

Ottawa-Carleton Collaborative Program in Chemical and Environmental Toxicology

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The Program

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, *Toxicology of Natural Products*
C.S. Findlay, *Modelling of Toxicant Transport*
P.A. Fried, *Pharmacotoxicology*
D.R. Gardner, *Pesticide/Nerve Interactions*
B.R. Hollebone, *Chemical Toxicology*
Iain Lambert, *Molecular Biology of Mutagenesis*
J.D. Lambert, *Plant Communities and Man*
T.W. Moon, *Comparative Physiology*
B.A. Pappas, *Developmental Psychopharmacology*
B.J. Philogène, *Ecophysiology of Insects*
Frances Pick, *Microbial Physiology and Ecology*
D.C.S. Roberts, *Drug Abuse, Brain Metabolism*
V.L. Seligy,* *Genotoxicity and Molecular Genetics*
B.W. Tansley, *Neurotoxicology*
D.C. Wigfield, *Chemical Toxicology*
R.C. Wyndham, *Molecular Microbial Ecology*
P.J. Weatherhead, *Ecology and Environmental Toxicology*

Sessional Lecturers and Associates

R.P. Moody, (Health and Welfare Canada), *Environmental Toxicology*
L. Ritter, (Health and Welfare Canada), *Pesticides*
R. Norstrom,* (Canadian Wildlife Service), *Wildlife Toxicology*

Master's Program

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

* Adjunct Research Professor

have obtained a high honours 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 must fulfil the requirements for the primary academic unit in which they are enrolled (biology, chemistry or psychology). The requirements for the collaborative program in chemical and environmental toxicology include:

- Principles of Toxicology
- Seminar in Toxicology
- One additional half-credit course in toxicology
- A research thesis on a topic in toxicology supervised by a faculty member of the collaborative program in chemical and environmental toxicology

Graduate Courses*

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

The basic theorems of toxicology with examples of current research problems. The concepts of exposure, hazard and risk assessment 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)

- 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

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Toxicolog

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* All courses are half-credit courses unless stated otherwise.

A two term course in seminar format highlighting 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

An advanced course in chemical toxicology which deals with both chemical hazard and exposure. An overview of the empirical data relating to the toxicity of various classes of chemicals to test organisms is followed by a treatment of toxicity at the cellular level, including studies of interaction between toxic substances and enzymatic systems. This is the type of data which a student could apply to the interpretation and monitoring of the new WHMIS health regulations. Initial events in enzyme induction and mutagenesis are considered. Predictive capacities in the areas of structure-activity relationships and mechanisms of enzyme induction are considered, followed by an assessment of mechanism of exposure of toxic chemicals.

- Psychology 49.524

Principles and Methods in Behavioural Toxicology

A half-credit course examining the basic concepts of behavioural toxicology starting with a general discussion of behaviour testing methodology and then focusing on procedures used in screening chemicals for behavioural effects, and more advanced tests. Controversial examples from current research are used to illustrate the practical problems of assessing both animal and human behavioural toxicity.