting and finalizing stages of a research,
  - to commit to ethical values
  - to be able to criticize statistical studies,
  - to have sufficient computer and statistical software knowledge.
- A biostatistician with a MSc degree, is also expected to have sufficient knowledge of mathematical statistics and basic medical terminology in order to be able to decide on appropriate statistical methods and interpret the results of these methods and communicate with medical experts from various disciplines.
- The students, who successfully completed the MSc Program, are expected to know the basic biostatistical concepts in order to follow recent studies conducted on these topics.

Ethical Issues

- A successful graduate is expected
  - to commit to scientific truth and statistical ethics
  - to have fundamental statistical knowledge by which she/he can foresee possible intended or unintended sources of bias that could affect the results of a research.
  - to act as a key person in planning and execution stages of a research,
  - to be advisory for carrying out the research according to the objectives of the research and

- He/she should be able to apply appropriate statistical methods in various stages of a research such as; planning, sampling, sample size, power considerations, variable selection, randomization and etc.
- The candidate is informed and warned by the academic staff about possible ethical issues in their fields. The education of the candidate in this specific issue is supported by article critiques, seminars within department and discussions in the courses.

Disciplinary Methodologies

- The student graduated from Biostatistics MSc. Program is expected;
  - to be able to access and evaluate statistical literature,
  - to have sufficient knowledge in basic statistical issues such as: probability distributions, sampling distributions, hypothesis tests, assumptions of these tests, research and experimental design techniques, and vital statistics,
  - to be familiar with the factors those may effect the results of a test, and
  - to have enough basic medical knowledge in order to understand the medical problem for adopting appropriate statistical analysis

COGNITIVE / INTELLECTUAL SKILLS (Generic)

Analysis

- The success of the candidate in the classes (participation in discussions, presentations, assignments and examinations) determines his/her skills on selection of basic biostatistical and research methods properly, his/her improvement in thesis topic, and his/her capability of analyzing a complicated or incomplete data.
- A biostatistician, who successfully completed the program, is expected to transfer his knowledge about analysis to others properly and this qualification is evaluated by:
  - Contribution to – participation in discussions
  - Assignments
  - Examinations
  - Communication with thesis advisor
  - Article criticism
  - Presentation

Synthesis

When knowledge on the field of interest comes to an end, the candidate should be able to:
- investigate basic biostatistical methods both theoretically and practically in a deeper manner,
- follow recent developments in the literature and criticize them, and
- suggest different methods when necessary and be advisory to other researchers in the studies he/she participates in

Evaluation

Whether the candidate is capable of criticizing the studies in his/her field is evaluated by:
- Candidate's capability of understanding and sharing the knowledge derived from the literature (research methods, basic biostatistical methods),
- Critics and contributions made by the candidate in the seminars he/she participated,
- Following recent studies in biostatistics and investigate them thoroughly.

Application

- Candidate's capability of finding original solutions for overcoming problems is evaluated by his ability of finding proper solutions for problems that may occur in
  - deciding on appropriateness of data to the objective of the study before the analysis,
  - data entry, edition and management,
  - determining the appropriate method of analysis.
- Student's self preparations, presentations, finding solutions for possible problems in any stage of a statistical evaluation, and being in good relationship with department's staff during his education present the candidate's ability of taking responsibility in problem solving.

KEY / TRANSFERABLE SKILLS (Generic)

Group Working

- Cooperation of experts from different disciplines is essential for a proper and reliable design, analysis and reporting of a research. Carrying out a research or a theoretical study properly from the beginning up to end also requires a harmonious multi-disciplinary study. Candidate's willingness to work as a team member and commitment to his/her responsibilities during in-class group presentations and discussions are crucial for the success of a team as a whole. Students acquire these key features during their MSc education.
- During MSc program, it is frequently emphasized that research and statistics are parts of a whole. For this reason, the importance of being prepared for a team work and taking active roles in a team is frequently emphasized in the classes by the instructors. Furthermore, the students acquire the ability of participating in joint projects and making decisions. Students also acquire characteristics such as:
  - being in agreement with the group,
  - study in compliance with scientific ethical rules
  - to carry out the studies on his part properly and on time
  - having good relationship with other group members

Learning Resources

- Successful candidate should be able to use databases such as ScienceDirect, PubMed, ISI, and library facilities (electronic and printed books, and periodicals).
- Successful candidate should be able to use Internet to follow the recent developments in his/her field and access to any relevant information. Additionally, the candidate's access to library facilities should be at the highest level.

Self Evaluation

- Candidate participates in regular departmental seminars and makes one or two oral presentations annually according to the schedule. Candidate evaluates himself/herself in these seminars on the basis of his/her command of the topic, presentation ability and answering the questions satisfactorily.
- The candidate assesses his/her knowledge on a specific statistical topic and appropriateness of his/her suggestions about a statistical problem by discussing the statistical issues of the researches he/she participates in and the consultancies he/she carries out with the department's instructors in the scientific meetings held within the department weekly.

Management of Information

One of the skills acquired in the program is searching the literature sufficiently just with the help of keywords or topic title. Being able to solve theoretical or practical (e.g. when analysis require computer assistance) problems with minimum assistance is considered to be an indication of being able to access to the required information.

Autonomy

- In order to make the student being able to criticize certain topics, instructor carries out the class in an argumentative manner and additionally discusses some wrong planned, evaluated or interpreted studies in the classes. Discussions with the instructors regarding course topics or assignments both during class hours and after class hours is an indication of having the ability of criticism.

- In order to make the candidates able to work independently, students are expected;
    - to take part in statistical consultancies given in the department under supervision of an instructor,
    - to participate in a project, and
    - to submit an oral and/or poster presentation in national/international congresses.

Communication

Carrying out tasks given for self-improvement in the department successfully, having a good communication with instructors during such tasks, high performance in assignments and presentations, and scientific contributions to congresses and symposiums are assumed to make the candidate be self-confident and improve his/her skills of communication with academicians and professionals.

Problem Solving

- Taking role in statistical consultancies, projects, seminars and courses within the department, submitting oral and/or poster presentations in congresses and writing a thesis are the main activities realized in order to make the candidate ready to learn, adapt and develop different skills when necessary in his/her professional life.
- As research is a team work, the candidate should be ready to take role in a multi-disciplinary study. In order to make the candidate ready to communicate with others professionally and help him/her to acquire leadership characteristics, assignments and seminar topics are given to the groups of students and additionally the students take role in projects and consultancies.

PRACTICAL SKILLS (Specific)
Application of Skills In order for the candidate to be a good practitioner; he/she is expected to commit to statistical ethical principals, decide on correct methods and use statistical software properly in planning, conduct, evaluation, and interpretation stages of a research.
Autonomy in Skill Use Being able to carry out an analysis individually, prepare his/her assignments and presentations properly, carry out tasks given by his/her instructors on time are the main conditions for the candidate to be an independent and responsible professional. In order to achieve this goal, candidate should be successful in his assignments and presentations, take role in projects and consultancy services, present articles and complete his/her MSc thesis individually with the help of his advisor's suggestions.
Technical Expertise   - A successful candidate should know and apply basic biostatistical methods, be very qualified in using at least one statistical software in order to make statistical calculations and be able to search and follow the literature electronically.   - Assignments and presentations, project and consultancy services, article discussions, and participation in congresses and courses are some of the activities planned to improve the technical abilities of the candidate.
T. Other Relevant Information