CGS Agenda Item: 20-12
Effective Fall 2020

Eastern Illinois University

Department of Chemistry and Biochemistry

**Master of Science in Chemistry - Non-thesis Option**

## Program Summary

The objective of this non-thesis MS program is to provide an alternate pathway for students to complete an MS degree in Chemistry that does not involve an in-depth research project and thesis. The degree provides two options: MS degree in Chemistry-Chemistry option and MS in Chemistry-Biochemistry option.

Intended student groups will be K-12 teachers, non-traditional students, and employees of regional chemical, biochemical or related industries or businesses that require a graduate degree for professional advancement or to meet requirements for teaching positions at high schools or community colleges. This degree program will also be appropriate for students wishing to obtain additional course work prior to applying for health or other professional degree programs.

A Bachelor's degree in a natural science discipline with chemistry / biochemistry courses is required. A Bachelor's degree in chemistry or biochemistry is preferred but not necessary. The required graduate level courses for this program have significant undergraduate level prerequisites, which may be taken while enrolled in the program. Additionally, applicants should check the schedule of course offerings in order to meet any prerequisites and assure timely completion of requirements.

Students who eventually wish to pursue a PhD program in Chemistry or Biochemistry or who are interested in research-oriented career options should opt instead to enroll in one of the thesis-based MS in Chemistry or MS Biochemistry degree programs offered by the department.

## Program Goals

Upon completion of this non-thesis MS degree program, students will:

- possess extensive breadth and depth of knowledge in areas of chemistry and biochemistry.
- have an overall view of recent advances in chemistry and biochemistry.
- demonstrate critical thinking and problem solving skills.
- communicate and articulate chemical/biochemical scientific information clearly in written and oral forms.
- become skilled in searching and using the chemical/biochemical scientific literature.

## Admission Requirements

Prospective MS non-thesis students must meet the following requirements:

- Applicants must hold a Bachelor's degree in chemistry or biochemistry or a Bachelor's degree in some other area with significant chemistry and/or biochemistry course work. The degree must be from an accredited college or university. The applicant's undergraduate GPA should be 2.75 or higher on a 4.0 scale.
- Applicants may also voluntarily provide additional evidence of their ability to be successful in this program including any of the following but not limited to: published research papers, documentation of previous research experience, no more than 2 letters of recommendation, general GRE test scores, previous honors and/or awards.
- Placement exams in select areas of chemistry will be administered to all incoming students to assess chemistry proficiency. Eligibility to take chemistry graduate courses or the need

for undergraduate prerequisite courses will be determined by performance on placement exams and evaluation by admissions committee.

- International students whose Bachelor's degree is not in English medium must have a minimum score of 550 on the paper-based Test of English as a Foreign Language (TOEFL) test, 79 on the internet-based TOEFL test, or Overall Band of 6.5 on International English Language Testing System (IELTS).

**Degree Requirements**

- Candidates must complete a minimum of 32 semester hours of graduate credit according to the following requirements:

  **(i) At least 20 credit hours of 5000-level core courses**.

  1. Complete at least one course in each sub-disciplines of chemistry (analytical, inorganic, organic, and physical) courses to a total of 12 credit hours from the Chemistry and Biochemistry Department (see Study Plans below).
     - MS in Chemistry - Biochemistry Option candidates may replace two of the chemistry courses (or 6 hrs) with biochemistry related courses offered by the EIU Biological Sciences Department. Currently approved courses are listed under the Biochemistry – Option Study Plan below.
  2. At least 6 credit hours from 5000-level lecture in Chemistry and Biochemistry and/or another department. Courses must be approved by the faculty advisor, the graduate coordinator and the host department prior to enrollment.
  3. 1 hr of chemical or biochemical literature based seminar (CHM 5001).
  4. 1 hr of critical reading of chemical/biochemical literature (CHM 5003).

  **(ii) 12 credit hours** of 4750 or above undergraduate or 5000-level graduate electives from the Chemistry and Biochemistry Department or from approved disciplines (e.g. biology, geology, mathematics, physics, business, education, psychology or any combination) with the permission from the Faculty Advisor and the Graduate Coordinator. See currently approved courses from other departments below.

- Students who have received a grade of B or better in graduate chemistry coursework taken at another institution may transfer ~~up to 6 credit hours of~~ equivalent required graduate coursework upon approval by the graduate committee and the graduate dean. A written request for this approval must be submitted within one semester of full admission to the MS program.

**Further Considerations**

- Students must maintain a 3.00 grade point average in graduate coursework. ~~A student whose GPA falls below 3.0 will be placed on academic probation. Two consecutive semesters of being on academic probation will result in dismissal from the program.~~
- ~~Students pursuing this degree option are not eligible for graduate assistantship support nor a tuition waiver from the department/university.~~
- Departmental Graduate assistantships and tuition waivers are awarded to the graduate students who best advance the Department's research and teaching mission.
- Full-time graduate students already in the thesis-based MS program in chemistry or biochemistry who wish to switch to the non-thesis track must ~~seek formal approval from the~~ notify the MS Research Advisor (Faculty member supervising the student research), ~~and seek approval form~~ the Graduate Coordinator and the Chair of the Department of Chemistry and Biochemistry in advance to avoid any disruption to research and teaching. ~~If approved, this will result in immediate the loss of TA support and tuition waiver.~~ A

maximum of 3 credit hours of thesis research (CHM 5890X) earned can be applied towards the 32-hour minimum for the non-thesis MS degree.

- This non-thesis degree requires no laboratory research work. However, some course work may include a laboratory component. Additionally, students may enroll for 1-3 hrs of research as an elective course (CHM 5890X).
- The curriculum for each student will be different. The course plan will be determined in consultation with the Faculty Advisor and Graduate Coordinator at the beginning of the program.

**Plans for Completion**

- In consultation with the Graduate Coordinator, choose a Graduate Faculty Advisor prior to the end of the first semester in the program.
- Prepare an MS course plan in consultation with the Graduate Faculty Advisor and approved by the Graduate Coordinator. This must be completed by the end of the first semester in the program.
- Candidates are required to complete all of the requirements for their degree within the time stipulated by the graduate school for a master's degree.

**Study Plans**

**(1) MS in Chemistry - Chemistry Option – 32 Credits required**

*Core courses. Total credits: 20*

- CHM 5001 Graduate Seminar II. Credits: 1
- CHM 5003 Critical Reading of Chemical Literature. Credits: 1
- CHM 5180 Bioanalytical Problem Solving. Credits: 3
- CHM 5210 Bonding and Reactivity or CHM 5300 Molecular Spectroscopy. Credits: 3
- CHM 5360 Supramolecular Chemistry and Nanotechnology. Credits: 3
- CHM 5420 Modern Organic Chemistry. Credits: 3
- XXX 500X Courses from Chem & Biochem or other departments.[1] Credits: 6

*Elective courses. Total credits: 12*

The following elective courses are available from the Department of Chemistry and Biochemistry (also see Elective Courses from other departments).[2,3]

- CHM 4750 Environmental Chemistry. Credits: 3
- CHM 4790 Medicinal Chemistry. Credits: 3
- CHM 4800 Selected Topics in Chemistry. Credits: 1 to 4
- CHM 4860 Advanced Biochemistry. Credits: 3
- CHM 4900 Inorganic Chemistry II. Credits: 3
- CHM 4915 Advanced Laboratory. Credits: 3
- CHM 58901 Graduate Research. Credits 1-3
- CHM 5250 Special Topics. Credits: 3
- CHM 5990X Independent Study (can be repeated). Credits 1-3

**(2) MS in Chemistry - Biochemistry Option – 32 Credits required**

*Core courses. Total credits: 20*

- CHM 5001 Graduate Seminar II. Credits: 1

- CHM 5003 Critical Reading of Chemical Literature. Credits: 1
- CHM 5180 Bioanalytical Problem Solving. Credits: 3

*And one of the following courses (Credits: 3)*

- CHM 5210 Bonding and Reactivity or CHM 5300 Molecular Spectroscopy. Credits: 3
- CHM 5360 Supramolecular Chemistry and Nanotechnology. Credits: 3
- CHM 5420 Modern Organic Chemistry. Credits: 3

Select 12 hrs from the following courses[1,3]

- BIO 5400 Cell Physiology. Credits: 3
- BIO 5404 Advanced Plant Physiology II, Metabolism. Credits: 3
- BIO 5406 Endocrinology. Credits: 4
- BIO 5433 Neurobiology of Diseases. Credits: 4
- BIO 5434 Neurobiology. Credits: 3
- BIO 5435 Advanced Neurobiology. Credits: 3
- CHM 5210 Bonding and Reactivity or CHM 5300 Molecular Spectroscopy. Credits: 3
- CHM 5360 Supramolecular Chemistry and Nanotechnology. Credits: 3
- CHM 5420 Modern Organic Chemistry. Credits: 3
- CHM 5990X - Independent Study. Credits: 1

*Elective Courses. Total credits: 12*

The following elective courses are available from the Department of Chemistry and Biochemistry (also see Elective Courses from other departments)**:**[2,3]

- BCT 5000 Techniques in Biotechnology. Credits:3
- BIO 4751 Advanced Molecular Cell Biology. Credits: 3
- BIO 4818 Environmental Microbiology. Credits: 4
- BIO 4836 Pathogenic Microbiology. Credits: 4
- BIO 5250 Biological Microtechnique. Credits: 4
- CHM 4750 Environmental Chemistry. Credits: 3
- CHM 4790 Medicinal Chemistry. Credits: 3
- CHM 4800 Selected Topics in Chemistry. Credits: 1 to 4
- CHM 4860 Advanced Biochemistry. Credits: 3
- CHM 4900 Inorganic Chemistry II. Credits: 3
- CHM 4915 Advanced Laboratory Credits: 3
- CHM 58901 Graduate Research. Credits: 1-3
- CHM 5250 Special Topics. Credits: 3
- CHM 5990X Independent Study (can be repeated). Credits: 1-3

**Suggested elective courses from other departments for both degree options[1]:**

CSM 4880 Design and Analysis of Algorithms. Credits: 3
CSM 4885 Theory of Computation. Credits: 3
CSM 4970 Principles of Operating Systems. Credits: 3
CSM 4980 Networking and Distributed Computing. Credits: 3
CSM 4985 Artificial Intelligence and Machine Learning. Credits: 3
ECN 480~~75~~1 Intermediate Microeconomic Theory. Credit: 3 (Online)
ECN 4751 Managerial Economics. Credit: 3 (Online)
EDU 5200 Introduction to Educational Research. Credits: 3
EDU 5300 Educational Technology. Credits: 3
EDU 5680 Educational Assessment. Credits: 3

MAT 4760 Linear Algebra. Credits: 3
MAT 4920 Concepts of Algebra for Ele & Midd Teachers. Credits: 3
MBA 5660A Operations Management. Credit: 3 (Online)
MBA 5680A Organizational Behavior and Group Dynamics. Credit: 3 (Online)
MBA 5500 Quantitative Modeling. Credit: 3 (Online)
MBA 5550 Marketing Management. Credit: 3 (Online)
MBA 5000 Strategic Management. Credit: 3 (Online)
MBA 5640 Financial Management. Credit: 3 (Online)
PHY 4750 Thermodynamics and Statistical Mechanics. Credits: 3
PHY 4855 Quantum Mechanics. Credits: 3
PHY 4865 Advanced Quantum Mechanics. Credits: 3
PSY 4810 Neuropsychopharmacology. Credits: 3
PSY 5170 Theories of Learning. Credits: 3

[1] Courses other than Chemistry or Biochemistry require approval from the faculty advisor, the graduate coordinator and the host department. EDU and MBA courses, as well as PSY 5170, require admissions to additional programs.

[2] Other suitable courses can be allowed with approval from the faculty advisor, the graduate coordinator and the host department. Energy Chemistry (CHM 5700) course or other courses with BCT prefix cannot be applied towards this degree.

[3] Some courses listed here have pre-requisites; students should check with the catalog and/or their Faculty Advisor to be aware of these.

Approved by Chemistry and Biochemistry Department: February 12, 2020
Approved with revisions by CLAS-CC: Feb. 19, 2020
Approved by CGS: