

Biomedical Sciences

School of Medicine and Biomedical Sciences

Biomedical Sciences
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Overview

The BS in Biomedical Sciences enables students to increase the breadth of their undergraduate experience, combine courses from various departments within the School of Medicine and Biomedical Sciences, and focus their undergraduate experience in preparation for professional or graduate studies. This major requires that students take several core courses that are traditionally considered prerequisites for professional programs in medicine, dentistry, optometry and veterinary medicine. These courses are also generally required for admission to most graduate programs in various health science disciplines.

About our Degrees

The B.S. in biomedical sciences prepares students for admission into professional programs in medicine, dentistry, optometry, chiropractic, and veterinary medicine, as well as graduate programs in the life sciences.

Having completed the core courses in the natural and biomedical sciences, students are free to select courses (electives) that confer a unique character to their major in the biomedical sciences. The availability of electives is comprehensive; they include, but are not limited to, courses in medical terminology, sociology, ethics, nutrition, and anthropology.

Acceptance Criteria

Admission into the major is based on the completion of at least three semesters of chemistry, two semesters of biology, two semesters of calculus, and one semester of physics. The minimum GPA requirements for admission are 2.0 overall, and 3.2 in the math/science prerequisite courses with no grade less than B. It is recommended that the prerequisite courses be completed by the end of the fourth semester. Transfer students are held to the same criteria.

Degree Requirements

Prerequisite courses include:

[BIO 200](#) and [BIO 201](#), [CHE 101](#) and [CHE 102](#), [CHE 201](#) and [CHE 202](#); [MTH 121](#) and [MTH 122](#) or [MTH 141](#) and [MTH 142](#); [PHY 101/PHY 151](#) and [PHY 102/PHY 152](#) or [PHY 107](#) and [PHY 108/PHY 158](#)

A minimum grade of "C" in each of the core courses is required on either the first or second attempt and a maximum of two required courses may be repeated. The Biomedical Sciences core courses include:

[ANA 113](#); [BCH 403](#) or [BIO 205](#) or [PMY 302](#); [MIC 301](#); [PGY 300](#) and [PGY 412](#), or [PGY 451/PGY 452](#); [STA 119](#) or [PSY 207](#).

In addition to the prerequisite and core courses, students take a minimum of 18-24 credit hours of biomedical science electives with at least three electives are at the 300/400 level excluding [BMS 496](#) and [BMS 498](#). Students can choose from the following suggested electives:

[AAS 414](#) Health Problems in the Black Community
[APY 248](#) Human Genetics
[APY 275](#) Introduction to Medical Anthropology
[APY 276](#) Introduction to Ethnomedicine
[APY 345](#) Comparative Primate Anatomy
[APY 346](#) Primate Dissections
[APY 348](#) Forensic Anthropological Osteology
[APY 448](#) Human Genetics/Legal and Ethical Issues
[APY 476](#) Health Care in the United States
[BIO 302](#) Introduction to Molecular Biology
[BIO 415](#) Virology
[BIO 317](#) Medical Entomology/Parasitology

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[BIO 319](#) Genetics
[BIO 448](#) Endocrinology
[CHE 349](#) Physical Chemistry for Life Sciences
[CL 151](#) Medical Terminology
[GGS 260](#) Women and Health
[HIS 215](#) Death in America
[MFC 250](#) Health Care in the U.S.
[MFC 358](#) Introduction to Medical Devices and Implants
[MIC 401](#) General Microbiology
[MT 401](#) Clinical Biochemistry
[MT 402](#) Fundamentals of Immunology
[MT 422](#) Biomolecular Technology and Diagnostics
[MT 428](#) Forensic Science
[NTR 108](#) Human Nutrition
[NTR 401](#) Nutrition and Health
[NTR 402](#) Nutrition in the Life Cycle
[PGY 405](#) Cell Physiology
[PHI 337](#) Social and Ethical Values in Medicine
[PMY 302](#) Introduction to Pharmacology
[PMY 311](#) The Chemistry of Drug Action
[PSY 322](#) Abnormal Psychology
[PSY 325](#) Health Psychology
[PSY 351](#) Biopsychology
[SOC 304](#) Sociology of Aging
[SOC 322](#) Introduction to Medical Sociology
[UGC 303](#) Great Discoveries in Science: The Macroworld (Section DZI only)

The remaining credit hours are fulfilled by free electives. These free electives are not restricted to the biomedical sciences and should be chosen in consultation with the biomedical sciences program director.

About our Courses

Courses designated with the BMS prefix provide opportunities for an internship ([BMS 496](#)) and for research experience ([BMS 498](#)).

For course descriptions, please see [Courses](#).

About our Faculty

Our faculty hold appointments in the various basic science departments in the School of Medicine and Biomedical Sciences. Numerous faculty hold patents, teaching awards, and appointments on editorial boards associated with professional scientific organizations.

Transfer Policy

Prerequisite courses may be transferred from other educational institutions if they are equivalent. Students should consult with the School of Medicine and Biomedical Sciences academic advisor to determine equivalency.

Extracurricular Activities

Biomedical sciences students are invited to an annual majors reception; graduates are honored at a reception.

See the [UB Student Association](#).

Practical Experience and Special Academic Opportunities

Undergraduate Research and Practical Experience

The program offers students the option of completing an internship within the biomedical sciences. The internship requires students to participate in work experiences related to the biomedical sciences at either on- or off-campus locations. Potential work sites include hospitals, clinics, public health agencies, research laboratories, and medical service and/or equipment providers. Another special opportunity available to biomedical sciences students is undergraduate research. A student may collaborate with his or her research mentor on an ongoing project in the

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laboratory of the mentor, or conduct independent research under the guidance of the mentor.

Information on arranging research and internship experiences is available on the [Biomedical Sciences](#) Web site. Also see that site for information on [scholarships](#).

Career Information and Further Study

Employment opportunities for individuals with advanced degrees in the life sciences are abundant. The New York State Department of Labor Occupational Outlook 1998-2008 reports that the variety of employment opportunities for graduates with a bachelors degree is wide and their number is plentiful. The number of science-related jobs in sales, marketing, and research management, for which non-PhDs usually qualify, is expected to be bountiful. Graduates may fill positions as science or engineering technicians or health technologists and technicians. Optimistic projections were also made for physicians, and cardiovascular technologists and technicians. Job prospects for college and university faculty are also expected to increase as faculty retire and student enrollment increases.

Other positions that are expected to become increasingly available include medicine and health science managers, biological and medical scientists, life science teachers, post-secondary and secondary teachers, health practitioners and technicians, physician assistants, writers, and editors. Note that chiropractors, physicians, podiatrists, medical scientists, biological scientists, college and university faculty are among the fastest growing occupations.

Graduates with biomedical sciences majors generally continue their studies in a professional or graduate school program. The small number of graduates who enter the job market upon graduation pursue careers in pharmaceutical sales or as laboratory technicians.

Skills Gained in This Program Include:

- Applying principles and concepts developed via coursework in the natural sciences (biology, chemistry, physics, mathematics) to courses in the basic life sciences (anatomy, physiology, biochemistry, microbiology)
- Describing the detailed structure of the human body examined in anatomy, and exploring structure-function relationships in human physiology
- Investigating the molecular basis of life via the study of macromolecular structure and function, gene expression, and metabolic regulation in biochemistry
- Characterizing microorganisms that enable and disrupt normal biological functions in humans based on fundamentals of microbiology
- Making decisions in the face of uncertainty and making inferences from clinical and non-clinical data using statistical principles
- Integrating information gained via general education courses and applying it in the context of the biomedical sciences
- Utilizing knowledge gleaned from elective courses to broaden perspective on personal health care, health care delivery and administration, socio-economic factors that impact human health, global health issues, drug development, and ethical dilemmas (dependent on the choice of electives)
- Discussing the merits and shortcomings of biomedical research in the context of courses in the biomedical sciences
- Demonstrating the clinical relevance of coursework in the biomedical sciences
- Matriculating into graduate and/or professional programs of study in the life sciences

Degrees Offered

Undergraduate: BS

Links to Further Information About this Program

- [Undergraduate Catalog](#)
- [Undergraduate Admissions](#)
- [Pre-health Advising](#)
- [School of Medicine and Biomedical Sciences](#)
- [Graduate Admissions](#)
- [Masters Programs](#)
- [Ph.D. Programs](#)

Biomedical Sciences - B.S.

Acceptance Criteria

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The minimum GPA requirements for admission are 2.0 overall, and 3.2 in the math/science prerequisite courses with no grade less than B. Prior to applying, students should have completed at least three semesters of chemistry, two semesters of biology, two semesters of calculus, and one semester of physics. Application deadlines are September 15 and February 15.

Prerequisite Courses

[BIO 200](#) Evolutionary Biology
[BIO 201](#) Cell Biology
[CHE 101](#) General Chemistry or [CHE 105](#) Chemistry: Principles and Applications
[CHE 102](#) General Chemistry or [CHE 106](#) Chemistry: Principles and Applications
[CHE 201](#) Organic Chemistry
[CHE 202](#) Organic Chemistry
[MTH 121](#) Survey of Calculus and Its Applications I or [MTH 141](#) College Calculus I
[MTH 122](#) Survey of Calculus and Its Applications II or [MTH 142](#) College Calculus II
[PHY 101/PHY 151](#) College Physics I/Lab or [PHY 107](#) General Physics I
[PHY 102/PHY 152](#) College Physics II/Lab or [PHY 108/PHY 158](#) General Physics II/Lab

Required Courses

[ANA 113](#) Human Anatomy or [APY 345/APY 346](#) Comparative Primate Anatomy
[BCH 403](#) Principles of Biochemistry or [BIO 205](#) Fundamentals of Biological Chemistry or [PMY 302](#) Introduction to Pharmacology

[MIC 301](#) Biomedical Microbiology
[PGY 300](#) Human Physiology and [PGY 412](#) Applied Physiology or [PGY 451/PGY 452](#) Human Physiology I and II
[STA 119](#) Statistical Methods or [PSY 207](#) Psychological Statistics

A minimum grade of "C" in each of the core courses is required on either the first or second attempt and a maximum of two required courses may be repeated.

Biomedical Science electives: a minimum of 18-24 credit hours with at least three electives at the 3/400 level excluding [BMS 496](#) and [BMS 498](#).

Summary

Total required credit hours for the major...87-93

See [Baccalaureate Degree Requirements](#) for general education and remaining university requirements.

Recommended Sequence of Program Requirements

FIRST YEAR

Fall [BIO 200](#), [CHE 101](#), [MTH 121](#)
 Spring [BIO 201](#), [CHE 102](#), [MTH 122](#)

SECOND YEAR

Fall [CHE 201](#), [PHY 101/PHY 151](#)
 Spring [CHE 202](#), [PHY 102/PHY 152](#)

THIRD YEAR

Fall [ANA 113](#), [PGY 300](#)
 Spring [PGY 412](#), [STA 119](#)

FOURTH YEAR

Fall [BCH 403](#) or [PMY 302](#), biomedical sciences electives
 Spring [MIC 301](#), biomedical sciences electives

Electives and Course Groupings

[AAS 414](#) Health Problems in the Black Community
[APY 248](#) Human Genetics
[APY 275](#) Introduction to Medical Anthropology
[APY 276](#) Introduction to Ethnomedicine
[APY 345](#) Comparative Primate Anatomy
[APY 346](#) Primate Dissections
[APY 348](#) Forensic Anthropological Osteology
[APY 448](#) Human Genetics/Legal and Ethical Issues
[APY 476](#) Health Care in the United States
[BIO 302](#) Introduction to Molecular Biology
[BIO 415](#) Virology
[BIO 317](#) Medical Entomology/Parasitology

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BIO 319 Genetics
BIO 448 Endocrinology
CHE 349 Physical Chemistry for Life Sciences
CL 151 Medical Terminology
GGS 260 Women and Health
HIS 215 Death in America
MFC 250 Health Care in the U.S.
MFC 358 Introduction to Medical Devices and Implants
MIC 401 General Microbiology
MT 401 Clinical Biochemistry
MT 402 Fundamentals of Immunology
MT 422 Biomolecular Technology and Diagnostics
MT 428 Forensic Science
NTR 108 Human Nutrition
NTR 401 Nutrition and Health
NTR 402 Nutrition in the Life Cycle
PGY 405 Cell Physiology
PHI 337 Social and Ethical Values in Medicine
PMY 302 Introduction to Pharmacology
PMY 311 The Chemistry of Drug Action
PSY 322 Abnormal Psychology
PSY 325 Health Psychology
PSY 351 Biopsychology
SOC 304 Sociology of Aging
SOC 322 Introduction to Medical Sociology
UGC 303 Great Discoveries in Science: The Macroworld (Section DZI only)

BMS 496: Biomedical Sciences Internship

Credits: 1-4

Semester(s): Fall, Spring

Type: TUT

The content of this course is variable and therefore it is repeatable for credit. The [University Grade Repeat Policy](#) does not apply.

Exposes students to a nonacademic environment within which to apply the knowledge gained via traditional coursework. Students have the opportunity to work with a community, government, or private agency as a student intern. This volunteer, credit-bearing experience gives students the opportunity to experience specific job settings. Students may opt for biomedical sciences work sites whose primary focus is clinical, business, or research.

BMS 498: Biomedical Sciences Research

Credits: 1-8

Semester(s): Fall, Spring

Type: TUT

The content of this course is variable and therefore it is repeatable for credit. The [University Grade Repeat Policy](#) does not apply.

Students collaborate with research mentors on an ongoing project in a laboratory setting or conduct independent research under the guidance of their mentors. This experience provides students with an inquiry-based learning opportunity and engages them as active learners in a research setting. Makes available opportunities to hone students' oral and written communication skills.