

PRE-PHARMACY

College of Liberal Arts & Sciences Advising Center

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PORTLAND STATE UNIVERSITY

Besides being highly educated about drug actions and interactions, today's pharmacist must be skilled in written and verbal communications, identifying and solving problems, and working as a partner with patients, physicians and other health care providers. Pharmacists must be proactive and take responsibility for their patients. These days, the technical tasks of filling and labeling a prescription are being delegated to support personnel and even to highly sophisticated computers and robots. This allows the pharmacist more time to do the exciting things like counsel patients, consult with physicians and work with health care providers to develop policies for drug use. The goal is to assure that patients obtain the maximum benefit from their medications with the least side effects and at the most affordable price – in other words, to improve the health of the public.

Pharmacy programs require that applicants complete a specific set of prerequisite courses prior to enrollment. Some programs require that students earn a baccalaureate degree before matriculating to pharmacy school. Regardless, it is strongly recommended that students complete a baccalaureate degree prior to matriculation in pharmacy school. **Portland State offers a strong pre-pharmacy program** whereby students complete their prerequisite coursework, earn a baccalaureate degree, and obtain extensive assistance with the pharmacy school preparation and application process.

There are two pharmacy programs in Oregon. The College of Pharmacy at Oregon State University (OSU) and the School of Pharmacy at Pacific University (the program is housed in the Health Profession Campus, which is located in Hillsboro, OR). Applicants for admission to OSU must have at least 135 quarter hours of acceptable credits, or 93 quarter hours for Pacific University. To become a licensed pharmacist, applicants must graduate from an accredited, recognized pharmacy program, pass a national licensing examination, and complete a one year pharmacist-supervised internship.

Prerequisite Courses Required by Most Pharmacy Programs:

- One year of General Biology
- One year of General (Inorganic) Chemistry
- One year of Organic Chemistry
- One term of Microbiology
- One year of Human Anatomy & Physiology
- One year of Physics
- One term of Calculus
- One term of Communication/Speech
- One term of Economics (micro or macro)

NOTE: Science courses should be those designed for science majors

Additional Prerequisite Courses Required by Some Pharmacy Programs:

- Statistics
- College English/Writing
- Biochemistry
- Genetics
- Molecular Biology
- Cell Biology
- Behavioral Sciences such as Psychology
- Minimum credit requirements in the humanities and/or social sciences

The above lists are not exhaustive. Check individual schools for requirements. Note that most professional schools require that an **A, B, or C** be earned in all required preparatory courses. **Admission to pharmacy programs is limited and competitive.**

Requirements for Admission to Oregon State University College of Pharmacy

The following is an outline of OSU prerequisite courses and other admissions requirements
(Subject to change at any time)

Prerequisite Coursework

OSU Prerequisite Courses Quarter hours	Equivalent PSU Courses Quarter hours
<p>Mathematics: Calculus for health science or business – 4 quarter hours (AP Calculus or BC score of 3, 4, or 5 fulfills this requirement) & Introduction to Statistics – 3 quarter hours (AP Statistics score of 4 or 5 fulfills this requirement)</p>	<ul style="list-style-type: none"> • MTH 251 – Calculus (recommended prerequisite is MTH 112) • STAT 243 (4) – Introduction to Probability & Statistics (recommended prerequisite is second year high school algebra or equivalent)
<p>Chemistry: <i>General Chemistry with lab</i> for science majors – 15 quarter hours (AP score of 4 or 5 fulfills requirement) <i>Organic Chemistry with lab</i> for chemistry majors – 12 quarter hours</p>	<ul style="list-style-type: none"> • CH 221/227, CH 222/228, CH 223/229 (15) – General Chemistry (MTH 111 is a pre- or co-requisite for this course) • CH 334, 335/337, 336/338 (16) – Organic Chemistry I, II, III w/ Lab (CH 221-223 with lab is the recommended prerequisite)
<p>Biology: <i>Principles of Biology with lab</i> for science majors – 12 quarter hours (AP score of 4 or 5 fulfills requirement) <i>Human Anatomy & Physiology</i> – 12 quarter hours (must be completed at a four-year school - community college courses are not accepted) <i>Cell & Molecular Biology</i> – 4 quarter hours <i>Microbiology with lab</i> for science majors, upper division – 5 quarter hours (must be completed at a four-year school - community college courses are not accepted)</p>	<ul style="list-style-type: none"> • BI 251, 252, 253 w/ Lab (15) – Principles of Biology (recommend CH 221 be complete prior to or concurrent w/ BI 251) • BI 301, 302, 303 (12) – Human Anatomy & Physiology w/Lab (recommended one year of college level biology and a previous course in chemistry) • BI 334 (4) –Molecular Biology (prerequisite: BI 251) *or* BI 336 (5) – Cell Biology (prerequisite: 1yr of biology, 1yr of chemistry and BI 334) • BI 480 (4)– Microbiology (expected prerequisites for BI 480 are BI 334 & 336) w/Lab BI 488 (2) (expected prerequisite BI 235 or BI 337)
<p>Physics: <i>General Physics with lab</i> (algebra based) – 15 quarter hours (AP score of 4 or 5 on the AP Physics B exam fulfills this requirement)</p>	<ul style="list-style-type: none"> • PH 201/214, 202/215, 203/216 (15) – General Physics w/ Lab (MTH 111 & 112 are recommended prerequisites for Physics)
<p>English/Writing: <i>English composition</i> – 6 quarter hours (AP English Lit & Comp score of 3, 4, or 5 fulfills one course requirement)</p>	<p>Choose two of the following:</p> <ul style="list-style-type: none"> • WR 121 (4) - College Writing • WR 222 (4) - Research Papers • WR 323 (4) - Writing as Critical Inquiry <p>Note: Freshman Inquiry may count for WR 121 (3 credits). Check with the pre-pharmacy adviser.</p>
<p>Communications: <i>Interpersonal Communication</i> – 3 quarter hours (Public Speaking and Small Group Communication can also meet this requirement)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> • COMM 218 (4) – Interpersonal Communication • COMM 220 (4) – Public Speaking • COMM 313 (4) – Communication in Groups
<p>Economics: <i>Micro or Macro</i> – 4 quarter hours (AP Economics score of 3, 4, or 5 fulfills this requirement)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> • EC 201 (4) – Micro Economics • EC 202 (4) – Macro Economics
<p>Psychology: <i>General Psychology</i> – 3 quarter hours (AP Psychology score of 3, 4, or 5 fulfills this requirement)</p>	<p>Choose one of the following:</p> <ul style="list-style-type: none"> • PSY 200 (4) – Psychology as a Natural Science • PSY 204 (4) – Psychology as a Social Science

Additional Oregon State University Pharmacy Admissions Requirements:

- A bachelor's degree is not required for admission to the program, but must be completed before the third year of the professional program. To learn about bachelor's degree options please contact the adviser for more information. Approximately 75 percent of students admitted in recent years earned their bachelor's degree before entering the pharmacy program. Completion of the B.S. prior to matriculation to the program is recommended.
- **First Aid/CPR** certification is not required at the time of application. However, all admitted applicants must have current First Aid and CPR certification prior to their first day of class in the program.
- **Prerequisite science GPA:** must be a 2.75 or higher for residents and a 3.0 for non-residents. The science GPA is calculated by PharmCAS and will not be recalculated by OSU.
- When applications are received from PharmCAS they are screened by minimum Science GPA (as calculated by PharmCAS). The pre-pharmacy science GPA is then calculated for applications meeting the minimum criteria. This GPA includes *only* the science and math courses from OSU's PharmD prerequisites. Non-science requirements like writing and communication are not calculated in this GPA. If a course has been repeated, only the highest grade earned will be calculated into the pre-pharmacy science GPA.
- **International applicants:** Courses completed outside the U.S. may or may not fulfill OSU's prerequisites. The answer varies depending on the course content, the date completed, and the country in which the course was taken. It is extremely rare for foreign credits to fulfill all the OSU pharmacy prerequisites and it is strongly recommended that applicants in this situation plan to complete the upper-division prerequisites (organic chemistry, microbiology, anatomy and physiology) at a U.S. university. For specific information about foreign credits for pharmacy prerequisites, applicants can submit a request for transcript evaluation.
- **Letters of Reference:** You must submit at least two recommendation letters with your pharmacy application. A maximum of four letters will be accepted. Letters must be submitted directly to PharmCAS and received by the application deadline. Letters submitted directly to OSU will not be accepted.
- **PCAT:** not required
- **The average pre-pharmacy science GPA** of applicants who have been admitted to the Doctor of Pharmacy program at OSU in recent years is 3.58.

Oregon State University Pharmacy Program Application Information:

- **Pharm.D. Application deadlines:** You can apply to the program between June 4th and December 1st for entrance in September. All applications must be submitted via [PharmCAS](#) by Dec. 1st.
- **Early Decision Program** is a binding option for applicants who have decided that a particular pharmacy degree program is their first choice and that they will enroll if accepted. See www.pharmacas.org for more information on participating programs. OSU **does** participate in the Early Decision Program.
- **Early Decision Deadline:** September 3rd
- **Regular Decision Deadline:** December 1st
- **Supplemental Application Deadline:** December 1st. In addition to completing the PharmCAS application, all applicants to OSU's program are required to submit the OSU Supplemental Application. Supplemental Application materials must be **received** (in one envelope) directly to the OSU College of Pharmacy no later than **Dec. 1st**. This application consists of three parts: 1) Essay: 1000 words or less on the topic, "Why do you want to attend the OSU College of Pharmacy?" 2) Prerequisite Worksheet, this worksheet is available to download on OSU's website 3) \$50 fee.
- **Transcript Evaluation:** Informal evaluations of prospective students' transcripts can be made by the College of Pharmacy Student Affairs Office upon request. Submit copies of your transcripts via e-mail to pharmacy@oregonstate.edu, or fax to 541.737.3999 attn: Transcript Evaluation or send via postal mail (Transcript Evaluation; 203 Pharmacy Bldg, Corvallis, OR 97331). Unofficial transcript copies are sufficient for the informal evaluation. Include your name and e-mail address so results can be communicated to you. Allow 4-6 weeks to receive the results.

Oregon State University Pharmacy Program Contact:

College of Pharmacy

203 Pharmacy Building

Corvallis, OR 97331-3507

Phone: 541.737.3424 Fax: 541.737.3999

Website: <http://pharmacy.oregonstate.edu/>

Angela Austin Haney, Director of Student Services & Head Advisor

Email: Angela.austinhaney@oregonstate.edu

Jeff Ruder, Academic Advisor

Email: Jeffrey.ruder@oregonstate.edu

Requirements for Admission to Pacific University School of Pharmacy

The following is an outline of Pacific's prerequisite courses and other admissions requirements
(Subject to change at any time)

Prerequisite Coursework

Pacific University Prerequisite Courses	Equivalent PSU Courses
Mathematics: <u>Calculus</u> 3 semester hours or 4 quarter hours	<ul style="list-style-type: none"> • MTH 251 – Calculus (recommended prerequisite is MTH 112)
Chemistry: <u>Chemistry – minimum of 16 semester hours or 24 quarter hours</u> <i>General Chemistry w/Lab</i> 8 semester hours or 12 quarter hours <i>Organic Chemistry w/Lab</i> 8 semester hours or 12 quarter hours	<ul style="list-style-type: none"> • CH 221/227, CH 222/228, CH 223/229 (15) – General Chemistry (MTH 111 is a pre- or co-requisite for this course) • CH 334, 335/337, 336/338 (16) – Organic Chemistry I, II, III w/ Lab (CH 221-223 with lab is the recommended prerequisite)
Biology: <u>Biological Sciences – minimum of 19 semester hours or 29 quarter hours</u> <i>General biology w/Lab</i> 8 semester hours or 12 quarter hours <i>Microbiology (Lab not required)</i> 3 semester hours or 3 quarter hours <i>Human Anatomy and Physiology w/Lab</i> 8 semester hours or 12 quarter hours (all parts of the series should be taken at the same institution)	<ul style="list-style-type: none"> • BI 251, 252, 253 w/ Lab (15) – Principles of Biology (recommend CH 221 be complete prior to or concurrent w/ BI 251) • BI 480 (4) – Microbiology (expected prerequisite BI 334 & 336) • BI 301, 302, 303 (12) – Human Anatomy & Physiology w/Lab (recommended one year of college level biology BI 251, 252, & 253 and a previous course in chemistry)
Physics: <u>Physics with lab</u> 3 semester hours or 4 quarter hours	<ul style="list-style-type: none"> • PH 201/214 (5) – General Physics w/ Lab (MTH 111 & 112 are recommended prerequisites for Physics)
English/Writing: <u>English composition - 6 semester hours or 8 quarter hours</u> Must include 3 semester hours of a composition course The additional credits should be composition, literature, creative writing, or poetry.	Choose two of the following: <ul style="list-style-type: none"> • WR 121 (4) - College Writing • WR 222 (4) - Research Papers • WR 323 (4) - Writing as Critical Inquiry Note: Freshman Inquiry may count for WR 121 (3 credits). Check with the pre-pharmacy adviser.
Speech: <u>Speech, Communication or Debate</u> 3 semester hours or 3 quarter hours	Choose one of the following: <ul style="list-style-type: none"> • COMM 218 (4) – Interpersonal Communication • COMM 220 (4) – Public Speaking • COMM 313 (4) – Communication in Groups
Economics: <u>Micro or Macro</u> 3 semester hours or 3 quarter hours	Choose one of the following: <ul style="list-style-type: none"> • EC 201 (4) – Micro Economics • EC 202 (4) – Macro Economics
Psychology: <u>Intro to Abnormal Psychology</u> 3 semester hours or 3 quarter hours	Choose one of the following: <ul style="list-style-type: none"> • PSY 200 (4) – Psychology as a Natural Science • PSY 204 (4) – Psychology as a Social Science • PSY 434 (4) –Intro to Psychopathology
Social/Behavioral Sciences <u>Anthropology, Government, Human Development, Political Science, Psychology, Sociology, etc.</u> 3 semester hours or 3 quarter hours	<ul style="list-style-type: none"> • 4 credits of any of the following: ANTH, PS (government), PSY, SOC
Humanities/Fine Arts <u>Geography, History, Literature, Performance, Visual Arts, Philosophy, etc.</u> 3 semester hours or 3 quarter hours	<ul style="list-style-type: none"> • 4 credits of any of the following: GEOG, HST, ENG LIT, PHL, TA (performance), ART (visual art)

Additional Pacific University Pharmacy Admissions Requirements:

- While a bachelor's degree is not required in order to apply to the Pharm.D. program at Pacific, it can make an application more competitive. It is recommended that all required science coursework be completed within seven calendar years of the time of application to the program.
- **Recommended courses:** Molecular Biology, Genetics, Cell Biology, Immunology, Biochemistry
- A minimum of 62 semester hours (93 quarter hours) of pre-pharmacy study in a regionally accredited college or university in the United States. **Applicants must achieve a minimum cumulative, science/math, and last 45 (67 quarter hour) GPA of 2.7** on a 4.0 scale, or its equivalent, and have received a grade of "C" or better in all prerequisite courses.
- **Highly Recommended: Pharmacy experience -- A minimum of 40 hours of experience or observation** (shadow or paid) is highly recommended at the time of your application. These hours should be completed under the supervision of a licensed pharmacist. You can strengthen your application further with observation in settings which will expand the breadth of your experience (community/retail, hospital, HMO). Also consider criteria such as urban/rural location, exposure to different client populations, and exposure to different pharmaceutical tasks.
- **References** – should be from college/university faculty members, advisors, supervisors, employers or licensed pharmacists that you have worked, volunteered or observed within a professional capacity. Pacific requires only two PharmCAS forms but applicants can submit up to four forms to PharmCAS.
- **International applicants:** Courses completed outside the U.S. may or may not fulfill Pacific's prerequisites. The answer varies depending on the course content, the date completed, and the country in which the course was taken. It is extremely rare for foreign credits to fulfill all the Pacific pharmacy prerequisites and it is strongly recommended that applicants plan to complete the upper-division prerequisites (organic chemistry, microbiology, anatomy and physiology and writing) at a U.S. university. For specific information about foreign credits for pharmacy prerequisites, applicants can submit a request for transcript evaluation.
- **Transcript Evaluation** -- This unofficial prerequisite evaluation is recommended prior to applying to Pacific University and is available to help you determine which required coursework you have completed and which coursework you still need to complete in order to meet the prerequisite requirements. Required prerequisite coursework does not need to be completed to apply to the School of Pharmacy. To be eligible for admission for a given academic year you need to be able to show that you can complete ALL required prerequisite coursework in a reasonable amount of time. Completed worksheets can be submitted via email, fax, or postal mail. Email: kgray@pacificu.edu. Postal Mail: Office of Graduate & Professional Admissions Pacific University, 222 SE 8th Avenue, Ste. 212 Hillsboro, OR 97123 or Fax: (503) 352-7290 along with copies of your unofficial transcripts.
- **PCAT:** not required

Pacific University Pharmacy Program Application Information:

- **PharmCAS Application Deadline** – November 1st
- **Supplemental Application:** In addition to completing the PharmCAS application, all applicants to Pacific's program are required to submit a Supplemental Application. The Supplemental Application directions and materials will be available on Pacific's website and must be mailed (in one envelope) directly to the Pacific University School of Pharmacy no later than **Dec. 1st**. The supplemental application consists of completing the prerequisite worksheet, calculating the last 45 semester hour (67 quarter credit) GPA, and responding to essay questions.

Pacific University Pharmacy Program Contact:

Pacific University - Office of Admissions
Kieran Bennett, Assistant Director of Graduate and Professional Program Admissions
222 SE 8th Avenue, Ste. 212
Hillsboro, Oregon 97123
Phone: 800-933-9308 or 503-352-7222
Email: pharmacy@pacific.edu, kgray@pacificu.edu
Website: www.pacificu.edu

Application Process in Brief:

Students typically apply to pharmacy school about a year and a half before they expect to matriculate to pharmacy school (e.g. in the spring before their last academic year in college).

Students apply to pharmacy school by completing and submitting a **primary application** through a central application service (PharmCAS). This service sends your application to the schools of your choice.

PharmCAS: The Pharmacy College Application Service (PharmCAS) serves as the **primary application** for participating pharmacy programs. PharmCAS will calculate your GPA, gather electronic letters of reference and send your application to the pharmacy programs you designate.

In **supplemental applications**, some pharmacy schools request additional information from students, such as a response to an essay question, a supplemental application fee, etc. (OSU and Pacific do require a supplemental application).

PCAT:

Please note that OSU & Pacific do not require the PCAT. However, other pharmacy schools to which you plan to apply may require it.

Test Content: The PCAT is divided into separate sections, or subtests, each of which is timed separately. During the time allowed for each subtest, you will be permitted to work only on that section. You will not be allowed to go back to earlier subtests or on to later ones. As you work on each section, you may find it useful to first answer the questions that are easy for you, skipping over those questions to which you will need to return for further thought.

There are six content areas measured by the PCAT in seven separate subtests:

- The **Verbal Ability** section measures general, non-scientific word knowledge and usage using analogies and sentence completion.
- The **Biology** section measures knowledge of the principles and concepts of basic biology, including general biology, microbiology, and human anatomy and physiology.
- The **Reading Comprehension** section measures ability to comprehend, analyze, and evaluate reading passages on science-related topics.
- The **Quantitative Ability** section measures skills in mathematical processes and the ability to reason through and understand quantitative concepts and relationships, including applications of algebra, geometry, probability and statistics, pre-calculus, and calculus.
- The **Chemistry** section measures knowledge of principles and concepts of inorganic and elementary organic chemistry.
- The written **Essay** sections measure conventions of language skills in terms of sentence formation, usage, and mechanics. One is included as an experimental item. Beginning with the June 2007 exam, all of the writing prompts will state a problem involving a health issue, a science issue, or a social, cultural or political issue. Examinees will be asked to present a solution to the problem in their essays. They will be scored on how well they write an essay that is a sufficient length to adequately explain a solution to the problem.

SENDING YOUR PCAT SCORES TO PHARMCAS - CODE 104

If you apply to a PharmCAS school that requires the PCAT, you must arrange for Harcourt Assessment to release your PCAT scores directly to PharmCAS **CODE 104**. PharmCAS schools may **not** accept PCAT scores sent directly to the institution. Harcourt will send PharmCAS your most recent set of PCAT scores along with test results from up to four other previous attempts over a five-year period. During the Academic Update, enter any new PCAT test dates taken or planned since you first submitted your application to PharmCAS.

IMPORTANT! PharmCAS will match your PCAT scores to your application based on your Candidate Information Number (CID). Enter your CID on your PharmCAS application and PCAT registration form. If your CID is missing on either form, PharmCAS can NOT match or forward your PCAT scores. Applicants who do not report a CID must contact PharmCAS at 617-612-2050. If you are applying to a pharmacy school that does not participate in PharmCAS, arrange for your PCAT test scores to be sent directly to the institution.

For test dates and enrollment deadlines, please visit: <http://www.pcatweb.info/>

(Source for the above PCAT info: Harcourt Assessment website)

Tips & Recommendations:

- **Apply to more than one pharmacy school.** The information on this worksheet is based primarily on OSU & Pacific University requirements. Research the admissions requirements of additional schools to which you plan to apply.
- **Check periodically with the adviser** for recent changes, remaining University and pre-professional requirements, and application procedures.
- **Request letters of recommendation from professors ahead of time**, while their experience with you is fresh. Don't wait until you are in the process of applying to the program.
- **Personally read the admission brochure and Web site** of each of the pharmacy schools to which you plan to apply to obtain information on admissions requirements and deadlines and to determine if the school is a good fit for you.
- **Participate in paid, volunteer, and/or shadowing experience** in the health care field and in the community at large early on in your college experience. It is important that you understand the realities of the pharmacy field and illustrate through action your commitment to serving the community.
- **Get involved with other pre-pharmacy students on campus** – joining the Portland Pre-Health Society (<http://www.pps.pdx.edu/>) is a great way to start.
- **Take the PCAT *only* when you are fully prepared to do so.** This is not an exam to “take cold” for practice. You should do everything in your power to take it just once. Ideally, you will have completed general biology, human anatomy & physiology, microbiology, general chemistry, organic chemistry, and calculus prior to taking the PCAT. Include PCAT study time in your academic planning.
- **Begin the application process early** in the spring before your last academic year at PSU. Submit your application as early as possible without compromising the quality of your application. Visit the pre-pharmacy adviser at PSU to discuss the application process.
- **Utilize free university resources** such as the pre-pharmacy adviser, Writing Center, and Career Center for help with your personal statement(s) and interview preparation.
- **Begin completing financial aid forms in January; the priority filing deadline is March 1.**

Additional Resources:

- **American Association of Colleges of Pharmacy** - <http://www.aacp.org/>
- **PCAT** - <http://www.pcatweb.info/>
- **PharmCAS** - <http://www.pharmacas.org/>
- **Oregon Board of Pharmacy** - <http://www.pharmacy.state.or.us/>
- **Oregon State Pharmacists Association** - <http://www.oregonpharmacy.org/>