Radiation Safety Institute of Canada
Institut de radioprotection du Canada

WWW.RADIATIONSAFETY.CA
1-800-263-5803
info@radiationsafety.ca

NATIONAL EDUCATION CENTRE
100 Sheppard Ave East, Suite 760
Toronto, ON M2N 6N5
Phone: (416) 650-9090
Fax: (416) 650-9920

NATIONAL LABORATORIES
102-110 Research Drive
Saskatoon, SK S7N 3R3
Phone: (306) 975-0566
Fax: (306) 975-0494

Re: Radiation Safety Institute of Canada Credentials Documentation Package in Support of the Application Submission for the Employer Training Grant/ Radiation Safety Officer (RSO) course.

Please find attached for your review the Institute's documentation package in support of the Training Grant Application under **the Canada Job Grant Program** administered by your Province**.**

About the Institute
The Radiation Safety Institute of Canada was incorporated in 1980 under the laws of Canada as a not-for-profit corporation. It is the organization's mission to promote radiation safety in the workplace, home, and environment. Over the decades, the Institute earned recognition as a leading radiation and X-Ray safety training provider in Canada. The exceptional quality of our courses is what sets us apart and attracts regulators, workers, and employers alike to participate in our educational programs.

Course Information
Radiation Safety Officer course is essential for working with nuclear sources. It is s designed to provide certification for radiation safety personnel for companies and institutions using radioactive materials under Canadian Nuclear Safety Commission (CNSC) regulation and those planning to acquire a CNSC licence. The course develops new technical safety skills and allows course participants to take charge of the CNSC licence, their own safety and that of their co-workers.

The course takes **5 days** and **35 hours** to complete. Please see attached documentation for the detailed training schedule. This is a certificate course. At the end of day 5 participants who have passed the exam will receive a formal individualized certificate signed by the Institute's Manager of Training. Record of their participation and the exam result shall be kept on file by the Institute.

The remaining 2021 registration fee and course schedule are as follows:

- June 21-25, 2021 Central Time $2,399.00 (CAD)
- July 19-23, 2021 Eastern Time $2,399.00 (CAD)
- Sept 27 – Oct 1, 2021 Eastern Time $2,399.00 (CAD)
- Nov 22-26, 2021 Eastern Time $2,399.00 (CAD)

Please note that all prices, schedules, and outlines are posted in the training section of the RSIC website at www.Radiationsafety.ca. For ease of reference please see screen shots attached.

Trainer Qualifications
The Institute is highly selective about its educational staff. All our educators have a minimum of a master's degree and no less than 10 years of teaching experience. We apply the latest adult education teaching techniques and standards to our courses. The trainers' bios are attached.

Contact Information for the Provincial Grant Administrators
If you have any questions about the Institute's eligibility as training provider, please contact our Administrator, Maria Costa: Tel: 416 650 9090 ext. 21 or mcosta@radiationsafety.ca

Attachments: Course Schedule, Course Brochure, Course Page Print Screen, Trainers' bios.

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Session/Lecture 1 / CAMRT CE Credit Submission
Radiation Safety Officer Course

The Radiation Safety Institute of Canada offers a 5-day **Radiation Safety Officer Course**. Each day is divided into sessions which consist of a 50 minute presentation followed by a 10 minute refreshment break. Participants are encouraged to ask questions and participate in discussions during the presentations. Instructors are also available to answer questions and discuss material during the break times.

The following is an outline of the sessions covered in the course.

Scientific and Technical Sessions:

Introduction to Matter and Radiation
- Atoms
- Elements
- Isotopes
- Nuclear radiation
- Radioactivity
- Ionizing radiation

Nature of Radiation and Radioactivity
- Alpha radiation
- Beta radiation
- Gamma radiation
- X-rays
- Activity
- Half-life

Radiation Interactions and Neutron Radiation
- Direct Ionization
- Indirect Ionization
    - Photoelectric Effect
    - Compton Effect
    - Pair Production
- Neutron Radiation
    - Ionization by neutrons
    - Fission
    - Elastic and Inelastic Scattering
    - Activation

Radiation Quantities and Units
- Energy
- Exposure
- Absorbed Dose
- Equivalent Dose
- Effective Dose

Biological and Health Effects of Exposure to Radiation, Part I
- Radiation effects on tissues

- Direct and Indirect damage
- Cellular biology
- Hereditary effects
- Somatic effects

Biological and Health Effects of Exposure to Radiation, Part II
- Deterministic effects (Acute Exposure and Radiation Effects on Organs)
- Sources of radiation exposure
- Occupational exposures
- Medical exposures
- Effects on the foetus

Radiation Instrumentation: Gas-Filled Detectors
- Detecting radiation
- Gas-filled detectors
    - Ionization chambers
    - Proportional counters
    - Geiger-Müller counters

Radiation Instrumentation: Other Detectors and Instrument Selection
- Scintillation detectors
- Neutron detectors
- Instrument selection

Radiation Instrumentation: Dosimeters
- Thermoluminescent dosimeters
- Optically stimulated luminescent dosimeters
- Film badges
- Pocket dosimeters
- Electronic dosimeters
- Regulatory requirements

Regulations and Regulatory Requirements Sessions:

Nuclear Safety and Control Act

General Nuclear Safety and Control Regulations

Radiation Protection Regulations

Nuclear Substances and Radiation Device Regulations

Packaging and Transport of Nuclear Substances Regulations

Nuclear Substances and Radiation Device Licensing
- Types of Licences
- Exemptions
- Introduce licensing concept
- Discuss general licensing requirements
- Licence application

Regulatory and Standards Organizations
- Canadian organizations
- International organizations
- US organizations

Organization and Administration of Radiation Safety Programs
- ALARA
- Radiation Safety Organization Structure
- Executive and Senior Management
- Radiation Safety Committee
- Radiation Safety Officer
- Permit Holders/Authorized Users
- Radiation Users/Employees
- Radiation Safety Program

Radiation Protection Sessions:

External Exposure to Radiation
- ALARA principle
- Principles of radiation protection
- Shielding

Internal Exposure to Radiation
- Internal radiation exposure
- Distribution of radionuclides in the body
- Effective half-life
- Toxicity
- Annual limit on intake
- Derived air concentration

Employee Qualifications and Performance
- Worker classifications
- Training requirements

Operating Procedures
- Nuclear material management
- Receipt of packages
- Safety rules
- Waste management and disposal

Contamination Control
- Radioactive contamination
- Surface contamination
    - Loose
    - Fixed
- Measuring contamination
- Regulatory limits
- Decontamination

Controlling Exposure to Radiation
- Leak testing
- Air sampling
- Good work practices
- Personal protective clothing
- Respiratory protection

Emergency Management
- Incidents and Emergencies
- Spills
- Radiation accidents

Transportation of Dangerous Goods
- Training requirements
- Dangerous goods classes
- UN number and shipping name
- Shipping document
- Placards and labels
- Accidental release
- Reporting
- ERAP

Transportation of Radioactive Materials
- Regulations
- Package types
- Package testing
- Package labels
- Transportation documents
- Example

Inspections, Audits and Investigations
- CNSC Inspections/Audits
- Internal Inspections
- Internal Reviews
- Investigations
- Radiation Safety Self-Audit Check List

Nuclear Gauges
- Nuclear gauge types
- Applications
- Radiation safety

Radiation Safety Officer (RSO-1)

100% Online Course Delivery with Live Instruction

Our five-day **Radiation Safety Officer (RSO-1)** training is the premiere course of its kind in Canada and is designed to provide certification for radiation safety personnel for companies and institutions using radioactive materials under Canadian Nuclear Safety Commission (CNSC) regulations.

If you are responsible for workplace radiation safety within your organization, you owe it to your fellow employees to benefit from this highly acclaimed program.

BONUS! Transportation of Dangerous Goods Certificate!
Along with the RSO Certificate now you will be getting a TDG Certificate.

30.75

Category A credit*

The Canadian Association of Medical Radiation Technologists

**CAMRT Credits are recognized by the ARRT, The ASRT, and all Provincial Associations under the CAMRT umbrella.*

Download 2021 RSO Brochure

How you learn ^ hide details

Online: The sessions held online are designed to recreate the in-class experience as much as possible. The course is delivered live through an online meeting platform, led by our experienced instructors. Participants are encouraged to ask questions and instructors are available to offer assistance. Breaks are offered throughout the day, including one hour for lunch. Please note that the timing of the course is set for the time-zone of the course location. For example, if the course location is specified as Toronto, the course will begin at 9:00 am Eastern time and the lunch break will be around noon Eastern time. All course materials will be provided electronically and certificates will be emailed to participants within a week after the end of the course.

Classroom: You learn in a friendly classroom setting over a period of five days from **our knowledgeable Education Team**. Each day has several learning sessions. Appropriate refreshment breaks are included. Your learning is enhanced by lively discussions and video presentations.

When you complete the course requirements and pass the final exam, you will receive the Radiation Safety Institute of Canada's Radiation Safety Officer (RSO-1) Certificate. You will also be eligible to write the Canadian Radiation Protection Association's professional registration exam.

Subjects Covered **hide details**

- Structure of matter
- Radiation and radioactivity
- Radiation quantities and units
- Radiation detection, instrumentation and dosimetry
- Biological and health effects of exposure to radiation
- Radiation protection principles and practices, including contamination control
- Hands-on exercises in the practical application of radiation protection principles
- Nuclear gauges and their applications
- Workplace radiation safety program: organization and administration
- Emergency procedures
- Employee training
- Transport of radioactive materials
- Workplace inspections and audits
- Regulatory agencies and standard-setting organizations
- Licensing of nuclear substances and radiation devices
- Key sections of the Nuclear Safety and Control Act and Regulations

Course Location **show details**

Train your colleagues yourself!

To help RSO-1 graduates train workers at their company or institution, we offer an efficient, ready-to-go training tool on CD, *"Basics of Radiation Safety"*. We have a special price for RSO-1 graduates of $299.00 (plus HST). Learn more about the **Employee Learning Module**.

RSO-1 not for you?

If you find that RSO course is not what you need, please take a moment to look at **other radiation safety courses we offer**.

Contact Information

Tara Hargreaves
Staff Scientist and Manager of Training
Tel: (416) 650 9090 ext. 23 | Fax (416) 650 9920 | Email: **thargreaves@radiationsafety.ca**

Cancellations | The following administrative fees will apply to course registration refunds:

- 20% of course fee if cancelled 14 days prior to the scheduled date
- 50% of course fee if cancelled less than 14 days prior to the scheduled date
- No refunds will be issued if cancelled on the day of the course

Details	Price	Qty
May 17-21, 2021 *Online* 9am EDT start time	$2,399.00 (CAD)*	0
June 21-25, 2021 *Online* 9am CST start time	$2,399.00 (CAD)*	0
July 19-23, 2021 *Online* 9am EDT start time	$2,399.00 (CAD)*	0
Sept 27-Oct 1, 2021 *Online* 9am EDT start time	$2,399.00 (CAD)*	0
Nov 22-26, 2021 *Online* 9am EST start time	$2,399.00 (CAD)*	0

* price before applicable taxes

Biographical Note

Tara Hargreaves, BSc, MSc
Staff Scientist and Coordinator – Training Program

Scientist, training developer, and highly effective course instructor with 10 year of teaching experience. Tara Hargreaves is also knowledgeable in the practical application of radiation protection principles in a variety of industrial and institutional settings.

Ms. Hargreaves has participated in developing and updating various radiation safety training courses for the Institute. She was a key member in the development of the Institute's new X-Ray Safety Officer (XSO) course. She was also instrumental in having the Institute's RSO-1 course approved by the Canadian Radiation Protection Association (CRPA) as satisfying eligibility requirements for their professional registration exam.

As an instructor for the Institute's courses, including the week-long Radiation Safety Officer Course, that include Transportation of Dangerous Goods (TDG) certification and the two-day X-Ray Safety Officer Course, Ms. Hargreaves has received high praise from course participants. Her clear speaking style, various illustrative examples, as well as her humorous approach, are among the qualities that course participants greatly appreciate. Ms. Hargreaves has travelled across the country to deliver the Institute's radiation safety courses.

In addition to teaching, Ms. Hargreaves is also experienced in conducting EMF surveys. She was a member of the Institute team that conducted a major EMF survey at the Bruce Nuclear Power Station. On behalf of the Institute, she has also conducted a number of EMF surveys for various Institute clients, from small businesses to large organisations.

Ms. Hargreaves also responds to general inquiry calls at the Institute's head office in Toronto. She provides information to radiation professionals as well as members of the public on a wide range of topics from regulatory obligations to health concerns from radiation exposure.

Ms. Hargreaves holds an Honours BSc in physics and mathematics, and an MSc in physics. She is a member of the Canadian Radiation Protection Association, the Health Physics Society, and has been certified as a Radiation Safety Officer (RSO) by the Institute. She has also completed a course on Quality Control Testing from the Michener Institute.

Biographical Note

Brian Bjorndal, BSc, MSc
Manager of National Laboratories

Brian Bjorndal brings over 20 years of experience in radiation safety and occupational health and safety in industry, academia and research. Before joining the Institute, he held positions as Director, Workplace Safety and Environmental Protection with the University of Saskatchewan, and Manager Safety and Radiation with AREVA Resources. Hel managed the Institute's National Laboratories during its formative years and was instrumental in the development and licensing of the Institute's Personal Alpha Dosimetry service with the Canadian Nuclear Safety Commission.

Brian Holds a Master of Science degree in Nuclear Physics. He is a of such professional organization as: the Canadian Association of Physicists (CAP), Canadian Society of Safety Engineers (CSSE), Canadian Radiation Protection Association (CRPA), Health Physics Society (HPS) and the Saskatchewan Environmental Industry and Managers Association (SEIMA).

Brian was instrumental in the development of the Institute's first radiation and x-ray safety training courses in the 1990s. Upon returning to the Institute in 2017, Brian continued to teach and contribute to the course curriculum improvement. He enjoys sharing his practical radiation safety experience with the Institute's students and is passionate about the quality of the training programs offered.

Brian supports the extensive consulting services provided by the organization in a wide range of radiation protection and health and safety areas. These research, environmental assessments, radiological modelling, dosimetry, programs audit/review and development, field monitoring and assessment, emergency preparedness and response, information systems development in health physics, equipment testing, and licensing.

As Manager and Scientist for the National Laboratories, a federally licensed facility with the Canadian Nuclear Safety Commission, Brian Bjorndal provides leadership and oversight of the National Laboratories staff and operations in the field of radiation safety.

Biographical Note

Lynn MacDonald, BSc, BEd, MSc, OCT
Scientist

Lynn MacDonald is a scientist at the Radiation Safety Institute of Canada. In this role, she educates workers in ionizing radiation safety including the related science and legislation. She works as a part of the scientific team to design, edit, and prepare materials for educational and consulting services, review relevant materials to include on the company website, and answer enquiries received through the Institute's free information service. She is the lead in the Institute's project to convert current in-person radiation awareness courses to SCORM-compliant e-Learning courses.

Mrs. MacDonald comes to the Institute with an extensive teaching background. She had a successful teaching career in the public school system in Prince Edward Island, with 12 years of experience as a high school teacher including positions as department head and vice principal. Before this, she worked in adult education and web design. In 2009, she returned to graduate school at the University of Toronto to obtain her MSc in physics.

Her scientific training included work in condensed matter physics and biophysics. Her experimental physics research projects were in the areas of scanning tunneling microscopy (STM) of liquid cultures, non-linear pattern formation, and cellular biology in micro-fluidic systems. She is highly computer literate and has learned to program in many computer languages.

A believer in life-long learning, Mrs. MacDonald can relate well to training clients and their needs. Her strong scientific background and experience teaching to various learners allows her to translate technical subject matter into information usable to the trainee when they return to their workplace. Her skills as a professional teacher have been positively received by our course participants.