BIOSTATISTICS, M.S. OR PH.D.

About the Department

The Department of Biochemistry & Molecular Biology offers programs leading to the MS, PhD or MD/PhD degrees. These are research-based programs that provide outstanding interdisciplinary education and research opportunities.

Our 24 Primary Faculty and Adjunct Faculty have well-funded programs studying the molecular basis of genetic, bacterial, viral and parasitic diseases in projects that include control of gene expression, DNA replication and rearrangement, cell migration, signaling mechanisms, membrane biology and membrane trafficking pathways, structural biology and assembly of macromolecular complexes, and glycobiology.

The campus is well-equipped with Core Facilities (http://basicsciences.ouhsc.edu/biochemmolbiol/DepartmentFacilities.aspx) to assist high-technology research, and all departments as well as Oklahoma Medical Research Foundation (http://www.omrf.org/) have active seminar programs. Seminars (http://basicsciences.ouhsc.edu/biochemmolbiol/SeminarsEvents.aspx) allow students the opportunity to meet distinguished visiting scientists from academic, technological and government institutions all over the country as well as international speakers.

Academic Programs

MS Program

Our Master of Science program is designed to qualify graduates for jobs as lab managers or research managers in academic research or biotechnology companies. The program is very flexible and course work is determined by the student's previous experience and career aspirations. The program is thesis-driven, with emphasis on research experimental planning and interpretation of results.

PhD Program

Our research-intensive PhD program is designed to prepare students for successful careers as scientists in many occupations, such as academic research (in universities, research institutes or government laboratories), biotechnology and pharmaceutical industries, teaching, health and biomedical science management, regulatory organizations and science policy. The Biochemistry & Molecular Biology faculty is augmented by adjunct faculty at the Oklahoma Medical Research Foundation (OMRF), a private research institution across the street from our campus. Students can carry out their research on campus or at OMRF.

Most students enter the Biochemistry PhD program through the interdisciplinary Graduate Program in Biomedical Sciences (GPIBS) (http://graduate.ouhsc.edu/GraduatePrograms/PhDPrograms/GraduatePrograminBiomedicalSciences.aspx).

Students who wish to enter the Biochemistry & Molecular Biology Program directly can apply through the Admissions and Records (http://admissions.ouhsc.edu/ProspectiveStudents.aspx) web page.

Our PhD program is structured so that almost all coursework is completed in the first 1 1/2 years. In the first-year students rotate through three or more research labs to find a good match for their dissertation research. The qualifying examination is completed in the Spring of the second year, and consists of writing and orally defending a research proposal based on the proposed dissertation project. After that, the student engages almost full time in research, honing presentation skills in Journal Clubs and the departmental Workshops, and attending seminars. Students can also present their research at the annual campus Graduate Research and Technology Symposium in which they can win travel grants to attend and present research at national meetings.

Areas of Specialization

Specific areas include studying the molecular basis of genetic, bacterial, viral and parasitic diseases in projects that include control of gene expression, DNA replication and rearrangement, cell migration, signaling mechanisms, membrane biology and membrane trafficking pathways, structural biology and assembly of macromolecular complexes, and glycobiology.

Career Opportunities

The MS program of the department of Biochemistry & Molecular Biology has been recently redesigned to provide enhanced education opportunities for students who wish to extend their knowledge, experience, and opportunities for advancement in research laboratories at universities, research institutes or biotechnology companies.

Our research-intensive PhD program prepares students for successful careers as independent scientists and team leaders in academic research, biotechnology and pharmaceutical industries, health and biomedical science management or teaching.

Cost

It is the student's responsibility to ensure they are enrolled in the prescribed courses and to pay tuition and fees at the time designated by the Bursar's Office. Details regarding tuition/fee charges and collection are available from the Bursar's Office.

Admission Requirements

In addition to the general admission criteria outlined in the Graduate College and College of Public Health Bulletins, applicants to the Department must also meet the following criteria:

MASTER'S PROGRAM REQUIREMENTS

1. A baccalaureate degree from an accredited institution (120 semester hours or equivalent, minimum).
2. A minimum 3.0 grade point average in the last 60 hours Admission with full standing to Masters degree programs requires an undergraduate GPA of 3.0 in the last 60 semester hours of upper division (Junior and Senior level) coursework. If at least 12 semester hours of graduate work have been taken, then the minimum GPA will be based on the graduate work. Up to 12 semester hours of work completed as a Special Student may be applied to the degree program after admission.
3. Proof of language proficiency for international applicants; TOEFL score of 88 or above.
4. GRE test, taken within the last 5 years, is required for all degrees and programs.
5. Additional prerequisite requirements for the MS in Biostatistics include:
   a. Calculus and Analytic Geometry I. Topics covered include equations of straight line; conic sections; functions, limits and continuity; differentiation; maximum-minimum theory and curve sketching.
   b. Calculus and Analytic Geometry II. Integration and its applications; the calculus of transcendental functions;

techniques of integration; and the introduction to differential equations.
    c. Calculus and Analytic Geometry III. Polar coordinates, parametric equations, sequences, infinite series, vector analysis.
    d. Calculus and Analytic Geometry IV. Vector calculus; functions of several variables; partial derivatives; gradients, extreme values and differentials of multivariate functions; multiple integrals; line and surface integrals.

DOCTORAL PROGRAM REQUIREMENTS

1. A master's degree in either biostatistics or epidemiology from an accredited institution, provided that the academic and experience requirements for such a degree are equivalent to those required for the Master's degree at the University of Oklahoma Health Sciences Center.
2. A graduate grade point average of at least 3.5.
3. Written evidence of research experience, if available. These materials will be evaluated for creativity and overall quality. Special preference will be given to applicants with research experience.
4. Proof of language proficiency for international applicants: TOEFL score of 88 or above.
5. GRE test, taken within the last 5 years, is required for all degrees and programs.
6. Additional prerequisite requirements for the Doctoral degree in Biostatistics include:
    a. Calculus and Analytic Geometry I. Topics covered include equations of straight lines; Conic sections; functions, limits and continuity; differentiation, maximum- minimum theory and curve stretching.
    b. Calculus and Analytic Geometry II. Integration and its applications; the calculus of transcendental functions; techniques of integration; and the introduction to differential equations.
    c. Calculus and Analytic Geometry III. Polar coordinates, parametric equations, sequences, infinite series, vector analysis.
    d. Calculus and Analytic Geometry IV. Vector calculus; functions of several variables; partial derivatives; gradients, extreme values and differentials of multivariate functions; multiple integrals; line and surface integrals.
    e. A course in Linear Algebra

APPLICATION PROCESS

All applicants who wish to apply for admission to the Master of Science or Doctoral degree programs in Biostatistics or Epidemiology must apply, submit, and pay the fees for two electronic applications:

1. Schools of Public Health Application Service (SOPHAS)
2. College of Public Health Supplemental Application.

A Complete Application to the OU College of Public Health Will Include:

Completed SOPHAS application (www.sophas.org) and payment of required fee. The following materials must be loaded into or received by SOPHAS:

Transcripts
- ***U.S. applicants***
  SOPHAS requires a separate official transcript from every U.S. and Canadian institution attended.
- ***International applicants:***

International applicants are required to submit transcripts/mark sheets to the World Education Services (www.wes.org (http://www.wes.org/)) for a course-by-course evaluation. Applicants should designate SOPHAS to receive the evaluation.

SOPHAS mailing address:
SOPHAS
P.O. Box 9111
Watertown, MA 02471

GRE Test Scores
Applicants are required to submit an official GRE (http://www.ets.org/gre/) score, taken within the last 5 years. SOPHAS should be designated to receive the scores by using the designation code #4244.

Career goal statement
This personal essay should be created in a word processing program and pasted into the online SOPHAS application. Complete instructions are within the SOPHAS application.

Current CV/ Résumé
The SOPHAS application allows applicants to upload the CV or résumé **before** electronically submitting the application. It is not possible to upload the resume to the SOPHAS application after e-submission of the application.

Recommendations
Three letters of academic or professional recommendation are preferable (personal references are not encouraged). Applicants will list recommenders' contact information and SOPHAS will send the recommenders instructions concerning how to submit their recommendations electronically through an online SOPHAS recommenders' portal. Recommendations must be submitted electronically.

International Applicants' English Language Proficiency
International applicants are required to submit TOEFL scores to SOPHAS using the designation code #5688. Minimum acceptable TOEFL score for most programs is 88 IBT. IELTS or other language proficiency tests will not be accepted. Additional information about the TOEFL requirement is available at https://admissions.ouhsc.edu/Prospective-Students/International- Applicants/English-Proficiency-Requirement-TOEFL (https://admissions.ouhsc.edu/Prospective-Students/International-Applicants/English-Proficiency-Requirement-TOEFL/)

THE UNIVERSITY OF OKLAHOMA COLLEGE OF PUBLIC HEALTH SUPPLEMENTAL APPLICATION AND FEE

All applicants to the OU College of Public Health are required to submit a supplemental application and fee. The supplemental application is available at: https://admissions.ouhsc.edu/.

Applicants must select the same program/s in the supplemental application as in the SOPHAS application. The fee for the supplemental application is $100 if the applicant selects two professional programs (MPH, MHA, DrPH, Certificate of Public Health). If the applicant selects one professional program and one graduate program (MS or PhD), the fee for the supplemental application is $175. If the applicant selects only graduate programs, the fee is $75.

Master of Science Degree Requirements

The Master of Science (MS) degree is a research oriented degree offered in the area of biostatistics or epidemiology. Requirements for admission are the same as for all MS degree programs in the Graduate College and

are described elsewhere in this bulletin. Additionally, the department requires three letters of reference and a statement of career goals.

Graduation requirements include a minimum of 39 semester hours (for the MS in Biostatistics) or 40 semester hours (for the MS in Epidemiology), including no more than 4 semester hours credit for BSE 5980 Research for Master's Thesis .

The Outline of Graduate Work for the Master of Science in Biostatistics is as follows
Required courses

Code	Title	Hours
BSE 5001	Problems in Biostatistics and Epidemiology	1
BSE 5013	Application of Microcomputers to Data Analysis	3
BSE 5113	Principles of Epidemiology	3
BSE 5163	Biostatistical Methods I	3
BSE 5703	Principles of the Theory of Probability	3
BSE 5733	Principles of Mathematical Statistics I	3
BSE 5173	Biostatistics Methods II	3
BSE 5980	Research for Master's Thesis	4
BSE 5111	Scientific Integrity in Research	1

Elective Courses
- Epidemiology courses - 6 credit hours
- Applied Biostatistics courses above 5173 - 6 credit hours
- One non-BSE course - 3 credit hours (if needed)

Additional Degree Requirements
- Computer Literacy
- Basic knowledge of biomedical sciences
- Comprehensive exam
- Master's Thesis

Doctor of Philosophy Degree Requirements

The Doctor of Philosophy (PhD) is an advanced, research-oriented degree program requiring in-depth study and research in a particular area in biostatistics or epidemiology. General requirements for admission and completion of the degree are consistent with those applicable to all PhD programs as described elsewhere in this bulletin. An applicant must present a master's degree in biostatistics or epidemiology. In addition, three of the five M.P.H. core courses are required. A minimum of 90 semester hours, excluding credit for research tools and including a maximum of 40 hours of transfer credit, must be presented for the degree. No more than 25 hours will be allowed for work related to the dissertation (6980).

All courses, including those related to research tools, must be approved by the student's advisory committee. An advisory committee appointed by the Graduate College upon recommendation of the department will supervise each student's program of study and monitor all coursework. Composed of at least five members, the committee must include at least one representative of a department other than the major one. Defense of the dissertation must be completed within five years of the end of the

semester in which the general examination was successfully completed; otherwise, coursework must be revalidated.

The Outline of Graduate Work for the Doctor of Philosophy in Biostatistics is as follows:
Required Courses

Code	Title	Hours
BSE 5111	Scientific Integrity in Research	1
BSE 5153	Clinical Trials	3
BSE 6192	Grant Writing Skills in Epidemiology	2
BSE 5703	Principles of the Theory of Probability	3
BSE 5733	Principles of Mathematical Statistics I	3
BSE 5743	Principles of Mathematical Statistics II	3
BSE 6553	Linear Models I	3
BSE 5653	Nonparametric Methods	3
BSE 6563	Longitudinal Data Analysis	3
BSE 6643	Survival Data Analysis	3
BSE 6663	Analysis of Multivariate Data	3
PATH 6024	Principles of Pathobiology	4
BSE 6980	Research for Doctoral Dissertation	1-16
Specialization Electives		6

Notes
- Student's advisory committee sets the remainder of any needed requirements to meet the 90 hours required for the degree.
- Student must earn at least 30 credit hours in coursework at the University of Oklahoma after admission to the Ph.D. program.
- Other Requirements:
  - Complete training in Responsible Conduct of Research (RCR) and Protection of Human Research Subjects. Attendance at the OUHSC IRB In-House Education Program, and successful completion of one credit-hour course in RCR.
  - Pass General Written and Oral Examination
  - Submit Defense of Dissertation

Master of Science Prerequisites
- Bachelor's degree from an accredited institution
- Grade point average of 3.0 or above calculated using the upper-division coursework of the bachelor's degree.
- Proof of language proficiency for international applicants: TOEFL score of 88 or above for most programs. The MHA program requires a TOEFL score of 100 IBT.
- GRE test is required for all degrees and programs.

Doctor of Philosophy Prerequisites
- Successful completion of a Master's degree in Biostatistics or related field. With approval of the department and the graduate dean, up to 40 credit hours from the master's program may be counted toward the Ph.D.
- Minimum grade point average of 3.5.
- GRE scores within the past 5 years.
- Successful completion of the following courses:

- Calculus & Analytic Geometry I
- Calculus & Analytic Geometry II
- Calculus & Analytic Geometry III
- Calculus & Analytic Geometry IV
- Successful completion of the following courses:

Code	Title	Hours
BSE 5001	Problems in Biostatistics and Epidemiology	1
BSE 5013	Application of Microcomputers to Data Analysis	3
BSE 5033	Foundations and Overview of Public Health	3
BSE 5113	Principles of Epidemiology	3
BSE 5163	Biostatistical Methods I	3
BSE 5173	Biostatistics Methods II	3
BSE 5193	Intermediate Epidemiologic Methods	3
BSE 5663	Analysis of Frequency Data	3

Program Objectives

The Department of Biostatistics and Epidemiology has two main objectives:

1. Teach the concepts of biostatistics and epidemiology essential to all students in the health sciences.
2. Educate master's and doctoral students specializing in the fields of biostatistics or epidemiology leading to master and doctoral degrees in biostatistics or epidemiology.
3. Although the department functions as a single administrative unit, it includes two distinct disciplines: biostatistics and epidemiology. A student may work toward a master's or doctoral degree in either discipline, depending on his or her interests and background. Each discipline has a different set of required courses; however, there is some flexibility in the program to allow each student to develop his or her strengths and interests through elective courses.