

SEMINAR NOTICE

*Department of Physics and Engineering Physics
University of Saskatchewan*

SPEAKER: Dr. Esam Hussein, Professor Emeritus
Engineering and Applied Science, University of Regina

TOPIC: *Isotopic Journey Through Fission Reactors: Impact on Design, Operation and Waste Management.*

DATE: Tuesday March 10th, 2026

TIME: 3:30-4:30 p.m.

Isotopes play central and interconnected roles in every aspect of nuclear reactors design, operation, control, safety, and waste management. This talk is a journey through the major isotopic families that define reactors behavior, from the fissile and fertile nuclides that sustain chain reactions to the fission products and activation products that shape reactor performance, safety limits, and long-term environmental considerations. Neutron-generating isotopes are examined, showing how their energy spectra and emission timescales govern reactor dynamics in both thermal and fast neutron systems. The presentation then highlights isotopic factors that influence proliferation resistance. Key fission products are discussed and their impacts on reactivity and power maneuvering are presented. Radiologically significant isotopes are reviewed in the context of accidents and waste management. The talk concludes with activation products in reactor materials, underscoring their relevance to radiation fields, maintenance, and decommissioning. Together, these isotopic behaviors frame the essential considerations that shape reactors performance and safety.