The B.S. in pharmaceutical sciences is not a major, but is an internal degree granted to current doctor of pharmacy (Pharm.D.) students after they complete their second year of the Pharm.D. program. In order to qualify for the B.S. in pharmaceutical sciences, students must have attended UW–Madison prior to entering the School of Pharmacy, and must meet all degree requirements. More detailed information about this degree may be found on the school website (https://pharmacy.wisc.edu/programs/pharmd/curriculum/bs-ps).

Information about our Doctor of Pharmacy program (Pharm.D.) can be found at https://pharmacy.wisc.edu/programs/pharmd/. The Pharm.D. is required to be eligible to take the North American Pharmacist Licensure Examination (NAPLEX) and be registered and licensed as a pharmacist.

Students interested in pursuing an undergraduate degree offered by the School of Pharmacy may want to investigate the B.S. Pharmacology and Toxicology (http://guide.wisc.edu/undergraduate/pharmacy/pharmacy/pharmacology-toxicology-bs) program. This interdisciplinary major in the biomedical sciences can serve as a foundation for further education in graduate or professional degree programs, or for entry-level scientific employment.

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REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatetestudytext) section of the Guide.

PHARMACEUTICAL SCIENCES, B.S.

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General Education

- Breadth--Humanities/Literature/Arts: 6 credits
- Breadth--Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth--Social Studies: 3 credits
- Communication Part A & Part B *
- Ethnic Studies *
- Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

MAJOR REQUIREMENTS

MATH & SCIENCE COURSES

1. **Biology with labs**
   - A complete two-semester integrated sequence of General Biology, to include a strong foundation in both Organismal Biology and Cellular/Molecular/Genetic Biology.
   - If a sequence of general biology is not available, then:
     - Semester system: Animal Biology and a course in Cell Biology (preferable) or Botany.
     - Quarter system: Animal Biology and Cell Biology and Botany.
   - Human anatomy, human physiology, and microbiology do not count toward the biology requirement.

2. **Chemistry with labs**
   - General Chemistry (at least 8 cr. minimum) and one year of Organic Chemistry (8 cr. minimum).

3. **Calculus for Math / Science Majors**
   - The Calculus requirement is content-based, not course-based.

4. **Physics with lab**
   - An introductory physics course and lab

5. **Microbiology**
   - A microbiology course -- lab is not required.

6. **Statistics**
   - Most 3-credit college-level statistics courses will satisfy this requirement.

NON-MATH & SCIENCE COURSES

1. **Communication “A”**
   - Course work equivalent to the UW-Madison Communication “A” requirement.
   - A score of at least 4 on the AP English: Language & Composition exam
   - A score of at least 4 on the AP English: Literature & Composition exam
   - Acceptable UW System English placement test score(s):
     - an ENGL score of at least 605, or
     - an ECS score of at least 706, or
     - a UWEPT score of at least 660 and a UWRCT score of at least 730

2. **Communication “B”**

3. **Economics**
7. **Humanities** (6 credits required)
   - Most courses labeled as humanities will satisfy. 6 credits (typically 2 courses) are required.

### UNIVERSITY DEGREE REQUIREMENTS

**Total Degree** To receive a bachelor’s degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

| Residency | Degree candidates are required to earn a minimum of 30 credits in residence on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs. |
| Quality of Work | Undergraduate students must maintain the minimum quality of academic performance specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation. |

### LEARNING OUTCOMES

1. **Scientific and Medical Terminology.** Use appropriate scientific and medical terminology to convey anatomic, pathophysiologic, physical, chemical, pharmacologic, pharmacoeconomic, socio-behavioral, and therapeutic concepts.
2. **Drug factors.** Apply knowledge of the physical, chemical, pharmacologic, and formulation properties of drugs and relate how these properties influence drug parameters (such as kinetics, pharmacodynamics, stability, dosage form design, and treatment-related outcomes). Differentiate among the major therapeutic drug classes based on mechanisms of action, clinical use and adverse effects, contraindications, drug interactions, dosage forms, and dosing regimens.
3. **Patient factors.** Collect, integrate and apply knowledge of a patient’s biochemistry, anatomy, physiology, genomics, culture, socio-behavioral characteristics, and pathophysiologic states to develop an individualized patient care plan using drug factors that will improve therapeutic outcomes, minimize drug reactions, reduce adverse events, and increase adherence.
4. **Drug kinetics.** Design or modify dosage regimens using patient-specific or population pharmacokinetic data, plasma concentration-time profile of drugs, and factors that alter them.
5. **Product preparation.** Compound parenteral and non-parenteral drug products using appropriate calculations, pharmaceutical components, and techniques. Demonstrate a commitment to patient safety by assuring total accuracy in calculation, preparation, labeling and dispensing of prescription and medication orders.
6. **Communication.** Communicate effectively in oral and written forms with patients, caregivers, healthcare professionals, scientists, and others. Demonstrate empathy, listening skills, and altruism in interactions.
7. **Teamwork.** Collaborate effectively with pharmacy colleagues, other healthcare professionals, scientists, and patients and/or their caregivers.
8. Behavioral principles. Apply social and behavioral principles and theories in the design, delivery, and evaluation of pharmaceutical care.

9. Management principles. Use management principles to analyze and have ability to manage pharmacy operations and to analyze and evaluate personnel, including optimizing physical and technological resources, to assure safe, efficient and effective management of medication distribution, control, and use systems.

10. Practice evaluation. Apply patient- and population-specific data, quality assurance strategies, and evaluation to develop and implement practice-based drug use strategies and public health policies to assure that medication use systems minimize drug misadventuring, optimize patient outcomes, and address public health problems.

11. Health disparities. Identify causes of health disparities and incorporate principles of cultural awareness, sensitivity, and competence into plans to address these issues.

12. Public Health. Identify and address public health problems and promote health and wellness. Design individual and population-specific, evidence-based disease prevention and disease management programs (such as medication therapy management) and protocols based upon analysis of epidemiologic and pharmaco-economic data, medication use criteria, medication use review, and risk reduction strategies.

13. Lifelong learning. Create and enhance a personal plan for continuing professional development to promote lifelong learning and ensure maintenance of professional competence.

### FOUR-YEAR PLAN

**Third Year**

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**Fourth Year**

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Total Credits 50-51