Chemical and Environmental Toxicology

This section presents the requirements for programs in:

- **M.Sc. Biology with Collaborative Specialization in Chemical and Environmental Toxicology**
- **M.Sc. Chemistry with Collaborative Specialization in Chemical and Environmental Toxicology**
- **M.Sc. Earth Sciences with Collaborative Specialization in Chemical and Environmental Toxicology**
- **Ph.D. Biology with Collaborative Specialization in Chemical and Environmental Toxicology**
- **Ph.D. Chemistry with Collaborative Specialization in Chemical and Environmental Toxicology**
- **Ph.D. Earth Sciences with Collaborative Specialization in Chemical and Environmental Toxicology**

Program Requirements

M.Sc. with Collaborative Specialization in Chemical and Environmental Toxicology

The student is responsible for fulfilling both the Institute and departmental requirements for the Master's degree, and the requirements of the Collaborative Program. Consult the individual programs for detailed program requirements.

The minimum requirements of the Collaborative Program include completing at least three courses, which include:

1. A relevant introductory course in toxicology (The suitability of any introductory toxicology courses as a prerequisite for the Collaborative Program will be decided by the executive committee, comprised of the Coordinator and Associate Coordinator of the Collaborative Program. It is the student's responsibility to provide justification for an exemption. This can be either:
   - Prior to admission to the Collaborative Program in Chemical and Environmental Toxicology, or
   - By taking one of the two introductory courses, Principles of Toxicology (BIOL 6402/BIO 9101 - CHEM 5708/CHM 8156) or BIOL 6403/BIO 9104 while registered in the Collaborative Program.
2. The Seminar in Toxicology (BIOL 6405/BIO 9105 - CHEM 5805/CHM 8167).
3. Additional courses required by the Master's Program and approved by the Collaborative Program.
4. Thesis Requirement - a research thesis on a topic in toxicology supervised by a faculty member of the Collaborative Program in Chemical and Environmental Toxicology.

Note: In addition, the student's Advisory Committee may direct the student to take or audit further courses to complement the student's background and research program. Other courses offered in the programs of the primary academic units of biology or chemistry may be taken as options, with the permission of the student's supervisory committee, in addition to the basic requirements of the Collaborative Program in Chemical and Environmental Toxicology.

M.Sc. Biology with Collaborative Specialization in Chemical and Environmental Toxicology (5.0 credits)

Requirements:

1. 1.5 credits in:		1.5
BIOL 6405/ CHEM 5805 [0.5]	Seminar in Toxicology	
BIOL 6402/ CHEM 5705 [0.5]	Principles of Toxicology	
or BIOL 6403/ CHEM 5708 [0.5]	Ecotoxicology	
and 0.5 credit in additional approved coursework		
2. 3.5 credits in:		3.5
BIOL 5909 [3.5]	M.Sc. Thesis (in the specialization, including successful oral defence)	
Total Credits		**5.0**

M.Sc. Chemistry with Collaborative Specialization in Chemical and Environmental Toxicology (5.0 credits)

Requirements:

1. 1.0 credit in:		1.0
CHEM 5708 [0.5]	Principles of Toxicology	
or CHEM 5705 [0.5]	Ecotoxicology	
CHEM 5805 [0.5]	Seminar in Toxicology	
2. 0.5 credit in CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department		0.5
3. 0.5 credit in:		0.5
CHEM 5804 [0.5]	Modern Scientific Communication	
4. 3.0 credits in:		3.0
CHEM 5909 [3.0]	M.Sc. Thesis (in the specialization)	
Total Credits		**5.0**

M.Sc. Earth Sciences with Collaborative Specialization in Chemical and Environmental Toxicology (5.0 credits)

Requirements:

1. 0.5 credit in:		0.5
BIOL 6402/ CHEM 5708 [0.5]	Principles of Toxicology	
or BIOL 6403 [0.5][5]	Ecotoxicology	
or CHEM 5705 [0.5][5]	Ecotoxicology	
2. 0.5 credit in:		0.5
BIOL 6405/ CHEM 5805 [0.5]	Seminar in Toxicology	
3. 0.5 credit in additional course work		0.5
4. 3.5 credits in:		3.5
ERTH 5909 [3.5]	M.Sc. Thesis (in the specialization)	

5. A pre-defence public lecture, preceding the oral examination, based on the thesis research

6. 0.0 credit: participation in the OCGC Seminar Series. Each student gives a presentation of one lecture (open to all members of the OCGC) describing the candidate's research study within 16 months of the candidate's registration in the M.Sc. program.	
Total Credits	**5.0**

Ph.D. (Biology, Chemistry, or Earth Sciences) with Collaborative Specialization in Chemical and Environmental Toxicology

Students are responsible for fulfilling both the Institute and Departmental requirements for the Ph.D. degree, and the requirements of the Collaborative Program. Consult the individual programs for detailed program requirements.

The requirements of the Collaborative Program are as follows:

1. All courses required by the primary program and approved by the Collaborative Program. If an introductory course (either Principles of Toxicology (BIOL 6402/BIO 9101/CHEM 5708/CHM 8156 or Ecotoxicology (BIOL 6403/BIO 9104/CHEM 5705/CHM 9109 [0.5 credit] , or an approved alternative) has not been completed prior to admission, it must be included among these courses.
2. The Seminar in Toxicology (BIOL 6405/BIO 9105 - CHEM 5805/CHM 8167 [0.5 credit] (see **Note**, below)
3. In addition, students may be directed by their Advisory Committee to take or audit further courses to complement their background and research program. A list of approved electives is provided under 'Graduate Courses'.
4. Thesis Requirement - a research thesis on a topic in toxicology supervised by a faculty member of the Collaborative Program in Chemical and Environmental Toxicology.

Note: Item 2 above is not required for students who have already completed the Seminar in Toxicology for the Master's specialization.

Ph.D. Biology with Collaborative Specialization in Chemical and Environmental Toxicology (1.5 credits)

Requirements:

1. 1.0 credit in:		1.0
BIOL 6405/ CHEM 5805 [0.5]	Seminar in Toxicology	
BIOL 6402/ CHEM 5708 [0.5]	Principles of Toxicology	
or BIOL 6403 [0.5]	Ecotoxicology	
or CHEM 5705 [0.5]	Ecotoxicology	
2. 0.5 credit in additional course work		0.5
2. 0.0 credits in:		0.0
BIOL 6909 [0.0]	Ph.D. Thesis (in the specialization, including successful oral defence)	
Total Credits		**1.5**

Ph.D. Chemistry with Collaborative Specialization in Chemical and Environmental Toxicology (3.0 credits)

Requirements:

1. 1.5 credits from:		1.5
CHEM 5705 [0.5]	Ecotoxicology	
CHEM 5708 [0.5]	Principles of Toxicology	
CHEM 5805 [0.5]	Seminar in Toxicology (not required for students who have already completed the Seminar in Toxicology for the Master's specialization)	
2. 0.5 credit in:		0.5
CHEM 5804 [0.5]	Modern Scientific Communication	
3. 1.0 credit in CHEM at the graduate level, which may include up to 0.5 credit in another discipline, with permission of the department.		1.0
4. Comprehensive examination (see Note below)		
5. Research Proposal (see Note below)		
7. Public lecture, to precede the oral defence		
8. 0.0 credits in:		0.0
CHEM 6909 [0.0]	Ph.D. Thesis (in the specialization)	
Total Credits		**3.0**

Ph.D. Earth Sciences with Collaborative Specialization in Chemical and Environmental Toxicology (1.0 credit)

Requirements:

1. 0.0 credits in:		
ERTH 6909 [0.0]	Ph.D. Thesis (a research thesis on a topic in toxicology supervised by a faculty member of the Collaborative Program in Chemical and Environmental Toxicology, defended at an oral examination before an examination board that includes an external examiner)	
2. A pre-defence public lecture, preceding the oral examination, based on the thesis research		
3. 1.0 credit in:		**1.0**
BIOL 6402 [0.5]	Principles of Toxicology	
or CHEM 5708 [0.5]	Principles of Toxicology	
BIOL 6405 [0.5]	Seminar in Toxicology	
or CHEM 5805 [0.5]	Seminar in Toxicology	
4. 0.0 credit in:		**0.0**
ERTH 6908 [0.0]	Ph.D. Comprehensive Examination (Conducted by the thesis advisory committee. Includes the presentation of a thesis proposal)	
5. 0.0 credit in: participation in the OCGC Seminar Series. Each student gives a presentation of one lecture (open to all members of the OCGC) describing the candidate's research study within 16 months of the candidate's registration in the Ph.D. program.		**0.0**
6. Fulfilment of residence requirement: at least four terms of full-time study		**0.0**
Total Credits		**1.0**

Chemical and Environmental Toxicology Courses

Other courses listed in the calendar under the primary academic units of psychology, biology, or chemistry may be taken, with the approval of the student's advisory committee, as options in addition to the basic requirements of the degree in chemical and environmental toxicology.

BIOL 6402/ CHEM 5708 [0.5] (CHM 8156, TOX 8156)	Principles of Toxicology
BIOL 6403/ CHEM 5705 [0.5] (CHM 9109, TOX 9104)	Ecotoxicology
BIOL 6405/ CHEM 5805 [0.5] (TOX 9105)	Seminar in Toxicology
BIOL 5709/ CHEM 5709 [0.5] (TOX 8157)	Chemical Toxicology

Regulations

See the General Regulations section of this Calendar and the regulations of the primary participating unit for the degree.

Admission

Applications should be directed to the primary participating unit (i.e. departments of Biology, Chemistry, or Earth Sciences) that is the most appropriate to the student's research interests. Once sponsored and accepted into one of the Institutes, students must be sponsored into the Collaborative Program in Chemical and Environmental Toxicology by a faculty member involved in the program. This will normally be the student's supervisor.

The requirements for admission to the Master's in the Collaborative Program in Chemical and Environmental Toxicology are as follows:

1. Prior admission to the master's program in one of the supporting Institutes participating in the program.
2. A letter of recommendation from the participating faculty member of the collaborative program, which both recommends admission and indicates the willingness of the faculty member to supervise the candidate's research program in Chemical and/or Environmental Toxicology.

Admission

Applications should be directed to the primary participating unit that is the most appropriate to the student's research interests. Once accepted and registered in one of the Institutes, students must be sponsored into the Collaborative Program in Chemical and Environmental Toxicology by a faculty member involved in the program; this will normally be the student's thesis supervisor. Application forms and further information can be obtained by writing directly to any of the participating Institutes or Departments or to the program Coordinator.

The requirements for admission to the Collaborative Program in Chemical and Environmental Toxicology at the Ph.D. level are as follows:

1. Prior admission to the Ph.D. program in one of the supporting Institutes participating in the program.
2. A letter of recommendation from a participating faculty member who is a member of the Collaborative Program, which both recommends admission and indicates the willingness of the professor to supervise the candidate's research program in Chemical and Environmental Toxicology.