

Pharmacology (BCP)**Major in Pharmacology****Department of Pharmacological Sciences, College of Arts and Sciences**

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UNDERGRADUATE PHARMACOLOGY
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Minors of particular interest to students majoring in Pharmacology: Biomaterials (BES), Bioengineering (BNG), Biomedical Engineering (BME), Chemistry (CHE), English (EGL), Philosophy (PHI), Political Science (POL)

Pharmacology (BCP)

Pharmacology is an interdisciplinary science which investigates the actions of drugs and chemicals on biological systems. It requires a knowledge of the sources, chemical properties, biological effects, and therapeutic uses of drugs. It is a science that is basic not only to medicine but also to pharmacy, nursing, dentistry, and veterinary medicine. Pharmacological studies range from those that determine the effects of chemical agents upon subcellular mechanisms, to those that deal with the potential hazards of drug therapy for major diseases. By unlocking mysteries of drug action, discovering new therapies, and developing new medicinal products, pharmacology inevitably touches upon all of our lives.

The curriculum in Pharmacology, leading to the Bachelor of Science degree, is designed to prepare students for careers in drug research and development and to provide a solid background for those students who choose to pursue graduate studies in the pharmacological sciences. Focusing on cellular, molecular, and human pharmacology, the program allows students to develop an understanding of this discipline in a basic science teaching and research environment.

Students majoring in Pharmacology have the conceptual and practical knowledge to pursue technical and professional careers in all areas of drug research and development within the pharmaceutical and biotechnology industry, research institutes, and government agencies. The program provides an excellent foundation for graduate programs in pharmacology, toxicology, and molecular biology. The Pharmacology curriculum teaches students the principles of pharmacology and toxicology and mechanisms of drug action to students whose career interests lie in medicine, and other branches of health care and life sciences. Current career objectives in order of choice are Ph.D. programs in pharmacology, M.D./Ph.D., and M.D. degrees, and entry-level scientist positions in industry.

Requirements for the Major in Pharmacology (BCP)

Acceptance into the Undergraduate Pharmacology Program

Acceptance into the program requires an application process involving reference letters, a personal statement, and an interview. Applications are available through the Undergraduate Pharmacology Web site at <http://www.pharm.stonybrook.edu/Undergraduate%20Program/application>. Note: Students may not declare a double major among biology, biochemistry, and pharmacology.

Requirements for the Major in Pharmacology (BCP)

The major in Pharmacology leads to the Bachelor of Science degree. All courses offered for the major must be taken for a letter grade. In the requirements listed below, a minimum grade point average of 3.00 must be obtained for all 100-level and upper-division courses.

Completion of the major requires approximately 68-69 credits.

A. Courses in Related Fields

1. CHE 131, CHE 132 General Chemistry
2. CHE 133, CHE 134 General Chemistry Laboratory
3. CHE 321, CHE 322 Organic Chemistry
4. CHE 327 Organic Chemistry Laboratory A or CHE 333 Organic Chemistry Laboratory B
5. MAT 131, MAT 132 Calculus I, II (See Note 1)
6. PHY 121/PHY 123, PHY 122/PHY 124 Physics for the Life Sciences and labs (See Note 1)

B. Courses in Biological Sciences

1. BIO 202 and BIO 203 Fundamentals of Biology
2. BIO 204 and BIO 205* Fundamentals of Scientific Inquiry I and II
3. BIO 310 Cell Biology
4. HBY 350 Physiology (BIO 328 will be allowed as a substitute under extenuating circumstances.)
5. BIO 361, BIO 362 Biochemistry I, II
6. BIO 365 or BIO 311 Biochemistry Laboratory

*BIO 207 may be used as a substitute for BIO 205

C. Pharmacology

1. BCP 400 Writing in Pharmacology
2. BCP 401 Principles of Pharmacology
3. BCP 402 Advanced Pharmacology
4. BCP 403 Principles of Pharmacology Laboratory
5. BCP 404 Advanced Pharmacology Laboratory
6. BCP 406 Pharmacology Colloquium
7. BCP 487 Pharmacology Research (at least three credits are required to graduate, along with a written senior thesis)

D. Upper-Division Writing Requirement

To fulfill the upper-division writing requirement in Pharmacology, a sample of writing from an upper-division course in biological sciences, must be submitted to the Department of Pharmacological Sciences for evaluation by the Pharmacology writing committee. This writing sample can be a laboratory report, a term paper, or a report for a reading or research course, and it must contain at least 750 words of text. It is to be accompanied by a form (available in the Department of Pharmacological Sciences office) signed by the student and the instructor of the course for which the material was written. The student must enroll in BCP 400 Writing in Pharmacology for the semester in which the upper-division writing requirement is being attempted. The deadline for submission of the writing sample is December 1 for students graduating in the following May or August, and May 1 for students graduating in the following December. If the writing in this sample is judged to be satisfactory by the writing committee, the requirement is fulfilled. If the writing is judged unsatisfactory, the student is advised to seek help in writing skills from the Writing Center and must pass a writing examination administered by the Department of Pharmacological Sciences at a scheduled time prior to graduation.

E. Courses Recommended but not Required for the Major

- BCP 475 Undergraduate Teaching Practicum I
- BCP 488 Internship
- BIO 320 General Genetics
- CHE 301 Physical Chemistry I
- CHE 302 Physical Chemistry II
- CHE 312 Physical Chemistry (Short Course)

Note: The following alternate sequences may be substituted for major requirements:

for MAT 131, MAT 132: MAT 125, MAT 126, MAT 127 or MAT 141, MAT 142 or MAT 171

for PHY 121/PHY 123, PHY 122/PHY 124: PHY 131, PHY 132 or PHY 141, PHY 142 or PHY 125, PHY 126, PHY 127

Honors Program in Pharmacology

Graduation with honors in Pharmacology requires: 1) a cumulative grade point average of 3.50 or higher in all courses in Requirements A, B, and C above, and 2) presentation of an outstanding thesis based on a research project performed under BCP 487, written in the format of a paper in a scientific journal. A student interested in becoming a candidate for honors should submit an outline of the proposed thesis research project to the pharmacology director, no later than the second week of classes in the last semester. (Acceptance of a project for BCP 487 registration does not imply automatic acceptance of that project for honors.) The director, in consultation with the student, then appoints a thesis committee consisting of the research sponsor and two additional faculty members. Two members of the thesis committee must be members of the Department of Pharmacological Sciences and one must be a member of another department in a related field.

Copies of the finished thesis, approved by the research sponsor, must be presented to the pharmacology director and thesis committee at least 21 days before the date of graduation.

Accelerated Bachelor of Science (BS) in Pharmacology and Master of Public Health (MPH) Evaluative Science Concentration

The BS in Pharmacology is an excellent preparation for the MPH degree, particularly for the MPH

Evaluative Sciences concentration which focuses on the highly quantitative areas of biostatistics and demography. The current demand for MPH graduates with quantitative backgrounds is strong.

Admission Requirements: Students must have completed 60 credits of undergraduate coursework with a minimum GPA of 3.0 in all college work before being admitted into any accelerated Bachelor/Masters degree program. Additional entry requirements for this specific accelerated degree consist of: GPA in courses required for the Pharmacology major of at least 3.3, and letters of recommendation from two faculty members in the undergraduate Pharmacology Program. Students in this accelerated BS/MPH program will be able to complete

both degrees in 5 years.

Please see the Pharmacology Undergraduate Program Director for further information.

Sample Course Sequence for the Major in Pharmacology

**BCP 487 research project is usually begun by the fall semester of the senior year

Freshman Fall	Credits	Spring	Credits
First Year Seminar 101	1	First Year Seminar 102	1
D.E.C. A	3	D.E.C. A	3
CHE 131	4	CHE 132	4
CHE 133	1	CHE 134	1
MAT 131	4	MAT 132	4
D.E.C.	3	D.E.C.	3
Total	16	Total	16
Sophomore Fall	Credits	Spring	Credits
CHE 321	4	BIO 203 and BIO 205	5
BIO 202 and BIO 204	5	CHE 322 or 326	4
D.E.C.	3	CHE 327	2
D.E.C.	3	D.E.C.	4
D.E.C.	3	D.E.C.	3
Total	18	Total	18
Junior Fall	Credits	Spring	Credits
PHY 121/123	4	PHY 122/124	4
BIO 361	3	BIO 362	3
BIO 365 or 311	2	BIO 310	3
Upper division elective	3	BCP 406	2
D.E.C.	3	D.E.C.	3
Total	15	Total	15
Senior Fall	Credits	Spring	Credits
BCP 401	3	BCP 402	3
BCP 403	2	BCP 404	2
HBY 350	3	**BCP 487	3
HBH 393	1	Elective	3
Elective	3	Elective	3
Total	12	Total	14

BCP

Pharmacology

BCP 400: Writing in Pharmacology

See requirements for the major in pharmacology, upper-division writing requirement.

Prerequisites: Pharmacology major; U3 or U4 standing; permission of instructor

S/U grading

BCP 401: Principles of Pharmacology

Basic principles and mechanisms of drug distribution, absorption, metabolism, and elimination. Principles of chemical carcinogenesis and tumor promotion. Autonomic, smooth-muscle, and CNS pharmacology. Pharmacology of specific drugs of historical interest including alcohol, antibiotics, aspirin, nicotine, and morphine. Review of anticoagulants and thrombolytic agents, antiparasitics, and drugs for the treatment of allergic conditions and gout.

Prerequisites: BIO 362; CHE 322 and 327; a g.p.a. of 3.00 or higher in these courses and their prerequisites.

Corequisite for pharmacology majors: BCP 403

4 credits

BCP 402: Advanced Pharmacology

Advanced concepts of drug metabolism, pharmacokinetics, biochemical, and molecular mechanisms of drug action, and drug resistance in human disease states. Toxicological agents and environmental pollutants. The pharmacology of autocoids, anti-inflammatories, immunosuppressants, and antiasthmatics. Rational drug design and drug receptor interactions using computer molecular modeling techniques.

Prerequisites: BCP 401 and 403; minimum of B- in BCP 401

Corequisite: BCP 404

4 credits

BCP 403: Principles of Pharmacology Laboratory

The use of molecular modeling software for the understanding of structure activity relationships. In vivo studies to demonstrate the pharmacological mechanism of action of drugs acting on the autonomic, cardiovascular, and renal systems. Pharmacokinetic studies, using HPLC, to determine the rate of absorption, distribution, and excretion of therapeutic agents. Radio- and enzyme-immunoassays for the detection of circulating

hormones. Cell culture techniques for drug determination and evaluation.

Prerequisite: Permission of instructor

Corequisite: BCP 401

2 credits

BCP 404: Advanced Pharmacology Laboratory

The use of molecular modeling software for the understanding of structure activity relationships. In vivo studies to demonstrate the pharmacological mechanism of action of drugs acting on the autonomic, cardiovascular, and renal systems. Pharmacokinetic studies, using HPLC, to determine the rate of absorption, distribution, and excretion of therapeutic agents. Radio- and enzyme-immunoassays for the detection of circulating hormones. Cell culture techniques for drug determination and evaluation. This course has an associated fee. Please see www.stonybrook.edu/coursefees for more information.

Prerequisites: BCP 401 and 403; permission of instructor

Corequisite: BCP 402

2 credits

BCP 406: Pharmacology Colloquium

Seminars on research in pharmacology and toxicology presented by faculty and distinguished scientists from academic and industrial institutions. Students are expected to develop an understanding of the scientific principles presented in the colloquium. Speakers meet with the students after the seminar to discuss research concepts and to answer questions. One hour Journal Club/ Discussion followed by one hour seminar. May be repeated.

Prerequisites: BIO 202 and 203; CHE 322; a g.p.a. of 3.00 in these courses and their prerequisites

2 credits

BCP 475: Undergraduate Teaching Practicum in Pharmacology

Prerequisites: Pharmacology major; U4 standing; permission of department

3 credits, S/U grading

BCP 487: Research in Pharmacology

Completion of an individual student research project under the supervision of a faculty member. Previously acquired laboratory course techniques and new procedures are utilized. Experimental results must be submitted to the department for grade evaluation in the format of a research report. Not for credit in addition to HBH 396, 398, and 399. May be repeated.

Prerequisites: BIO 202 and 203; CHE 322 and 327; a g.p.a. of 3.00 in these courses and their prerequisites; permission of instructor and department

0-6 credits

BCP 488: Internship

Research participation in off-campus laboratories, the pharmaceutical industry, and other academic and public agencies. Repeatable up to 12 credits.

Prerequisites: BIO 361; CHE 322; g.p.a. of 3.00 or higher in these courses and their prerequisites; permission of department

0-6 credits, S/U grading