

# Ottawa-Carleton Collaborative Program in Chemical and Environmental Toxicology

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## The Program

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*Coordinator of the Collaborative Program:*  
R.C. Wyndham

Toxicology is the study of the effects of poisons on living systems. These poisons can be either inorganic, synthetic or natural organic materials. As a field of research it cuts across traditional disciplinary boundaries such as chemistry, biology and psychology. While individual researchers usually specialize in a particular area, toxicologists today must be able to appreciate significant research in other fields and therefore require an understanding of the basic principles of other disciplines. To meet this challenge Carleton University and the University of Ottawa offer a multidisciplinary collaborative program in toxicology leading to the degree of the Master of Science.

The collaborative program is intended to augment the research and training which the student receives through one of the institutes or departments which participates in the program.

The primary or degree-granting participating departments or institutes are:

- The Ottawa-Carleton Institute of Biology, which consists of the Departments of Biology at Carleton University and the University of Ottawa
- The Ottawa-Carleton Chemistry Institute, which consists of the Departments of Chemistry at Carleton University and the University of Ottawa
- The Department of Psychology, Carleton University

The collaborative program is coordinated by a committee of representatives of these participating units.

Applications should be directed to the primary participating unit which is most appropriate to the student's research interests. Once accepted into the institute or department, 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 student is responsible for fulfilling the requirements for the master's degree of the department and the institute and the additional requirements of the collaborative program.** Application forms and further information may be obtained by writing directly to any of the three participating institutes or departments.

## Members of the Collaborative Program in Chemical and Environmental Toxicology:

J.T. Arnason, *Biochemical Ecology*  
C.S. Findlay, *Modeling of Toxicant Transport*  
P.A. Fried, *Pharmacotoxicology*  
D.R. Gardner, *Pesticide/Nerve Interactions*  
B.R. Hollebone, *Chemical Toxicology*  
J.D. Lambert, *Plant Communities and Man*  
T.W. Moon, *Comparative Physiology*  
B.A. Pappas, *Developmental Psychopharmacology*  
B.J. Philogène, *Ecophysiology of Insects*  
F. Pick, *Microbial Physiology and Ecology*  
D.C.S. Roberts, *Drug Abuse, Brain Metabolism*  
B.W. Tansley, *Neurotoxicology*  
P. Weinberger, *Ecotoxicology*  
D.C. Wigfield, *Chemical Toxicology*  
R.C. Wyndham, *Molecular Microbial Ecology*  
S. Gilbert,\* (Health and Welfare Canada), *Neurotoxicology*  
R. Greenhalgh,\* (Agriculture Canada), *Environmental Toxicology*  
D.B. Peakall,\* (Environment Canada), *Wildlife Toxicology*

## Sessional Lecturers and Associates

D.R. Lean, (National Water Research Institute, Environment Canada), *Limnology*  
L. Ritter, (Health and Welfare Canada), *Pesticides*

## \* Adjunct Research Professors

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## Master's Program

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### Admission Requirements

The requirements for admission to the master's program in chemical and environmental toxicology are as follows:

- Prior admission to the master's program of the primary institute or department which participates in the collaborative program
- A letter of recommendation from a 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. Students must normally have obtained a high honors grade point average in their undergraduate and/or graduate course work in order to be recommended for admission to the collaborative program.

### Program Requirements

Students enrolled in the collaborative program in chemical and environmental toxicology must fulfill the requirements for the master's program of the primary academic unit in which they are enrolled. This normally requires a minimum of five full credits, of which the thesis normally contributes three credits. In addition to the requirements of the primary academic unit, the student must successfully complete:

- **Biology 61.642 (BIO9101), Principles of Toxicology**
- **Biology 61.645 (BIO9105), Seminar in Toxicology**
- **One additional half-credit course in toxicology from the following list:**  
**Biology 61.643 (BIO9104) Ecotoxicology, or Chemistry 65.579 (CHM8157), Chemical Toxicology, or Psychology 49.524, Principles and Methods in Behavioral Toxicology**
- **A research thesis on a topic in toxicology supervised by a faculty member of the collaborative program in chemical and environmental toxicology**

Additional course credits may be required by the student's primary academic unit or advisory committee. This will include one additional course credit for students in the Ottawa-Carleton Chemistry Institute for the graduate seminar, **Chemistry 65.581**, and at least one additional half-credit course for students enrolled in the Department of Psychology or the Ottawa-Carleton Institute of Biology.

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### Graduate Courses\*

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Students are advised to check in July of each year with the department concerned for the scheduling of these 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 supervisory committee, as options in addition to the basic requirements of the degree in chemical and environmental toxicology.

- **Biology 61.642 (BIO9101)**  
**Principles of Toxicology**

A half-credit course (**one term**)? giving the basic theorems of toxicology and building on these concepts with examples of current research problems. The concepts of exposure, hazard, and risk assess-

ment will be defined and illustrated with experimental material from some of the more dynamic areas of current research.

**(Also offered as Chemistry 65.578/CHM8156 and Psychology 49.525.)**

**Before 1992-93 listed as Biology 61.642/ BIO9101: Environmental Toxicology and Chemistry 65.578/CHM8156: Principles and Mechanisms of Toxicology.**

- **Biology 61.643 (BIO9104)**

#### Ecotoxicology

Selected topics and advances in ecotoxicology with emphasis on the biological effects of contaminants. The potential for biotic perturbation resulting from chronic and acute exposure of ecosystems to selected toxicants will be covered, along with methods of pesticide, herbicide and pollutant residue analysis and the concept of bound residues.

**Prerequisite:** Biology 61.642 (BIO9101)

- **Biology 61.645 (BIO9105)**

#### Seminar in Toxicology

A half-credit course (**two terms**)? in a seminar format, highlighting selected current topics in toxicology. The course will feature student, faculty and invited seminar speakers.

**(Also offered as Chemistry 65.585/CHM8167 and Psychology 49.526)**

- **Chemistry 65.579 (CHM8157)**

#### Chemical Toxicology

In-depth studies of biochemical interactions between toxic substances and enzymatic systems. emphasis will be placed on understanding the bio-organic and bio-inorganic mechanisms of initial toxic events. Examples from mechanism failures, mechanism compensation and defensive behavior will be given.

**Prerequisite:** Biology 61.642 (BIO9101)

- **Psychology 49.524**

#### Principles and Methods in Behavioral Toxicology

A half-credit course (**one term**)? examining the basic concepts of behavioral toxicology starting with a general discussion of behavior testing methodology and then focusing on procedures used in screening chemicals for behavioral effects,

and **\* All courses are half-credit courses unless more ad-  
 stated otherwise.**  
 vanced tests.

Controversial examples from current research are used to illustrate the practical problems of assessing both animal and human behavioral toxicity.

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