DEPARTMENT OF BIOSTATISTICS
GRADUATE PROGRAM DIRECTORIES (PhD)

A. Program Name	Biostatistics
B. Degree Level (MSc./PhD.)	Philosophy of Doctorate, PhD
C. Chairman	Prof. Ergun Karaağaoğlu, PhD
D. Program Director	Prof. Ergun Karaağaoğlu, PhD
E. Name of the Degree Awarded	PhD Degree in Biostatistics
F. Program Aims	To educate biostatisticians who: • are professionalized on research topics, • are capable of developing new methods regarding the theory of statistics and its applications, • are able to improve their statistical knowledge, • are well-educated, intellectual, and reliant on ethical issues by means of a global biostatistics education.
G. Program Objectives	To educate biostatisticians who: • are able to apply statistical methods in new fields, • have sufficient theoretical knowledge on biostatistics to be able to make scientific contributions to science, • are able to apply advanced biostatistical methods properly and interpret results of their studies, • are able to plan, carry out, and finalize researchs in their fields individually, and • are able to use more than one statistical software efficiently.

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	4 Academic years +2 Academic years
K. Total Minimum Program Credit	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*
BİS 700	Special Topics	5	0	0	25x4=100	C
BİS 710	Medical Decision Making	3	0	3	7	S
BİS 712	Clinical Trials	3	0	3	7	C
BİS 718	Survival Analysis	3	0	3	7	S
BIS 719	Categorical Data Analysis I	3	0	3	7	C
BİS 730	Time Series Analysis	3	0	3	7	S
BİS 735	Biostatistics	3	0	3	7	S
BİS 736	Research Methods in Health Sciences	3	0	3	6	S
BİS 737	Advanced Statistical Methods Specific to Health Sciences	3	0	3	7	S
BİS 745	Statistical Methods for Reliability and Validity	3	0	3	7	S
BİS 750	Multivariate Data Analysis I	3	0	3	7	C
BIS 756	Statistical Computing II	3	0	3	7	C
BİS 757	Multivariate Data Analysis II	3	0	3	7	C
BIS760	Categorical Data Analysis II	3	0	3	7	S
BIS768	Structural Equation Modeling	3	0	3	7	S

*C/S: Compulsive/Selective;

N. Pre-requisite courses from other departments	None
O. Main Requirements for Comprehensive Exam	To fullfill the requirements stated in Article No 37 and 38 of Hacettepe University Graduate Education and Examination Regulations regarding the PhD comprehensive exam
P. Thesis work Satisfaction Criteria	To complete at least 24 credits successfully and to be successful in the comprehensive exam.
R. Thesis Defense Satisfaction Criteria	To present his/her studies to the thesis study evaluation committe twice a year upon succeding in the comprehensive exam and to get an approval from the committe regarding his/her progress in her study topic

S. Learning Outcomes
DEVELOPMENT OF KNOWLEDGE AND UNDERSTANDING

Knowledge Base

- A successful graduate of the Biostatistics PhD program is expected:
    - to take responsibility in planning, conducting, evaluation, and interpretation stages of a multidisciplinary research regarding statistical issues
    - to be able to present a seminar on his/her studies
    - to follow the studies of other scientists about his/her research interests and to contact and cooperate with these scientists when necessary,
    - to have an up to date knowledge on recent statistical biostatistical literature and to follow recent developments in statistics and biostatistics,
    - to be able to criticize statistical literature,
    - to submit an oral and/or poster presentation in national/international congresses,
    - to be able to introduce original ideas and discuss his/her ideas in scientific environments,
    - to publish articles, and
    - to be capable of giving lectures.

Ethical Issues

- A successful graduate
    - commits to the scientific truths and statistical ethics,
    - consults with experts about ethical issues when necessary,
    - shares his/her experience with students and colleagues,
    - should be a model for his/her students as a lecturer,
    - has good communication skills with his/her colleagues,
    - should prove his sufficiency regarding intelligence, perception and scientific discipline, and
    - should bring solutions to possible ethical problems

Disciplinary Methodologies

A successful graduate of the Biostatistics PhD Program has sufficient knowledge on most of the theoretical and practical biostatistical methods. A successful graduate is expected;

- to take role in a research individually as a biostatistician,
- to have sufficient knowledge on statistical software applications,
- to be able to criticize and compare limitations of different statistical software,
- to be able to criticize traditional and/or new statistical methods and to make scientific contributions for improvement of these methods,
- to be able to access and evaluate statistical literature,
- to be able to publish his/her theoretical and practical studies, and
- to be able to write a project proposal.

COGNITIVE / INTELLECTUAL SKILLS (Generic)

Analysis

The success of the candidate in the classes (participation in discussions, presentations, assignments and examinations), performance on departmental seminars, scientific contributions to the departmental studies, joint researches, and scientific meetings (congresses, seminars, and etc.) and selection of biostatistical methods properly are considered to be indicators of 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 and other academic staff
  - Article criticism
  - Presentation of his/her studies
  - Report given to the thesis study evaluation committee

Synthesis

A successful graduate of the Biostatistics PhD program is expected to be able to:
- find solutions to the problems he/she can experience during statistical evaluation of a certain problem,
- use appropriate statistical software for the required method,
- decide on appropriate statistical methods,
- be aware of requirements of an acceptable article and/or project,
- criticize the studies in the literature,
- determine and criticize limitations of statistical methods being used,
- compare different statistical methods, and
- develop new statistical methods

Evaluation

- A successful graduate should be able to evaluate and criticize a research project individually. He/she is expected to be able to evaluate and criticize content of the project, convenience to the objectives of the project, validity and originality of the project and appropriateness of statistical methods and analysis used in the project. Candidates are asked to criticize and evaluate some sample research studies, thesis, articles, and etc. in order to evaluate their capabilities of evaluation and criticism.

Application

A candidate should be responsible of planning and conducting a research consistent with its objectives and should commit to the predefined time schedule.
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 objectives of the study before the analysis,
- data entry, edition and management,
- determining the appropriate method of analysis, and
- finding solutions for the problems due to statistical software by using different algorithms.

- The activities such as
  - assignments,
  - presentations,
  - finding solutions for possible problems in any stage of a statistical evaluation,
  - taking role in
    - consultancy services within the department,
    - projects,
    - presentations in congresses and other scientific meetings and
    - the studies to be published, and
  - being in good relationship with department's staff during his education

are considered to indicate the candidates' ability of carrying out a project individually.

KEY / TRANSFERABLE SKILLS (Generic)

Group Working

- Students' capability of leading a group study (planning and executing the study and assigning tasks to other junior team members) is evaluated by
  - their suggestions on possible problems encountered during Biostatistics MSc program,
  - assistance in solving problems concerning the departmental issues,
  - taking role in planning, execution and evaluation stages of a multidisciplinary study as a leading biostatistician, and
  - coordinating and supervising junior researchers in a group study.

- A successful graduate should be able to prevent possible conflicts in a team work and solve the possible problems of the team without reflecting them to senior researchers.

- A successful graduate should play a key role in eliminating possible conflicts between junior team members, and should consider the suggestions of other team members regarding the solution of a problem. Such a characteristic is supported by the meetings and social activities within the department.

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

Candidates should realize the following tasks in order to assess their own and others' performances objectively:
- To participate in regular departmental seminars and make one or two oral presentations annually according to the schedule,
- To participate in thesis defense held within the department as audience,
- To discuss their suggestions on a research, which they take role in planning or evaluation stages, with the academic staff in the council meetings,
- To carry out practice hours under the supervision of the concerned lecturer, and
- To assist the lecturers in the exams.

Management of Information

One of the skills acquired in the program is searching the literature sufficiently just with the help of keywords, topic title or authors.

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

In order to acquire the ability of discussing a complicated topic both in professional and elementary level according to the experience of the discussants on the topic, the following activities are foreseen for the candidates:

- Presentations within the department and in national/international scientific meetings,
- Cooperation with students,
- Taking role in consultancy services,
- Article criticism, and
- Participation in the courses with the responsible lecturer as audience.

The graduates should be able to make scientific and technical contacts with statistical/biostatistical academia.

Problem Solving

- In order to acquire the ability of managing and finalizing a project individually, the candidates are expected to
  - take role in each stage of a project,
  - take role as the responsible biostatistician in the stages assigned by the academic staff,
  - publish the findings of the project, and
  - take an active role in presentation of the project in scientific platform.

- In order to make the candidates acquire the ability of supervising other people, the following activities are planned for the candidates:
  - Carrying out practice hours of a course under supervision of responsible lecturer.
  - Assisting to the lecturers in exams,
  - Taking role in consultancy services, research projects, and statistics courses
  - Being able to act as a leader in a group study.

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

Taking role in a project individually, finding solutions for possible problems in a research that the candidate conducts or takes role as a consultant, proposing projects, developing new suggestions about the interested topics and communicating with scientists studying on similar topics are the activities that will support the candidate to handle unpredictable and complicated problems individually.

Technical Expertise

- A successful graduate should know advanced statistical methods, use statistical software, prepare reports, and access, follow and search the literature.
- A successful graduate should be able to make scientific and technical contacts with statistical/biostatistical academia.

- Assignments, seminars, projects and consultancy services, article criticism and participation in congresses and courses are considered to improve the technical skills of the candidates.

T. Other Relevant Information