

MASTER OF SCIENCE in PHARMACEUTICAL SCIENCES

Mission and Vision

Mission: To advance the science of pharmaceutical research by developing future scientists trained to promote health through knowledge, research, and social responsibility

Vision: Preeminence in pharmaceutical sciences research, drug development skills, and integrated education abilities

Accreditation

Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC).

California Northstate University is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC), 985 Atlantic Avenue, #100, Alameda, CA 94501, 510.748.9001

Program Overview

The two-year Master of Pharmaceutical Sciences (MPS) program offered by CNU is designed to provide fundamental knowledge and skills in the pharmaceutical sciences field to enable students to pursue careers in academia, the pharmaceutical industry, regulatory affairs, and government positions upon graduation.

This program also provides advanced training in theory and laboratory-based settings to students opting for higher education in the health-related professions (MD/PharmD, MD/Ph.D., and PharmD/Ph.D.) and graduate schools (Ph.D.). In addition, this program provides a sufficient foundation in basic pharmacology, molecular biology and biochemistry to allow the students the flexibility to pursue careers in pharmaceutical and biotechnology industries, as well as regulatory affairs.

Program Objectives

- Expand the students' foundation of Basic Pharmaceutical Sciences with emphasis in drug design, drug development or drug delivery.
- Expand the students' pharmaceutical research skills.
- Develop the students' ability to identify problems, formulate hypotheses, plan and execute experiments, analyze data and present results.

MPS at CNU: Strengths & Unique Features

- Two track options: 1) a thesis-based track, and 2) a capstone track
- Foundational core courses are complemented by a broad spectrum of well-designed electives.
- Multiple teaching pedagogical formats maximize learning and subject retention.
- Small class sizes suitable for individualized education and research skills.
- Close proximity and ties to the Colleges of Pharmacy and Medicine, with course paths to prepare students seeking entry into pharmacy or medical school.
- Established collaborations with regional clinical centers, and pharmaceutical industries, providing an array of cooperative educational opportunities.
- Located in Elk Grove, California, the second largest city in the Greater Sacramento Metropolitan Area. Northern California is the hub for many biopharmaceutical companies.

Curriculum

MPS students have two course of study track options: 1) a thesis-based track; and 2) a capstone track.

Thesis/Course Track Core Courses (29 credits)

- MPS 501 Introduction of Pharmaceutical Sciences I (3 cr)
- MPS 511 Introduction to Pharmaceutical Sciences II (3 cr)
- MPS 502 Techniques in Pharmaceutical Sciences: Theory and Practice (2 cr)
- MPS 512 Principal of FDA Regulatory Affairs and Drug Discovery (3 cr)
- MPS 513 Biostatistics & Research Methods (3 cr)
- MPS 514 Clinical Biochemistry (3 cr)
- MPS 515 medical immunology (3 cr)
- MPS 518 Advances in drug delivery (3 cr)
- MPS 506 Research and Thesis-I (3 cr)
- MPS 516 Research and Thesis-II (3 cr)

Elective Courses (2 credits)

A minimum of 2 credits are required.

Capstone/Course Track Core Courses (29 credits)

- MPS 501 Introduction to Pharmaceutical Sciences I (3 cr)
- MPS 511 Introduction to Pharmaceutical Sciences II (3 cr)
- MPS 502 Techniques in Pharmaceutical Sciences: Theory and Practice (2 cr)
- MPS 512 Principal of FDA Regulatory Affairs and Drug Discovery (3 cr)
- MPS 513 Biostatistics & Research Methods (3 cr)
- MPS 514 Clinical Biochemistry (3 cr)
- MPS 515 medical immunology (3 cr)
- MPS 518 Advances in drug delivery (3 cr)
- MPS 507 Capstone Paper-I (3 cr)
- MPS 516 Capstone Paper-II (3 cr)

Elective Courses (2 credits)

A minimum of 2 credits are required.

Elective Course Options (It is subject to change)

- MPS 601 Advanced Topics in Drug Design (2 cr)
- MPS 602 Advanced Topics in Phytochemistry (2 cr)
- MPS 603 Advanced Topics in Immunology (2 cr)
- MPS 604 Journal Seminar (2 cr)

MPS to MD (2+4)-Combined Programs

The 2+4 MPS+MD (Master of Pharmaceutical Sciences + Doctor of Medicine) combined program at California Northstate University is designed to offer a unique opportunity (pathway) for students to enter into medical school. This combined program will significantly increase the chances to enter into medical school, receiving competitive clinical residencies and pursue career opportunities in advanced medicine. For this MPS-MD combined program, the students must maintain a cumulative GPA of 3.5 in the MPS program and required MCAT score to be matriculated into the MD program.

PharmD/MPS Combined Program

California Northstate University College of Pharmacy students in their P1 or P2 year with a minimum

cumulative GPA of a 3.0 are eligible to apply for the PharmD/Masters of Pharmaceutical Sciences (MPS) combined degree program, which runs concurrently with the pharmacy program. While the MPS degree alone takes a minimum of 21-months to complete, current pharmacy students may opt to complete the PharmD/MPS combined degree program requirements within the four-year time frame of the PharmD program. This combined program will increase your chances of receiving clinical residencies. Also, students completing the PharmD/MPS combined degree may be better-situated to pursue career opportunities within the pharmaceutical industry field, regulatory affairs, academia, and other clinical research areas.

Program Learning Outcomes (PLOs)

PLO 1: Foundational Knowledge in Pharmaceutical Sciences. Demonstrates the knowledge, skills, attitudes, and ethics that are required as scientists or scientific advocates

1.1. Demonstrate essential knowledge of pharmaceutical sciences needed to advance these sciences

1.2. Evaluate scientific literature and scientific products

PLO 2: Exposure to research instrumentation and laboratory techniques of pharmaceutical sciences

2.1. Demonstrate technical proficiency with basic laboratory techniques for pharmaceutical sciences

2.2. Utilize innovation in research instrumentation and laboratory techniques in basic science and drug discovery/ development

PLO 3: Critical thinking skills and problem-solving abilities

3.1. Demonstrate skillful research design and adaptation

3.2. Apply critical thinking and problem-solving skills to make decisions in developing, testing, and producing pharmaceutical products

PLO 4: Critical writing skills and data presentation abilities

4.1. Demonstrate writing skills needed for a career in pharmaceutical sciences and effective communication of scientific ideas in oral and visual formats appropriate for key audiences

4.2. Work effectively in a collaborative scientific setting and demonstrate appropriate intercommunication skills

PLO 5: Promote scientific and technique development of pharmaceutical sciences

5.1. Demonstrate ability to design mechanism-based drugs

5.2. Utilize scientific and technical skills needed to advance the discovery and management of new drugs and other therapeutic products.

Admissions

Educational Prerequisites

- A bachelor's degree (B.S. or B.A.) or higher in Biology, Chemistry or relevant science disciplines, or one year of biology and 1 year of chemistry.
- A cumulative grade point average (GPA) of 2.8 is considered competitive. When evaluating applicants, greater emphasis will be placed on courses that are relevant to our program.
- Completion of the GRE. No minimum requirement for GRE scores- only the General Test is required.

Applying to M.S. in Pharmaceutical Sciences:

- The online application must be completed fully.
- Application Fee: \$60 for applicants. Applicants who demonstrate financial need can request an application fee waiver.
- Personal Statement: Please provide a personal statement describing your professional goals as well as the characteristics you possess that make you a qualified candidate for entry into the Masters of Pharmaceutical Science Program.
- Official Transcripts: Your academic records from each college-level institution you have attended are required. Canadian applicants and all other foreign applicants must submit a foreign coursework evaluation; CNU accepts evaluations from ECE, IERF, WES, and Education Perspectives.
 - Transcripts from undergraduate and graduate institutions attended must be sent directly from the institution, even if a degree was not awarded.
- Minimum requirement GPA 2.8
- Official GRE General Test scores preferred
- Official TOEFL scores for international applicants
- Letters of Recommendation: At least two letters must be submitted from faculty members who are knowledgeable about your academic capabilities and interests.
- Official letters of recommendation should be mailed directly to CNU Master of Science in Pharmaceutical Sciences at the following address:
California Northstate University
Master of Pharmaceutical Sciences
Admissions
9700 W. Taron Dr.
Elk Grove, CA 95757

Additional Admission Requirements

Applicants are strongly encouraged to communicate with potential CNU research advisors listed in the graduate program prior to the admissions process. It is important to identify a research mentor and anticipated area of research prior to beginning the

program. Formal research laboratory rotations with faculty members will be implemented after your admission. Onsite interviews are also provided to enable applicants to familiarize themselves with CNU faculty and their research areas.

Deadlines

The deadline to submit an application for Fall enrollment will be May 1st of the same year. All supporting documents must be received prior to May 1st for a Fall enrollment and official transcripts must be received by September 30th of the same year. The online application must be fully completed to be accepted.

Student Enrollment Agreement

The Student Enrollment Agreement must be completed and submitted to the college in order to show intent to enroll in the program. The Student Enrollment Agreement is a legally binding contract when it is signed by the incoming student and accepted by the institution.

By signing the Enrollment Agreement, the student is acknowledging that the catalog, disclosures, and information located on the website have been made available to the student to read and review.

Any questions or concerns regarding the Student Enrollment Agreement should be directed to the college or university department.

Catalog, Performance Fact Sheet, and Website

Before signing the Student Enrollment Agreement, the prospective student is strongly urged to visit the University and College website at www.cnsu.edu, and to read and review the CNU General Catalog and School Performance Fact Sheet (SPFS). The SPFS contains important performance data for the institution. The Catalog contains important information and policies regarding this institution.

Student's Right to Cancel and Refund

You have the right to cancel the Student Enrollment Agreement until 12:01 AM on the first calendar day after the first classroom instruction session attended, or until 12:01 AM on the eighth calendar day after a student has signed the Enrollment Agreement, whichever is later.

Cancellation shall occur when you give written notice of cancellation to the University at the University's address shown at the top of the first page of the Enrollment Agreement. You can do this by hand delivery, email, facsimile, or mail. Written notice of

cancellation sent by hand delivery, email, or facsimile is effective upon receipt by the University. Written notice of cancellation sent by mail is effective when deposited in the mail properly addressed with postage prepaid.

After the cancellation period described above, you have the right to withdraw from the University at any time. Withdrawal shall occur when you give written notice of withdrawal to the Registrar at the University's address shown at the top of the first page of the Enrollment Agreement.

Student's Right to Withdraw and Refund

After the cancellation period described above in "Student's Right to Cancel and Refund," you have the right to withdraw from the University at any time. Withdrawal shall occur when you give written notice of withdrawal to the Registrar at the University's address shown at the top of the first page of the Enrollment Agreement. You can do this by hand delivery, email, facsimile, or mail. Written notice of withdrawal sent by hand delivery, email, or facsimile is effective upon receipt by the Registrar. Written notice of withdrawal sent by mail is effective when deposited in the mail properly addressed with postage prepaid.

The written notice of withdrawal should be on the Official College Withdrawal Form provided by the Office of the Registrar, but may also be in any writing that shows you wish to withdraw from the University. Please include your student ID number on your notice. A withdrawal may also be effectuated by the student's conduct showing intent to withdraw, including but not necessarily limited to the student's continuing and unexcused failure to attend all classes.

If you withdraw before or at completion of 60% (and no more) of the current term, you will be eligible for a pro-rata refund for such term. The University will perform a pro-rata calculation of current term tuition as follows:

Step A) Total calendar days* in current term** – Calendar days in current term completed = Total Calendar days Not Completed

Step B) Total calendar days not completed/Total calendar days in current term = % of pro-rata refund

Step C) Institutional charges*** x % of pro-rata refund = Total refund owed

* Total calendar days include weekends and holidays, except:

- Scheduled break of five or more consecutive days when no classes are offered.
- Days of leave of absence are not included in total days.

**Current term generally means the current semester, but when tuition is charged for the entire period of

enrollment rather than by semester, then the current term shall mean that period of enrollment.

***Institutional charges excluded from the pro-rata refund are: (1) non-refundable registration fee (applicable to first year, first semester students only), (2) all other non-refundable fees as described in the current General Catalog, (3) Student Tuition Recovery Fund fee, and (4) Student Health Insurance premium estimated at \$3,200.00, if applicable; institutional charges included in the pro-rata refund include: (1) current term tuition.

There is no refund for students who withdraw after completing more than 60% of the current term.

If the amount of the current term payments is more than the amount that is owed for the time attended, then a refund of the difference will be made within 45 days after the notice of withdrawal is received by the Office of the Registrar. Refunds owed to the student as a result of a pro-rata calculation will be done in the following order:

- Private Educational Loan(s);
- To the student.

If the amount of the current term payments is less than the amount that is owed for the time attended, it is the sole responsibility of the student to contact the University to make appropriate payment arrangements.

Student Tuition Recovery Fund (STRF) Disclosures

Information on the Student Tuition Recovery Fund disclosures (STRF) can be found on page 219 of the General Catalog.

Tuition, Fees and Related Disclosures

All tuition, fees, expenses, and policies listed in this publication are effective as of June 2020 and are subject to change without notice by California Northstate University.

In the tables below, MPS1 and MPS2 indicate the student's year in the program, e.g. MPS1 is a first-year student; MPS2 is a second-year student.

Tuition is charged on a full-time, semester basis. Generally, tuition and fees are charged to a student's account thirty (30) days prior to the start of each semester term. The above is based on the assumption that a student will attend each semester term on a full-time basis, which allows for a student to graduate after successfully completing two (2) years of coursework consisting of 31 semester credit hours.

International students are not charged additional fees or charges associated with vouching for student status.

Payment deadlines, loan obligations, refund calculations due to cancellation and withdraw, and the Student Tuition Recovery Fund (STRF) disclosures are located on page 219 of the General Catalog.

2020-2021 MPS Tuition & Fees

Tuition & Fees (T&F)	Amount	Class
Enrollment Fee (nonrefundable)	\$100.00	MPS1
Tuition	\$30,000.00	MPS1, MPS2
Student Activity Fee	\$100.00	MPS1, MPS2
Technology Fee	\$50.00	MPS1, MPS2
Pharma Sci Lab Fee	\$700.00	MPS1, MPS2
Orientation Fee	\$50.00	MPS1
Graduation Fees ¹	\$250.00	MPS2
STRF Fee per \$1000 ²	\$0.00	MPS1, MPS2
MPS1 Total Estimated Tuition & Fees per Year³	\$31,000.00	
MPS2 Total Estimated Tuition & Fees per Year³	\$31,100.00	

Total estimated cost for the 2-year Master of Pharmaceutical Sciences program ranges from \$62,100.00 to \$65,205.00³.

Other Educational Related Costs ⁴	Amount	Class
Health Insurance Premium ⁵	\$3,600.00	MPS1, MPS2
Books and Supplies ⁶	\$1,600.00	MPS1, MPS2
Room and Board ⁶ (based on 8 months)	\$16,778.00	MPS1
Room and Board ⁶ (based on 12 months)	\$25,167.00	MPS2
Transportation ⁶ (based on 8 months)	\$3,220.00	MPS1

Transportation ⁶ (based on 12 months)	\$4,830.00	MPS2
MPS1 Total Estimated Cost per Year⁷	\$56,198.00	
MPS2 Total Estimated Cost per Year⁷	\$66,297.00	

¹Covers regalia, transcripts, etc.

²The STRF fee is \$0.00 per \$1,000 of institutional charges

³Based on estimated annual tuition increases of 3% to 5%. This estimate is not binding on the University.

⁴Costs a student may incur as part of participation in the applicable year of the Master program, whether or not paid directly to CNU.

⁵Optional, estimated, and will increase based on number of insured members.

⁶Estimated amount

⁷Includes tuition, fees, and other estimated educationally related costs

General Policies

Orientation & Registration

Registration for classes requires:

1. All admission contingencies be fulfilled.
2. Financial aid clearance from the Financial Aid Officer.
3. Completion of all new student paperwork.

Admission contingencies include proof of medical insurance coverage and any other institutional requirements. Students may enroll in the Student Health Insurance Plan to satisfy the insurance requirement.

New students must submit the *Emergency Contact and Medical Information Form* to the Office of the Registrar by the end of Orientation. To make updates, a new form must be submitted to the Registrar. The Office of the Registrar requires submission of the Authorization to Release Student Records if a student desires to grant a personal third-party (such as a parent, spouse, etc.) access to his/her student record. Please refer to the *Directory Information and Access to Student Records* section of this catalog for more information.

New students should review their local, home, and billing contact information via the Student Portal and update as needed. It is the student's responsibility to maintain valid contact information throughout their enrollment at CNU. Instructions for accessing the Student Portal is sent by the CNU IT department to the student's CNU email address.

Registration is conducted by the Registrar prior to the start of each semester for new and continuing students. Students with business, financial, or other registration holds on their account will not be registered until the Registrar is notified that the hold has been cleared. Students who are non-compliant with institutional requirements or who have a hold on their student account at the time of registration are required to satisfy the requirement and may also be required to submit the Course Add/Drop form by the end of the Add/Drop period to register or make schedule changes.

Address Where Instruction Will Be Provided

Class sessions are conducted at 9700 West Taron Drive, Elk Grove CA 95757.

Thermal Camera Use for Temperature Checks

In response to the COVID-19 pandemic and in order to protect the health and safety of all persons on California Northstate University's ("CNU") campuses, CNU has implemented the use of thermal cameras at the entrances to both campuses. These cameras are used to determine if a person seeking entry to one of our buildings is displaying a fever. If after two scans the cameras indicate the person has a fever, entry will be denied to that individual. No exceptions shall be made to this policy. Anyone failing to abide by this policy will be removed from campus. Absences due to failing the thermal camera scan is considered as excused and

approved absence for students. Student must communicate with the faculty on record for that session for any required makeup. Failure to complete the required "makeup" will affect the course performance.

Catalog, School Performance Fact Sheet, and Website

Before signing the Student Enrollment Agreement, students are strongly encouraged to visit the College website at <http://pharmasciences.cnsu.edu/> and to read and review the CNU General Catalog and School Performance Fact Sheet (SPFS). The SPFS contains important performance data for the institution. The Catalog contains important information and policies regarding this institution.

By signing the Enrollment Agreement, the student is acknowledging that the catalog, disclosures, and information located on the website have been made available to the student to read and review.

Instruction/Course Delivery

All courses for MPS are 100% face-to-face on-campus teaching, with the exception of one course: MPS 607: Drug Discovery and Development. This comprehensive course is designed using a hybrid teaching format, combining direct faculty-student interaction and eLearning.

All courses are taught in English and English language services are not provided.

Description of Facilities

Information on research laboratories and facilities utilized by California Northstate University in conjunction with the delivery of instruction for all CNU Colleges, can be located on page 231 of the General Catalog.

Academic Policies and Procedures

Academic Calendar

The academic calendar consists of two semesters lasting approximately 15 weeks long and one summer term lasting approximately 10 weeks.

Credit Hour Policy

For each 15-week semester, one (1) unit of credit is assigned per hour each week of classroom and a minimum of two (2) hours of out-of-class student work (homework) (*LEC/SEM*). For courses that include workshop and/or laboratory time, one (1) unit of credit is assigned per two (6) hours each week of student time spent in this activity (*LAB/AL*)

Code	Course Type	Code	Course Type
AL	Active Learning course	LEC	Lecture course
LAB	Laboratory Course	SEM	Seminar

Grading

A letter grade equal to or greater than C is considered satisfactory performance (passing) for completion of a course. Students must maintain a minimum cumulative grade point average (GPA) of 3.0. The breakdown for assignment of letter grades and grade points for each letter grade are as follows:

Grade	Definition	GPA Unit
A	90.0 – 100%	4.00
B	80.0 – 89.9%	3.00
C	70.0 – 79.9%	2.00
D	60.0 – 69.9%	1.00
F	<60%	0.00
I	Incomplete	Not in GPA
S	Satisfactory (70% or above)	Not in GPA
U	Unsatisfactory (<70%)	Not in GPA
W	Withdrawal	Not in GPA

GPA Calculation

To calculate cumulative GPA, letter grades will be converted to their numeric grade point value using the grading convention table above, and then added together. The sum is then divided by the number of courses taken. Grades received in retaken classes will be used in determining cumulative GPA. The grade initially received in the course will not be included in the calculation, but is recorded on the transcript.

Course Add/Drop Procedure

Changes in course registration may be made without penalty up to the end of the first week (5 class days) for fall and spring terms. Specific add/drop deadlines will apply for courses offered during the summer term.

Incomplete or Withdrawal from a Course

During a semester, a student may withdraw or fail to complete all required assignments and/or examinations due to extenuating circumstances, such as, but not limited to, an illness or a family emergency. In such cases, the course coordinator may give a grade of Incomplete for the course.

All missed assignments and exams must normally be completed within 10 business days after the end of the semester in which the Incomplete was received, or within a timeframe determined by the course coordinator. Failure to successfully complete the course will result in an earned F grade for the course and placement on Academic Probation.

Withdrawal from a course must first be approved by the course coordinator and the Office of Academic Affairs. Where a student has had to withdraw from a course a grade of W will be applied and the student will have to repeat the course next time it is offered.

Grade Appeals Procedure

A student can file an appeal if there is a disagreement with a final course grade. The appeal must be submitted within ten (10) business days of online grade posting. The student must initiate a formal grade appeal process in writing and present the appeal to the course coordinator.

The faculty member will respond to the student in writing within ten (10) business days. If the appeal cannot be resolved, the student has two (2) business days to appeal in writing to the appropriate Department Chair who renders a decision in writing within ten (10) business days of receipt of the formal appeal. (If the course Coordinator is the Department Chair, then the student may appeal the decision directly to the Vice President of Academic Affairs. The student has two (2) business days to submit an appeal in writing to the Vice President of Academic Affairs. The Vice President of Academic Affairs will render a decision in writing within ten (10) business days of receipt of the formal appeal).

If the Department Chair cannot resolve the appeal, the student has two (2) business days to submit an appeal in writing to the Vice President of Academic Affairs. The Committee will render a decision in writing within ten (10) business days of receipt of the formal appeal.

If a grade appeal is approved, the professor must complete a Grade Change Form and submit the form to the Vice President of Academic Affairs for final approval. The form must then be submitted to the Registrar so that the grade can be changed on the transcript.

A record of the final decision concerning the appeal will be kept on file in the Vice President of Academic Affairs office.

Academic Progression Policy

The Master of Pharmaceutical Sciences (MPS) at California Northstate University has a rigorous academic progression policy to ensure students' progression through the curriculum in a timely manner.

The purpose of the academic progression policy is to ensure students in the MPS program reach and maintain high standard of course learning and successfully complete course credits and thesis or capstone paper within required time frame.

Students in the MPS program must pass all courses each semester with a least a grade of C and maintain a minimum grade point average (GPA) of 3.0. A grade of D or below in a course indicates a lack of understanding of the fundamental knowledge of the course necessary for progression.

Students struggling with academic courses must complete the MPS program within 3 years (2-year program) or 5 years (dual degree-MPS/PharmD) from the time they register and attend their first core course if insufficient knowledge has been identified and remediated.

Remediation

Remediation is provided to students who earn a letter grade lower than C in any course in the MPS curriculum. The course coordinator/instructors determine the format of remediation examination that covers the course material presented throughout the course. Preparation of the remediation exam is the sole responsibility of the student. A grade of C to this course will be reported to the Registrar if the remediation examination was satisfactorily completed.

Academic Probation

If a student fails a course or remediation is taking place for three or more courses, the student will be automatically placed on academic probation for three-

year plan (2-year program) or five-year plan (dual degree-MPS/PharmD) from the time they register and attend their first core course. An academic plan for probation must be documented and approved by the Dean of the College of Graduate Studies.

Dismissal

A student may be dismissed from the MPS program if any of the following conditions occur and the Professional and Academic Standards Committee determines that dismissal is warranted:

- Failure to meet any terms of remediation or academic probation.
- Conduct subject to dismissal as described in the Student Handbook.
- Failure to complete the degree requirements in three (two-year program) or five (dual degree) consecutive academic years from the date of the first day the student begins the program.

Appeal of Dismissal

Students dismissed from the MPS program may appeal the decision in writing within thirty calendar days of notification of dismissal to the Dean of the College. The Dean will render a decision in writing within 15 calendar days of the receipt of the formal written appeal. The Dean's decision is final.

Degree Requirements

The Master in Pharmaceutical Sciences degree is a two year (21-24 months) program. All requirements must be fulfilled within a period of two years following initial registration, although course credit is not nullified until three years after completion of a course. Any student who has not achieved candidacy by the end of their second year will be reviewed by the Thesis Committee for placement on academic probation, regardless of grade point average, and recommendations for progress will be established.

Degree requirements for the Thesis-based track and the Capstone/Course track are as follows:

Thesis-based Track:

To graduate from the M.Sc. program, students in this track must earn a minimum of 31 credits. In addition to the course requirements, students must pass a written prequalifying examination and complete a thesis.

Capstone/Course Track:

Students in this track must pass a minimum of 31 credits along with successfully completing a written qualifying examination, and a capstone paper that consists of conducting a detailed literature review and analysis on a selected topic in lieu of a thesis.

Comparison of Thesis-based and Capstone Track

	Thesis Track	Capstone Track
Years	2	2
Total Credits	31	31
Core Course Credits	29	29
Elective Credits	2	2
Written Examination	Yes	Yes
Thesis	Yes	Capstone paper

Attendance Policy

The MS program will follow University guidelines in attendance policy, which requires mandatory attendance for all students. Specifically, students are expected to attend and participate in all classes, and complete all exams and assessments as scheduled (together defined as "coursework").

However, occasionally an absence from coursework will be unavoidable. The policy described below delineates the circumstances when an absence will be considered excused along with expectations for timely communication with the Course Coordinator and makeup of missed coursework.

A. Approval of Absence

Students should seek approval for an absence from the course coordinator well in advance of the absence if possible, by completing an Excused Absence Request Form. In the case of emergency absence, students should complete and submit the Excused Absence Request Form within 3 business days of returning to campus after the absence. Regardless of whether an absence is excused or unexcused, students are expected to demonstrate professionalism and to follow procedure when requesting an absence.

B. Duration of Absence

A student may request no more than three academic days of excused absences per semester. Absences exceeding five academic days per semester may require a student to request a Leave of Absence or a Withdrawal. Students must contact the Office of Academic Affairs (OAA) if any one absence period exceeds five days to discuss these options.

C. Type of Excused Absence

A student may request an excused absence, from the course coordinator, only for reasons listed below:

- Medical (self or immediate family)
- Military duty
- Immigration & Naturalization
- Jury duty
- Legal
- Bereavement (first degree relative)

Involvement in traffic accident documented by law enforcement report

Professional Leave – conferences, invited presentations/posters, competitions, (requires verification of academic standing).

D. Makeup Allowances

Students are responsible for contacting the course coordinator to arrange makeup of coursework, otherwise they will receive a zero grade. A student seeking an excused absence should complete the Excused Absence Request Form and seek the Course Coordinator's signature for each course the student was absent within three business days upon return to courses or campus. The form must then be given to the Dean of Academic Affairs, who will approve or not the absence request. The OAA will notify the student and course coordinator of the outcome of the absence request.

If an absence is excused, students will be allowed the option to make up missed coursework, rotations, or missed assessments. The nature and type of makeup, makeup time, date, format, duration, and grading is at the sole discretion of the Course Coordinator, but in general Coordinators will draw the following distinction between "high" and "low" stakes assessments/coursework, and professional leave:

A student who is absent for a "high stakes" exam or other such activity considered high stakes, provided the absence has been excused, will be required and allowed to make up the work.

If a student is absent for a "low stakes" assessment the Course Coordinator may choose to drop the missed coursework from the gradebook or provide a makeup opportunity.

A student requesting an absence to attend a professional meeting must demonstrate they are in good academic standing. Requests for professional leave must be submitted at least 10 business days in advance of the professional conference attendance. If attendance coincides with a high stakes exam it is highly likely that the absence will be denied.

Leave of Absence

A leave of absence is approved for a specific period of time, not to exceed more than a year, and the institution agrees to permit the student to return to the University/College without formally reapplying for admission to the University/College.

The student will be required to return to the University/College at the beginning of the semester in which the leave was granted. All students requesting a Leave of Absence should fill out a Leave of Absence

Form after discussing their decision with the Academic Official for Academic Affairs. If a student is requesting a leave of absence, the Academic Official for Academic Affairs must sign the form. If the student is approved for a leave of absence, the student is eligible to return without reapplication if the absence is within the approved time frame. A student requesting a leave of absence should also meet with the Financial Aid Manager and Business Office to determine impact of their decision and any requirements needing fulfillment prior to the leave.

Non-attendance does not constitute notification of intent to apply for leave of absence status. The date of leave status is the date the Registrar receives the signed form.

Return from Leave of Absence

The Office of the Registrar will contact a student on Leave of Absence (LOA) approximately 90 days before the LOA expires via certified US mail and the email addresses on record. The student will receive the Intent to Return Form and instructions for re-enrollment and for withdrawing from the University.

The student will have 30 days of the date of the notice to reply to the Office of Registrar with their intent to return to the University/College or officially withdraw.

If a student does not return within 1 year of approved LOA they are no longer eligible to return as a continuing student and must reapply to the University/College for admission.

Journal Club & Attendance at Seminars and Thesis Presentations

The journal club and graduate seminar are conducted mainly by students, facilitated by the course coordinator. Each week, a student presents a paper related to their research/scholarship interest. The chosen paper will be announced prior to the class and copies provided to all participants. The goal of the journal club is to create an open venue for friendly but lively scientific discussion. Students are encouraged to critically review the paper, and understand how to gauge its impact on the field. Grades will be determined primarily based on the presentation of the student during the course, as well as overall class participation.

Assisting in Research and Teaching

Under the recommendation of faculty members and the advisory committee, research assistantship and teaching assistantship that cover tuition and other expenses are provided to outstanding graduate students with the final approval from the Dean.

MPS Thesis Advisory Committee

This committee, which is recommended by the MPS program Director and approved by the Dean, shall consist of at least three faculty members. All members of the committee shall be members of the Graduate Program Faculty. The student's Major Advisor (Thesis Mentor) typically serves as Chair of the committee.

Thesis Guidelines

The thesis is a vital portion of the curriculum for graduate students choosing the thesis-based track. These students will conduct hands-on, original research in CNU's state-of-the-art laboratories, mentored by faculty with experience in the biomedical and pharmaceutical sciences. Students will select their research topics after consultation with their major advisors. This course will examine student capabilities in scientific literature review, research design, research execution, statistics, result analysis & discussion, and written skills as required to produce a laudable thesis. Lab-based thesis research starts in the summer of the 1st year and proceeds through the entire 2nd year, with 1 credit in each semester. Students will be evaluated each semester, and their progress monitored closely by their thesis advisors. The components of this course evaluation include the following comprehensive elements: literature review; experimental design; research performance; statistical analysis; result presentation and discussion, and conclusion.

- Literature review: 5%
- Research design: 20%
- Research performance: 20%
- Statistical analysis: 5%
- Result analysis and expression: 10%
- Discussion: 10%
- Thesis quality: 20%
- Oral presentation: 10%

Final grades for the student thesis will be indicated as Satisfactory (S) or Unsatisfactory (U) without any computation of grade points for the course into the semester or cumulative grade point average (GPA). A Satisfactory score in this course is granted based on the evaluation results with 70% or above. Unsatisfactory for Research & Thesis will be indicated if the net result of evaluation components is less than 70% in two semesters. Extension to the 3rd year for students with "U" grade will be reviewed by the thesis committee and approved by the Dean of College of Graduate Studies. Only one year extension is allowed for students with "U". For details please refer to the Graduate Student Handbook.

Thesis Defense

Defense of thesis is the final step for graduate students on the thesis-based track. This process tests the depth and breadth of knowledge in pharmaceutical sciences, and will assess the overall understanding of scientific

inquiry as it relates to the thesis. Students will be expected to justify their decisions in study design and interpretation of data. The advisory committee will make the recommendation based on the quality of thesis, answers to all questions, and other factors. The Dean of College of the Graduate Studies will make the final decision upon the recommendation of committee.

Requirements for Laboratory-based Research

Laboratory research is one of the essential components for graduate students in the Master's program in Pharmaceutical Sciences at California Northstate University (CNU). Any students working in the Lab must abide by the following standards.

1. Students must complete the Collaborative Institutional Training Initiative (CITI) training and relevant biosafety training that are required for the personnel working in the Lab at CNU. CITI is an on-line service program providing research ethics and related modules to faculty, staff, and students working for research projects or courses. Students must present completion certificates to their major advisors prior to self-directed work in the labs. Students must complete and pass the Responsible Conduct of Research course and the student Biosafety and Biosecurity Course. Additional courses may be recommended or required by their instructors.
2. Students must respect all ethical standards and must observe all federal, state, local, and institutional regulations.
3. Students must abide by all safety regulations while present in the labs, including those regarding appropriate clothing and shoes. Students must wear lab coat, gloves, and other appropriate personal protective equipment when performing procedures in the Lab.
4. Students must follow all standard operating procedures and protocols when conducting research.
5. Students must work in their designated areas. All shared equipment and instruments must be cleaned and stored in their original location after completing experiments.

6. Students must maintain original research records, catalogs, and research materials following good practices. Computer records must be consistent with the notebooks. Students are strongly encouraged to discuss the records and seek approval from the advisors.
7. All packages, containers, buffers and reagents in the Lab must have discernible, compliant labels that include name, date, identity, and sources.
8. Eating, drinking, or smoking in the Lab are strictly prohibited. Violators will be excluded from the research projects or relevant courses.
9. Hand washing with clean, running water is a good practice before leaving the Lab, and is required after certain procedures.
10. It is expected that all students will exercise professionalism and decorum while in the Labs. Horseplay, practical jokes, pranks or other inappropriate or distracting behaviors will result in a loss of Lab privileges and may impact student graduation.
11. Please report all unexpected issues to your advisors or Lab Manager.

Student Grievance Policy

If a student wishes to file a grievance, they can submit a written complaint using the Complaint/Grievance form placed in a sealed envelope and delivered to the Vice President of Academic Affairs or submit an online Anonymous Report available on the CNU website. The Vice President of Academic Affairs will handle the complaint in accordance to University policies and after a review of the facts will attempt to resolve the issue. Any resolution will be provided to the student in writing within 4 weeks of the form submission, excluding holidays and University breaks.

For complaints related to accreditation standards can be found on page 10 of the General Catalog.

Student Services

Information on Student Services can be located on page 225 of the General Catalog.

MPS Course Descriptions

Core Courses

MPS 501 Introduction to Pharmaceutical Sciences-I (3 cr)

Crosslist: PBS 602 Pathophysiology & Pharmacology I

This course introduces the basic mechanisms of pathophysiology and pharmacology, and then integrates these disciplines through the study of the etiology, pathogenesis, clinical manifestations, treatment and prevention of major neurologic, psychiatric, and neuroendocrine diseases/disorders. Following an introduction to normal tissue types and adaptive responses, the course will cover basic etiological and pathophysiological mechanisms; mechanisms of injury will be reviewed; the central and peripheral nervous systems (CNS & PNS) are reviewed, major CNS, PNS and neuroendocrine diseases and disorders are covered, Students will learn the mechanism(s) of action and common or serious adverse effects of pharmacological agents and identify appropriate pharmacological treatments or adjust pharmacotherapy in the face of adverse effects. In addition, each student team will research a topic in depth, including a systematic search of peer-reviewed literature, to develop and present a formal case study, given at a level appropriate for an audience of healthcare professionals. To promote information literacy, teams will use systematic PubMed searches using MESH terms to identify and incorporate current literature reviews, guidelines, or other advanced professional sources, and carefully cite the information and sources on their slides.

MPS 502 Techniques in Pharmaceutical Sciences: Theory and Practice - I (2 cr)

This course is designed to advance critical thinking in research approaches and methodology providing MPS and PharmD dual degree students an overview in new advances in therapeutics including gene therapy and technical applications in the field of Industrial Pharmacy, Integrated Pharmacological Medicine, Translational Medicine, Alternative and Complementary Medicine, Drug Discovery and Targeting Complement Therapeutics. Course subjects will cover research technique trends, pitfalls and alternative approaches to overcome them.

MPS 506 Research and Thesis - I (3 cr)

This course is designed to provide hands-on research experience in laboratories of biomedical and pharmaceutical sciences. Students will choose the research topics after consultation with their major advisors. This course will exam the students' capabilities in original article review, research design, research execution, statistics, result analysis & discussion, and written skills of thesis.

MPS 507 Capstone Paper - I (3 cr)

This course is designed to advance critical thinking and written skills in the identification and synthesis of contemporary topics in the broad area of pharmaceutical sciences. MPS 504 (Literature & Technical Writing Skills) is divided into two sections for the graduate students in Plan B (Capstone Track): (i) section I delineates the basic skills and techniques in reference search, review, and writing exercise; and (ii) section II is designed to evaluate the students'

capabilities in integration of science, literature, and communication skills. Successful and timely completion of capstone paper is mandatory for students in this track.

MPS 511 Introduction to Pharmaceutical Sciences – II (3 cr)

Crosslist: PBS 605 TBL *Pharmaceutics and Calculations*

This course is designed to provide students with the deep understanding of the drug physicochemical properties and its effects on drug formulation and computing, dosage form as well as an understanding of the interactions between drug delivery systems and biological systems. The course covers the traditional and non-traditional dosage forms as well as drug delivery systems. The course also covers pharmaceutical calculations and an overview of drug quality control and regulation.

MPS 512 Principal of FDA Regulatory Affairs and Drug Discovery (2 cr)

This course focuses on regulatory strategy, guidance and regulatory compliance, legal and ethical issues, processes for product development and the business components of regulation in clinical research, all while reinforcing the science behind the methods. The regulatory affairs course provides students with the knowledge and understanding for the key elements of the regulatory process in various industries, governmental agencies, and consultancies worldwide.

MPS 513 Biostatistics & Research Methods (3 cr)

Crosslist: CAS 606 *Biostatistics and Pharmacoepidemiology*

This course is designed to introduce major concepts in biostatistics and pharmacoepidemiology. Students will develop the ability to interpret and critically evaluate medical literature and to identify findings that have implications for their practice. Emphasis will be placed on an examination of how observational study designs draw upon epidemiologic techniques to address drug effectiveness, safety, outcome assessment and regulatory decision making. Students will also acquire skills in applying statistical analysis concepts learned throughout this course with the use of common computer software.

MPS 516 Research and Thesis - II (3 cr)

This course is designed to provide hands-on research experience in laboratories of biomedical and pharmaceutical sciences. Students will choose the research topics after consultation with their major advisors. This course will exam the students' capabilities in original article review, research design, research execution, statistics, result analysis & discussion, and written skills of thesis.

MPS Curriculum

Example of Schedule for Thesis-Based Track and Capstone Track

Year 1 – Fall		Year 1 – Spring	
Course	Credit	Course	Credit
MPS 501-Introduction to Pharm. Sci.	3	MPS 511 –Introduction to Pharm. Sci.	3
		MPS 502 -Techniques in Pharm. Sci.	2
MPS 513 – Biostatistics & Research Methods	3		
		MPS 515– Medical immunology	3
Semester Credit	6		8
Year 2 – Fall		Year 2 – Spring	
Course	Credit	Course	Credit
MPS 512 – Principal of FDA Regulatory Affairs & Drug Discovery	3	MPS 518 – Advances in Drug delivery	3
MPS 514 – Medical Immunology	3		
MPS Elective	2	MPS 516 - Research and Thesis-II / MPS 517 – Capstone Paper-II	3
MPS 506 - Research and Thesis-I / MPS 507 – Capstone Paper-I	3		
Semester Credit	11		6

TOTAL CREDITS REQUIRED FOR MASTER OF SCIENCE IN PHARMACEUTICAL SCIENCES DEGREE = 31

MPS 2020 - 2021 Academic Calendar

SUMMER 2020

Summer Term: 05/12/2020 – 7/17/2020		
Event	Start Date	End Date
Summer Term	05/12/2020 - Tuesday	07/17/2020 - Friday
Final Grades Due	07/30/2020 - Thursday	

FALL 2020

Fall Semester: 09/01/2020 – 12/17/2020		
Event	Start Date	End Date
Orientation (New Students)	08/26/2020 - Wednesday	08/27/2020 - Thursday
Instructional Period	09/01/2020 - Tuesday	12/11/2020 - Friday
Course Add/Drop Period	09/01/2020 - Tuesday	09/07/2020 - Monday
Final Exams	12/14/2020 - Monday	12/17/2020 - Thursday
Remediation Exam Period	12/17/2020 - Thursday	12/18/2020 - Friday
Winter Break	12/18/2020 – Friday	01/01/2021 - Friday
Final Grades Due	12/30/2020 - Wednesday	

SPRING 2021

Spring Semester: 01/04/2021 – 04/27/2021		
Event	Start Date	End Date
		04/21/2021 -
Instructional Period	01/04/2021 - Monday	Wednesday
Course Add/Drop Deadline	01/04/2021 - Monday	01/08/2021 - Friday
Spring Break	03/15/2021 – Monday	03/19/2021 - Friday
Final Exams	04/22/2021 - Thursday	04/27/2021 - Tuesday
Remediation Exam Period	04/28/2021 - Wednesday	04/30/2021 - Friday
Final Grades Due	05/14/2021 - Friday	
Graduation Clearance Day	05/14/2021 - Friday	
Graduation Ceremony	05/15/2021 - Saturday	

