Forensic Science

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Trent University's Forensic Science Program offers two degree options: a Bachelor of Science in Forensic Science (BScFS) and a joint-major degree.

The Bachelor of Science in Forensic Science (BScFS) is a direct-entry professional degree program with a limited number of student places. This program integrates the study of science and law with investigative practice and theory. Students in Trent's Forensic Science degree program learn the foundational science of forensics through the study of anthropology, biology, and chemistry. These foundational science courses complement the specialized forensics courses offered in the program. The degree particularly emphasizes emerging developments in DNA forensic applications and crime scene investigation through courses in laboratory techniques and related case work.

From the beginning of their forensic studies at Trent, BScFS students are fully immersed in a functioning forensic research and service environment located in the DNA Building. Students practice case work, learn team-building, analyze ethical and legal issues related to evidence, and face the challenge of communicating complex scientific evidence within the legal system. Students in the program may also participate in a placement/mentorship course where they gain valuable "real-world" experience and begin to develop their professional network.

The joint-major degree option offered by the Forensic Science Program can be taken in conjunction with other departments or programs including, but not limited to, Biology, Psychology, Chemistry, Computing & Information Systems, Physics, and Anthropology. Students enrolled in the joint-major program can enrol in a number of the same courses that are provided to BScFS students and have the option of obtaining either an Honours Bachelor of Science (BSc) or an Honours Bachelor of Arts (BA) degree.

Admission Requirements

The BScFS is a direct-entry program with a limited number of student places. A secondary school diploma and six Ontario U/UM credits including one 4U credit in each of Chemistry, Biology, English, and Mathematics are required for admission. 4U Physics is highly recommended. Normally, students with an overall average lower than 75% will not be admitted to the program.

For students in the joint-major Honours program, see General Admission Requirements in the Calendar.

Bachelor of Science in Forensic Science Program

- In addition to the program requirements listed below, students must satisfy the University degree requirements (see p. 14).

The single-major Honours program. 20.0 credits including the following 17.0 credits:

- 6.0 FRSC credits consisting of FRSC 1011H, 1100H, 2020H, 2030H (or 1010H), 2050H, 2100H, 3010H, 3020H, 3100H, 3110H, 3700H (or 3620H), and 4312H
- 0.5 FRSC credit from FRSC 3000H or 3111H
- 0.5 FRSC credit from FRSC 3400H or 3410H
- 0.5 FRSC credit from FRSC 4570H or 4600H
- 2.0 FRSC credits from FRSC 4020D; or from one of FRSC 4010Y or 4890Y and 1.0 additional FRSC credit at the 4000 level
- 1.0 FRSC credit in addition to the above
- 0.5 ANTH credit from ANTH 1001H or 1010H
- 0.5 ANTH credit consisting of ANTH 2410H
- 2.0 BIOL credits consisting of BIOL 1030H, 1050H, 1051H, and 3080H
- 2.0 CHEM credits consisting of CHEM 1000H, 1010H, 2300H, and 2400H
- 1.0 MATH credit consisting of MATH 1051H and 1052H
- 0.5 PHYS credit consisting of PHYS 1001H

Bachelor of Arts and Bachelor of Science Joint-Major Programs in Forensic Science

- In addition to the program requirements listed below, students must satisfy the University degree requirements (see p. 14).
- The same course may not simultaneously satisfy the requirements of both programs in a joint-major degree.

The joint-major Honours program. 20.0 credits including the following 7.0 credits:

- 3.0 FRSC credits consisting of FRSC 1011H, 1100H, 2020H, 2030H (or 1010H), 3010H, and 3100H
- 2.5 FRSC credits at the 3000 level or beyond in addition to the above
- 1.5 FRSC credits in addition to the above
- For the BSc, 14.0 science credits are required, including 1.0 MATH credit

Specialization in Law & Policing

The Specialization in Law & Policing requires a suite of courses deemed important for those interested in pursuing a career in enforcement or the law and an additional list of courses students can choose from based on their own interests within law and policing.

Students who have fulfilled the requirements for a Bachelor of Science in Forensic Science or a joint-major Bachelor of Arts or Bachelor of Science degree in Forensic Science may graduate with a Specialization in Law & Policing if they have successfully completed the following 4.0 credits:

- 2.5 FRSC credits consisting of FRSC 2100H, 2110H, 2750H, 3110H, and 4380H
- 1.5 credits from the following:

FRSC-BIOL 3000H	ERST 4250H	PSYC 3240H
FRSC 3111H	IDST-SOCI 3120H	PSYC 3300H
FRSC 3800H	IDST-SOCI 3121H	PSYC 4310H
FRSC 4110H	INDG 3401H	PSYC 4720H
FRSC 4111H	INDG 3402H	SOCI 2615H
FRSC-PSYC 4320H	PHIL-POST 2150H	SOCI 4110H
FRSC-BIOL 4570H	PHIL-POST 3140H	SOCI 4270H
ANTH-FRSC 3405H	POST-CAST 3091H	WMST-CAST-SOCI 3966H
BIOL-FRSC 3330H	POST-CAST 3092H	
ERST 3250H	PSYC 2300H	

Please consult the academic timetable for information on courses that will be offered in 2019–2020, including when they will be scheduled.

» **FRSC 1011H: Introduction to Crime Scene Investigation (Sc)**
Introduces students to forensic investigations and crime scene processing. Students are instructed how to gather and document scientific evidence while processing crime scenes in the crime scene house, and then present their findings as written reports, and as expert witnesses in a courtroom setting.

» **FRSC 1100H: Introduction to Canadian Justice**
Introduces students to the Canadian justice system with an emphasis on the criminal justice system. Students are provided opportunities to apply their knowledge through analyzing legal cases and various pieces of legislation, and participating in a mock trial.

» **FRSC 2020H: Scientific Methodology in Forensic Science (Sc)**
Provides an introduction to the scientific method, data management, and basic statistics as a foundation for collecting, analyzing, and presenting scientific data in a scientific or forensic setting. Prerequisite: FRSC 2030H (or 1010H) and 1.5 additional science credits. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 2030H: Foundations in Forensic Science (Sc)**
Introduces students to forensic science by exploring multiple disciplines, including forensic psychology, chemistry, entomology, pathology, and dentistry, plus DNA forensics, wildlife forensics, arson investigation, food forensics, and bioterrorism. Students are also instructed in investigative procedures using the crime scene house. Prerequisite: 60% or higher in FRSC 1011H or permission of instructor. Excludes FRSC 1010H.

» **FRSC-BIOL 2050H: Introduction to Genetics (Sc) (See Biology)**

» **FRSC 2100H: Criminal Code**
Provides a systematic and detailed review of the Criminal Code. It focuses on implications of the Criminal Code for forensic science, current issues in its interpretation by the courts, and its implementation by law enforcement agencies. Prerequisite: 60% or higher in FRSC 1100H.

» **FRSC 2110H: Police Powers**
Focuses on the legislation governing criminal investigations, including the Constitution Act and the Charter of Rights and Freedoms, the practical application of those laws, and their judicial interpretation in the day-to-day activities of police officers and other law enforcement personnel. Prerequisite: FRSC 2100H.

» **FRSC 2220H: Forensic Chemistry (Sc)**
Designed to introduce the variety of sub-disciplines that encompass forensic chemistry. Students discover how analytical chemistry techniques can be applied to the areas of forensic toxicology, fire and explosives investigation, documents examination, firearms, and trace evidence analysis. Emphasizes a practical approach to the different types of examinations relevant to these sub-disciplines. Prerequisite: CHEM 2400H and FRSC 2030H (or 1010H).

» **FRSC 2400H: Data Analysis in Forensic Science (Sc)**
The way in which data is generated and analyzed has changed. Ranging from genome sequence to forensic accounting to monitoring Internet traffic, Big Data has revolutionized business, research, and security. This course introduces students to the analysis and interpretation of Big Data by exposing them to its history, theory, and application. Prerequisite: MATH 1051H and 1052H.

» **FRSC-COIS 2750H: Computer Crime and Forensics (Sc) (see Computing & Information Systems)**

» **FRSC-BIOL 3000H: Laboratory DNA Forensics (Sc)**
Examines the theoretical foundations and techniques of DNA analysis with leading-edge technology in light of forensic cases. Students learn the theory and practice of generating forensic DNA evidence. Prerequisite: FRSC-BIOL 2050H, 3700H (or 3620H), and BIOL 3080H.

» **FRSC-EGEO-ANTH 3001H: Applied and Environmental Geophysics (Sc) (see Environmental Geoscience)**

» **FRSC 3010H: Crime Scene Investigation (Sc)**
Explores forensic investigation techniques—observation, analysis, evidence identification, collection and preservation, and interviewing. Emphasizes gathering experts' scientific evidence and assessing it. Students explore use of evidence in Canadian court cases, the decision-making processes in court, and the roles of investigators, advocates, judges, and juries. Prerequisite: 60% or higher in FRSC 2020H and 2030H (or 1010H). Recommended: PHYS 1001H or PHYS-BIOL 1060H. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 3020H: Workplace Readiness and Professional Ethics**
Students gain valuable skills necessary to be accepted into and excel in a professional environment. Emphasis is placed on effective communication and the professional ethics required to work in the high stakes field of forensic science. Prerequisite: 9.0 university credits including FRSC 2020H, 2030H (or 1010H), and 2100H. Application instructions to complete workplace integrated learning as opposed to a special project are provided during the Winter term of second year. Open only to students in Forensic Science (single-major), Forensic Biology, or Forensic Chemistry. Excludes FRSC 2010H, 4000H.

» **FRSC 3100H: Trends in Forensic Science (Sc)**
Covers recent developments in forensic science and reflects the recommendations of practitioners. Typically includes updates in the theory and practices related to DNA analysis, blood-spatter analysis, tire-track and footwear impressions, ballistics, and so forth. Prerequisite: 60% or higher in FRSC 2020H and 2030H (or 1010H). Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 3110H: Criminology in Forensics**
Provides students with a comprehensive view and appreciation of criminology, including the scientific study of criminal behaviour, its forms, causes, legal implications, and controls. Provides a forum for discussion and debate and enhances students' knowledge of crime, criminal justice, and society in a forensic context. Prerequisite: 9.0 university credits including FRSC 2100H. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 3111H: Non-Human DNA Forensics (Sc)**
DNA has revolutionized how human forensic investigations take place, yet there are a myriad of non-human applications of DNA technology, including food, wildlife, environmental, and bioterrorism forensics, the tracking of sources of disease outbreaks, and invasive species detection. Theoretical and practical foundations and techniques of DNA analysis are examined through forensic case reviews and in labs. Prerequisite: BIOL-FRSC 2050H, 3700H (or 3620H), and BIOL 3080H.

» **FRSC-BIOL 3330H: Forensic Entomology (Sc) (See Biology)**

» **FRSC-CHEM-ERSC 3400H: Chromatography (Sc) (See Chemistry)**

» **FRSC-ANTH-BIOL 3404H: Human Osteology (Sc) (See Anthropology)**

» **FRSC-ANTH 3405H: Forensic Anthropology (Sc) (See Anthropology)**

» **FRSC-CHEM-ERSC 3410H: Methods of Spectral Analysis (Sc) (See Chemistry)**

» **FRSC-BIOL 3700H: Applied Population Genetics (Sc)**
Introduces students to the application of genetics to the study of taxonomy, structure of natural populations, mating systems, and forensics. Topics include the molecular tools that quantify genetic variation, mathematical models of population structure, paternity analysis, and DNA fingerprinting. Prerequisite: 7.5 university credits including FRSC-BIOL 2050H, or permission of instructor. Excludes FRSC-BIOL 3620H, BIOL 3600H.

» **FRSC-HIST 3711H: The History of Incarceration (See History)**

» **FRSC-CHEM 3720H: Advanced Topics in Forensic Chemistry (Sc)**
Focuses on the major applications of various chemistry disciplines to forensic science. Specific focus is placed on the services which are routinely performed by the Chemistry section of the Centre for Forensic Sciences, including accelerants and explosives, drugs, paint, inks and dyes, polymers, and trace evidence. Prerequisite: CHEM 2300H, CHEM 2400H, and one of FRSC 2220H or CHEM 2110H. Strongly recommended: CHEM-FRSC 3410H.

» **FRSC-HIST 3751Y: The History of Crime in England (See History)**

» **FRSC 3800H: Forensic Toxicology (Sc)**
Analyses to test for the presence of alcohol, drugs, and poisons are frequently utilized in death and criminal cases to provide important information pertaining to forensic investigations. This course explores the pharmacology and interpretation of drugs and drug classes in the context of forensic science. Prerequisite: FRSC 2030H (or 1010H), CHEM 2300H, and CHEM 2400H. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 3900H: Reading Course**
Provides an opportunity for more intensive or broader study of a selected topic in forensic science under the guidance of a faculty member. Students may take only one reading course. May be taken as a science credit with permission of the department chair. Prerequisite: 10.0 university credits and permission of course supervisor. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 4010Y: Independent Project (Sc)**
This self-directed research course requires students to investigate research topics relating to forensic science and to prepare a thorough, detailed research proposal in an area of research pertinent to forensic science. Students defend their research questions and their proposed methodology in a class discussion. Research is carried out individually or working in small groups. Open only to students in Forensic Science (single-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 4020D: Research Thesis (Sc)**
A double credit. Students design and carry out research under the supervision of a faculty member, and attend fourth-year Forensic Science seminars on research-related issues. Permission of the program and the availability of a thesis supervisor are required. Students are contacted by the course coordinator regarding the application process before the end of the Fall term of third year. Prerequisite: A minimum 80% cumulative average. Students with a cumulative average lower than 80% will be considered provided they include a written letter of support from a prospective supervisor with their application. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 4110H: Firearms and Ballistics (Sc)**
An introduction to firearm examination and ballistics. Students learn the science behind firearm examinations, including gunshot residue analyses, erased number restoration, and classification of firearms-related deaths. Students complete an independent case-based project and present firearms-related evidence to their peers. Prerequisite: 60% or higher in each of FRSC 2220H, FRSC 3100H, and one of PHYS 1001H, PHYS-FRSC 1020H, or PHYS-BIOL 1060H. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 4111H: Basic Bloodstain Pattern Analysis (Sc)**
Develops a fundamental knowledge of the discipline of bloodstain pattern analysis. Students learn the basic theoretical and practical aspects that are associated with the discipline. Scientific evidence-based analysis and conclusions are emphasized. Techniques are discussed in lectures; practical aspects are learned through participation in laboratory experimentation. Prerequisite: FRSC 1011H, 2030H (or 1010H), 3010H, and one of PHYS 1001H, PHYS-FRSC 1020H, or PHYS-BIOL 1060H. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.

» **FRSC 4312H: Presentation of Forensic Evidence**
Explores the legal functions and processes of courts and tribunals and the laws governing evidence and testimony by witnesses. Communication theory and techniques are applied to the experience of testifying in a courtroom setting and to understanding the impact of ethical and effective testimony. Prerequisite: 14.0 university credits including FRSC 2100H. Open only to students in Forensic Science (single-major), Forensic Biology, or Forensic Chemistry.

» **FRSC-PSYC 4320H: Forensic Psychology (Sc)**
Examines how empirical psychological research informs police, the law, and courts. Topics include suspect interrogation and lineups, critical approaches to deception detection, eyewitness memory and testimony, jury biases and jury selection, mental illness and drug courts, risk assessment tools and methods, psychopathy and predictive assessment, sexual and intimate partner violence, and theories of homicidal offenders. Prerequisite: FRSC 2100H and PSYC 2300H. Open only to students in Forensic Science (single-major), Forensic Biology, Forensic Chemistry, or the joint-major program in Forensic Science and Psychology.

» **FRSC 4380H: Advanced Topics in Law and Policing**
Allows fourth-year students specializing in law and policing the opportunity to delve into a topic area within that study in more detail. Students pick a focus area, research relevant case law and literature, and conduct independent investigation into the specialized area. Prerequisite: 60% or higher in each of FRSC 2110H, 3010H, 3100H, and 3110H.

» **FRSC-BIOL 4510H: Species-at-Risk Biology and Policy (Sc) (See Biology)**

» **FRSC-BIOL 4570H: Biocrime and Bioterrorism (Sc)**
Students gain knowledge of microbes and other biological agents used in criminal endeavours and an overview of the methods used to detect crimes involving biological agents and link them to individual perpetrators. Bioterrorism and agricultural bioterrorism are discussed. Prerequisite: 60% or higher in FRSC 2030H (or 1010H); and one of BIOL 3080H, FRSC 3000H, FRSC 3111H, or BIOL 3250H.

» **FRSC-BIOL 4600H: Applied Molecular Genetics (Sc)**
This seminar-based course introduces students to the application of DNA profiling to forensics, medical genetics, and natural resource management (molecular ecology/conservation genetics). Prerequisite: 10.0 university credits including BIOL-FRSC 3700H (or 3620H).

» **FRSC 4700H: Forensic Biosensor Development (Sc)**
Provides students with an introduction to biosensor development and applications using bioanalytical chemistry. In-depth description of instrumental techniques for characterization and detection of biomolecules and biologically active molecules is provided. The strategies for design and development of functional biosensors for applications in forensic sciences are described. Prerequisite: 60% or higher in each of FRSC 3400H, 3410H, 3720H, and 3800H.

» **FRSC-CHEM 4710H: Molecules of Murder (Sc) (See Chemistry)**

» **FRSC-HIST 4751Y: The History of Crime in England (See History)**

» **FRSC-BIOL 4800H: Bioinformatics (Sc)**
Biological data has grown in size and complexity. Bioinformatics—the application of computer programming to the management and analysis of biological information—is necessary for storing, manipulating, and analyzing large datasets. A tutorial-based computer lab focusing on genome sequence data allows students to learn the basics of computer programming and bioinformatics. Prerequisite: FRSC-BIOL 2050H, and one of FRSC-BIOL 3000H or FRSC 3111H.

» **FRSC 4890Y: Forensic Community-Based Research Project**
Designed to allow fourth-year students the opportunity to work on a research project with a forensic community agency under the supervision of a faculty member. Students must contact the Forensic Science placement officer before the end of the Winter term of third year. Prerequisite: A minimum 75% cumulative average and 14.0 university credits including at least 3.0 FRSC credits at the 2000 or 3000 level. Open only to students in Forensic Science (single- or joint-major), Forensic Biology, or Forensic Chemistry.