Master of Pharmaceutical Sciences

2022-2023

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Introduction

Advances in biotechnology have significantly increased the need for pharmaceutical scientists with comprehensive knowledge and diverse skills than a typical specific subject program can provide. The Pharmaceutical Sciences Master Program (MPS) at the California Northstate University (CNU) provides rigorous background in a range of scientific disciplines that are critical to the preparation of the next generation of pharmaceutical scientists. Situated in Northern California, CNU is surrounded by over 700 biotechnology/pharmaceutical companies, with proximity to Silicon Valley – one of the world's leading technology innovation centers. Graduates with a Master of Pharmaceutical Sciences from CNU can look forward to abundant job opportunities in a variety of public and private settings, including research and development, drug manufacturing, and regulatory affairs, or to continuing on to PhD, PharmD and MD programs.

MPS at CNU is a unique program integrated with the Colleges of Pharmacy and Medicine. With over 20 faculty members from a variety of disciplines, the MPS program prepares students with integrated pharmaceutically-relevant aspects of classical disciplines and applications in drug discovery and development with unique clinical and therapeutic perspectives. The MPS at CNU has designed a flexible Master Program to prepare students for a wider spectrum of professional career in pharmaceutical sciences fields and leadership roles in industry while also providing them with the opportunity to strengthen their fundamental knowledge and obtain a hands on skills in research.

Accepted graduate applicants commonly have strong scientific backgrounds, a passion for pharmaceutical sciences/biotechnology and in many cases ample laboratory experience. Students with undergraduate degrees in the chemistry, biological sciences, and related fields are encouraged to apply.

Mission Statement

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

Faculty Profiles

Dr. Catherine Yang, PhD

Dr. Yang is a Professor of Molecular Pharmacology at the Department of Basic Science of College of Medicine of California Northstate University (CNU). Before joining CNU, Dr. Yang was a biochemistry/pharmacology Professor in the Department of Chemistry and Biochemistry at Rowan University for 23 years. She also held Professorships at Cooper Medical School of Rowan University in the Departments of Chemistry and Biochemistry and Translational Biomedical Sciences. While at Rowan, Dr. Yang served as the Chairperson for the Department of Chemistry and Biochemistry from 2007 to 2016 and the Director for the Biochemistry Program from 2000 to 2007. She has held research and faculty positions at Harvard Medical School, the American Health Foundation, Boston Biomedical Research Institute, Tokyo University of Medicine and Dentistry, University of Pennsylvania and Zhejiang University of Technology.

Dr. Yang has made strong contributions in elucidating mechanisms of tumor progression, and in the development of novel cancer drugs and antibiotics. She has led research groups studying proteolytic regulatory mechanisms in the advanced stages of prostate cancer, lung cancer and leukemia. Her in-depth research on type 2 diabetic metabolic regulation led to a dual function diabetes drug patent. Dr. Yang's immunological research resulted in an allergy vaccine development that is currently under clinical trials at affiliated clinics. The specific approach of triggering induction of immunologic tolerance to external or autologous allergens, and induction of sensitization to infectious or tumor antigens, with targeted tissue delivery of particles sized to facilitate uptake by specific cell populations, will provide unique therapeutic platform for curing advancement stage cancer. Dr. Yang's unique predictive biomarker studies have also spurred a Nano-sensor development for an early cancer diagnosis.

Dr. Yang has published more than 60 research papers, several biotechnology books, and is an inventor of several patented inventions. She has also secured numerous grants from the NIH, NSF, Research Corporation and New Jersey Health Foundation as well as funding from many corporations and health foundations. She serves on various review boards of federal, private and health foundation funding agencies.

Dr. Ahmed El-Shamy, D.V.M., M.S., Ph.D.

Dr. Ahmed Elshamy is the Director of MPS program. Dr. El-Shamy is an assistant professor of virology at Dept. of Pharmaceutical and Biomedical Sciences College of Pharmacy and Dept. of Basic Sciences College of Medicine CNU. In 1999, Dr. Elshamy received a DVM from faculty of Vet. Medicine Suez Canal University, Egypt. In 2009, he received a PhD in Molecular Virology at Kobe University, Japan, where he also awarded two years post-doctoral fellowship. From Oct. 2011 to Dec. 2017, Dr. Elshamy joined Division of Liver Diseases at Mount Sinai School of Medicine, New York as a senior post-doctoral fellow. During his PhD and post-doctor studies, Dr. Elshamy published 25 publications in high impact peer-viewed journal. He is the first author

in 10 publications; three of them have been published in the highest journals of liver field (two in Hepatology and one in Journal of Hepatology). Over the course of these studies, Dr. Elshamy has established a global network with world-leading virology researchers. In 2014, Dr. Elshamy received Japan Society for the Promotion of Science (JSPS) Award; and in 2013, he received The Encouragement State Prize in Medical Sciences from the Academy of Scientific Research and Technology, Egypt. His PhD study was selected as the Medical School Excellent Paper for the 2008-2009 Academic Year from Kobe University, Japan (El-Shamy et al., Hepatology. 2008; 48:38-47).

As assistant lecturer at faculty of Vet. Medicine Suez Canal University, Egypt, Dr. Elshamy was responsible to teach the Diagnostic Virology course to post graduate students from 2001 – 2005. In 2004, he was awarded the best Teaching Assistant Trainee completing Teaching Skills Courses, Suez Canal University, Egypt. During his post-doctoral training at Kobe University and Mount Sinai School of medicine, Dr. Elshamy trained several medical, master and Ph.D students on molecular virology techniques, especially isolating the virus on tissue culture.

Liver cancer is the second leading cause of site-specific cancer-related death worldwide and the most rapidly increasing cause of cancer-related death in North America. Hepatitis B and C viruses are the leading risk factors of liver cancer development. Therefore, Dr. Elshamy's research focuses on investigating the biology underlying cellular pathways disrupted by oncogenic HBV and HCV strains using novel cell culture system that was recently established by Dr. Elshamy's team (El-Shamy et al., J. Hepatology 2016). This research plan aims eventually to identify novel viral markers for liver cancer and novel targets for liver cancer therapy. In addition, Dr. Elshamy will use the newly established cell culture-based system as an efficient platform for high throughput screening of novel therapies for liver cancer.

Dr. Elshamy's research plan will open several doors to (i) use stat-of-art research techniques (including RNA-seq, Single cell sequencing, Mass cytometry-CyToF and next generation sequencing), (ii) train and mentor both under graduate and graduate students, and (iii) collaborate with multidisciplinary teams.

Dr. Hongbin Wang, PharmBS, MS, PhD

Hongbin Wang is an Assistant Professor in the Department of Pharmaceutical & Biomedical Sciences at California Northstate University College of Pharmacy (CNUCOP). He received his Ph.D. from University of Pennsylvania, Department of Pharmacology. After receiving his doctoral degree, Dr. Wang worked as a Postdoctoral Researcher in the Department of Systems Pharmacology and Translational Therapeutics and a Senior Research Investigator in the Department of Pathology & Laboratory Medicine, University of Pennsylvania Perelman School of Medicine. During his time at Penn Medicine, Dr. Wang supervised multiple undergraduates, graduates and postdoctoral researchers.

Dr. Wang is interested in studying: 1), interaction of complement activation fragment C4a with protease-activated receptor (PAR) 1/4 G protein-coupled receptors (GPCRs) and their roles and signaling pathways in the initiation and progression of complement related diseases. 2), the function and regulation of protein kinase C enzymes (PKCs), the receptors for the phorbol ester tumor promoters and the second messenger diacylglycerol (DAG), an important intracellular mediator of proliferation and malignant transformation. 3), chimaerins, novel phorbol ester/DAG receptors with Rac-GAP activity toward Rac that is a small GTPase-binding protein that regulates gene expression, cell cycle progression, actin cytoskeleton organization, cell adhesion and migration.

Dr. Abdelbasset Farahat, PharmBS, MS, PhD

Dr. Abdelbasset Farahat is an Assistant Professor of Pharmaceutical and Medicinal Chemistry in the Department of Pharmaceutical and Biomedical Sciences, Master of Pharmaceutical Sciences at California Northstate University. In 2002, Dr. Farahat received a Bachelor of Pharmacy from Mansoura University Egypt, and then in 2006, he received a Master of Pharmaceutical Sciences from Mansoura University Egypt. In 2010 Dr. Farahat received his Ph.D. in Medicinal Chemistry after doing research at Georgia State University, Atlanta, GA, USA. His Ph.D. research focused on the design and synthesis of dicationic compounds to be used as antimalarial and antitrypanosomal agents.

In 2011, Dr. Farahat joined the Faculty of Pharmacy, Mansoura University as Assistant Professor. In 2012 Dr. Farahat joined Boykin's laboratory at Georgia State University, Atlanta, GA. As a Postdoctoral researcher, then research scientist and team leader. In 2018 Dr. Farahat joined Kennesaw State University as Assistant Professor of Medicinal Chemistry. In 2018 Dr. Farahat was awarded The Encouragement State Prize in Medical Sciences from the Academy of Scientific Research and Technology, Egypt. Dr. Farahat has published 67 publications in high impact peer-viewed journals and is an inventor of three Patents.

Dr. Farahat's research focuses on medicinal chemistry and synthetic organic chemistry projects. My focus is being primarily on targeting the DNA minor-groove as an approach for antiparasitic

drug discovery. This work is being mostly directed towards the discovery of antimalarial, antitrypanosomal, antileishmanial, antinaeglerial and antiacanthamoebal drugs. More recently, my research has focused on developing heterocyclic dications for DNA minor groove binding which induce topological effects, bind into either the major or minor grooves, in specific parasitic sequences to generate a new mode of therapeutic activity. This work has led to new investigations that focus on the development of modular base pair recognition units for a variety of mixed DNA sequences. My previous work has yielded several cationic modules that recognize AT sequences quite well and are well known to enter cells and thus can potentially be developed for drugs against many diseases.

My recent work has identified two G-recognition modules and we are working on expanding the number of readily accessible G- recognition units such that modules may be combined to recognize a broad array of DNA mixed base pair sequences. A long-term goal of this proposed research is to develop an entirely new class of anticancer drugs that can target DNA-protein complexes, such as transcription factors that have previously been considered "undruggable" targets. Recently I was working on the design and synthesis of new dicationic molecules to target Naegleria Fowleri which is a pathogenic free-living amoeba that causes the acute fatal disease known as primary amoebic meningoencephalitis (PAM). The anti-PAM effort began with lead compounds with IC50 values between 1 and 2 micromolar and through optimization efforts have produced several compounds with IC50 values less than 30 nM. Six of these highly active compounds have been made in gram quantities and are currently being evaluated in an in vivo animal model for PAM.

Dr. Hazem Ali, B. Pharmacy, PhD

Dr. Hazem Ali is Adjunct Associate Professor at California Northstate University. Dr. Ali received Bachelor of Pharmacy from Mansoura University, Egypt and Ph.D. in Pharmaceutics from University of Louisiana at Monroe, Monroe, LA, USA. His Ph.D. research focused on formulation development and physicochemical characterization of self-emulsifying Drug Delivery Systems (SEDDS) and Nanoparticles. He used statistical modeling and experimental design (Design-of-Experiments (DoE)) to develop Simvastatin/Tocotrienol lipid nanoparticles and studied their effect on breast cancer cell lines. After graduation, Dr. Ali joined University of Texas Medical Branch at Galveston, Texas, USA as Postdoctoral Fellow where he developed polymeric nanoparticles and studied their transport across in vitro models of human placenta and Blood Brain Barrier (BBB). He designed Oxcarbazepine-loaded polymeric nanoparticles for potential therapy of Pregnant Women with Epilepsy. Dr. Ali was awarded William and Mary McGanity Research Fund Award for his research. Subsequently, Dr. Ali joined Moores Cancer Center at the University of California San Diego, San Diego, CA, USA

where his research was supported by Ruth L. Kirschtein T32 Postdoctoral Fellowship from NIH. He was trained to develop enzyme-encapsulated silica nanoparticles and study their effects on nude mice bearing ovarian tumor xenografts. Dr. Ali is currently a Chemist in the Office of Pharmaceutical Quality at the US FDA Center for Drug Evaluation and Research.

Dr. Eslam Mohamed, PharmBS, PhD

Dr. Mohamed got his PhD training in Dr. Andrew Mellor's lab at the Medical College of Georgia where he studied the immune regulatory role of indoleamine 2,3 dioxygenase enzyme in viral infection, autoimmunity and tumor models. After earning his doctoral degree in 2016, Dr. Mohamed pursued a postdoctoral fellowship in Dr. Paulo Rodriguez's lab at Moffitt Cancer center where he focused on understanding the mechanisms that govern the suppressive phenotype of tumor associated myelopoiesis and developing therapeutic interventions to promote an effective antitumor immunity.

Learning Outcomes

M.S. in Pharmaceutical Sciences Graduate 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 product

Objectives of the program:

- 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.

Strength of the program:

- Augment the growth of CNU in the area of pharmaceutical sciences
- Bolster interactions between the clinical pharmacologists from COP and clinicians from COM
- Create a translational medical innovation center to enhance CNU programs
- Establish an interdisciplinary program for training new generations of pharmaceutical scientists and regulatory affairs specialists
- Foster scholarly interactions between faculty from different Colleges on drug discovery
- Harness the energy in innovation and translational medical sciences
- Leverage the faculty expertise from the Colleges of Health Sciences, Medicine, and Pharmacy

Additional Scope of the program:

This program also provides advanced training in theory and laboratory- based settings to students opting for higher education in the health-related professions (M.D./Pharm.D, MD/Ph.D., and Pharm.D/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

The MPS program is designed to provide fundamental knowledge and skills in the pharmaceutical sciences to students who are interested in pursuing careers in academia, the pharmaceutical industry, and government positions after graduation.

Master's Degree Requirements

This proposed M.Sc. program will be completed within two years. There are two tracks, the Thesis-based Track and the Capstone Track (**Table 1**).

Track A (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.

Track B (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.

Table 1. Comparison between Thesis-based Track and Capstone Track

	Plan A: Thesis-based Track	Plan B: Capstone Track
Years	2	2
Total Credits	31	31
Core Course Credits	29	29
Elective Credits	2	2
Written Examination	No	Yes
Thesis	Yes	Capstone paper

Curriculum Design (Credits, Course Coordinator)

The course codes and course names as well as coordinators/instructors of all courses are listed in **Table 2.**

Track A (Thesis-based Track) **Thesis/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 (2 cr)
- MPS 506 Research and Thesis-I (3 cr)
- MPS 516 Research and Thesis-II (3 cr)

MPS 505 Graduate Seminar (1cr)

Track B (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 (2 cr)
- MPS 507 Capstone Paper-I (3 cr)
- MPS 517 Capstone Paper-II (3 cr)
  MPS 505 Graduate Seminar (1cr)

Elective Courses (2 credits)

- A minimum of 2 credits are required.

<u>Elective Courses</u> (Minimum requirement: *2 credits*)

- MPS 601 Advanced Topics in Drug Design (2 cr)
- MPS 602 Advanced Topics in Clinical Diagnosis (2 cr)
- MPS 603 Emerging Viral Diseases (2cr)
- MPS 604 Advances in immunology (2 cr)
- MPS 605 Medical writing skills (2 cr)

Table 2. Courses Offered in the Master Degree in Pharmaceutical Sciences Program

Course	Course name	Credit	Coordinator	Instructor
MPS 501	Introduction to Pharmaceutical Sciences-I	3	Dr. Wang	Dr. Wang and
MPS 511	Introduction to Pharmaceutical Sciences -II	3	Dr. Farahat	Dr. Farahat
MPS 502	Techniques in Pharmaceutical Sciences-I	3	Dr. Wang	Dr. Wang and
MPS 512	Principle of FDA regulatory Affairs	3	Dr. Ali	Dr. Ali
MPS 513	Biostatistics & Research Methods	3	Dr. El-Shamy	Dr. El-Shamy
MPS 514	Clinical Biochemistry	3	Dr. Mohieldin	Dr. Mohieldin
MPS 515	Medical Immunology	3	Dr. Mohamed	Dr. Mohamed
MPS 505	Journal Club and Graduate Seminar	1	Dr. El-Shamy	Dr. El-Shamy
MPS 506	Research and Thesis-I	3	Dr. El-Shamy	Individual faculty
MPS 516	Research and Thesis-II	3	Dr. El-Shamy	Individual faculty
MPS 507	Capstone Paper I	3	Dr. El-Shamy	Individual faculty
MPS 517	Capstone Paper II	3	Dr. El-Shamy	Individual faculty
MPS 601	Drug Design (Elective)	2	Dr. Farahat	Dr. Farahat
MPS 603	Emerging Viruses (Elective)	2	Dr. El-Shamy	Dr. El-Shamy
MPS 604	Advances in Immunology (Elective)	2	Dr. Mohamed	Dr. Mohamed
MPS 605	Medical writing skills (Elective)	2	Dr. Mohieldin	Dr. Mohieldin

Program Timeline

Tentative Schedule

Year 1 – Fall		Year 1 – Spring	
Course	Credit	Course	Credit
MPS 501-Introduction to Pharm. Sci. I	3	MPS 511 –Introduction to Pharm. Sci. II	3
MPS 515 – Medical Immunology	3	MPS 502 -Techniques in Pharm. Sci.	2
		MPS 513 – Biostatistics & Research Methods	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	2
MPS 514 – Medical Immunology	3	MPS 516 - Research and Thesis-II / MPS 517 – Capstone Paper-II	3
MPS Elective	2	MPS 505 – Graduate Seminar	1
MPS 506 - Research and Thesis-I / MPS 507 – Capstone Paper-I			
Semester Credit	**11**		**6**

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. To enroll in this MPS-MD combined program, the students should have a minimum overall undergraduate GPA of 3.2 in a life science major. Then the progression from MPS to MD is dependent upon successfully completing certain specific admission criteria, including but not limited to earning a grade point average of at least 3.5 in the MPS Program, and an MCAT score of at least 508 which must be verified no later than the MPS graduation date.

Credit Assignment 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). For courses that include workshop and/or laboratory time, one (1) unit of credit is assigned per two (2) hours each week of student time spent in this activity.

Transfer credit POLICY STATEMENT

Master of Pharmaceutical Sciences (MPS) will consider admission of qualified transfer students who have taken graduate college-level courses at other institutions. Course credits earned at other institutions will be evaluated for equivalence with MPS course offerings and articulated accordingly as substitute courses in the CNUMPS curriculum. No more than 14 course credit hours from other institutions can be transferred to CNUMPS on this basis. Potential transfer students who believe that CNUMPS may be an appropriate place to complete their graduate degree are encouraged to contact the Office of Admissions to discuss options and possible arrangements.

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.

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 proceeds through the entire 2nd year, with 3 credits 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.

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.

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.

Academic Progression

1. Policy Statement

   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.

2. Purpose

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

3. Academic Standard

Students in MPS program must pass all courses each semester with at 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 MPS program within 3 years (2-year program) or 5 years (dual degree-MPS/Pharm.D.) from the time they registered and attended their first core course if insufficient knowledge has been identified and remediated.

4. 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.

5. Dismissal

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

a. Failure to meet any terms of Remediation or Academic Probation.

b. Conduct subject to dismissal as described in the Student Handbook.

c. 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.

6. Appeal of Dismissal

Students dismissed from 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.

Graduate Environment

The size of the master program of Pharmaceutical Sciences fosters a close interaction between the graduate students and the entire faculty. Every effort is made to create an environment of scholarship, creativity and learning, which is the very essence of graduate study. This enhances the quality of student-faculty communications and enriches the academic environment to benefit both learning and discovery. The College of Graduate Studies strongly supports the MPS students interacting with students from College of Pharmacy and College of Medicine.

General 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.

Admission General Information

Requirements for Admission to the M.S. in Pharmaceutical Sciences Program

Critical Date: The deadline to submit an application for Fall 2022 enrollment will be August 1, 2022. All supporting documents must be received prior to August 15, 2022 for Fall 2022 enrollment and official transcripts must also be received by August 15, 2022. The online application must be completed fully.

Educational Prerequisites

- A bachelor's degree (B.S. or B.A.) or higher in Biology, Chemistry or relevant science disciplines.
- 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 is preferable but not required.
- Completion of an English proficiency test for international students from non-English speaking countries:
  - Minimum TOEFL paper-based test (PBT) score: 550
  - Minimum TOEFL internet-based test (IT) score: 80
  - Minimum IELTS score: 6.5
  - International applicants are exempt only if you are a native English speaker or have completed at least two years as a full-time student at a college or university where English is the primary language of instruction at the time in which you apply.

Requirements and Materials for Applying to M.S. in Pharmaceutical Sciences:

1. Application Fee: $100 for U.S. citizens and permanent residents; $120 for international applicants. Applicants who demonstrate financial need can request an application fee waiver.
2. 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.
3. Official Transcripts: Your academic records from each college-level institution you have attended are required and must be directly submitted from your institution or educational credential evaluators. Canadian applicants and all other foreign applicants must submit a foreign coursework evaluation; CNU accepts evaluations from ECE, IERF, WES, and Education Perspectives.
4. Official TOEFL scores for international applicants
5. Two Letters of Recommendation: At least two letters must be submitted from faculty members who are knowledgeable about your academic capabilities and interests. You will

be asked to list the names and contact information for those references as well. They will each receive instructions for uploading their letter of recommendation.

Nondiscrimination Policy

California Northstate University (CNU) is committed to cultivating a diverse community that recognizes and values inherent worth in individuals, fosters mutual respect, and encourages individual growth. The University believes that diversity enhances and enriches the quality of our academic program. CNU provides equal opportunity in education and employment and does not discriminate on the basis of race, color, creed, religion, national origin, ethnicity, gender identity, gender expression, age, sexual orientation, political affiliation, veteran status, or disability.

Payment Due Dates and Options

All tuition and fees described on the second page of the Student Enrollment Agreement are due in full in accord with the schedule "Total Charges You Are Obligated to Pay upon Enrollment and Required Scheduled Payment Dates" set forth on the last page of the Enrollment Agreement. As an alternative to payment in cash, the student may (1) provide satisfactory written creditor approved loan documentation to the College, or (2) apply for one of the installment payment plans offered by the College, either of which the College may within its complete discretion accept as an alternative to cash payment for the above tuition and fees, excluding the enrollment confirmation fee and the student health insurance fee. If either of these options is chosen by the student, the student must make the appropriate arrangements with the College no later than thirty (30) days before the applicable due date described on the last page of the Enrollment Agreement.

Failure to make full payment, or alternative loan or installment payment arrangements, by the due dates described in the Enrollment Agreement subject the defaulting incoming student to forfeiture of the student's seat and the defaulting returning student to dismissal or interest at the then current rate under the College's direct pay installment program, which is presently 12% per year.