



# RADIOGENIC ISOTOPE GEOLOGY

## **PROF. R. ANAND**

Department of Applied Geology  
IIT-ISM

**PRE-REQUISITES :** Students should have a sound understanding of Geochemistry

**INTENDED AUDIENCE :** Students of Geology/Earth Sciences

**INDUSTRY SUPPORT :** Mineral Exploration companies

### **COURSE OUTLINE :**

Radiogenic isotope geology course will cover fundamental aspects of nucleosynthesis, radioactive decay and growth, and introduce the enrolled candidates to geological applications of various isotopic systematics such as U-Pb, Sm-Nd, Lu-Hf, U-disequilibrium series, cosmogenic radionuclides etc. for studies ranging from petrogenesis, crust-mantle evolution to ore genesis. This course will provide a complete learning of geochronological methods as applicable to geological as well as extraterrestrial studies.

### **ABOUT INSTRUCTOR :**

Prof. R. Anand is presently working as an Assistant Professor in the Department of Applied Geology, Indian Institute of Technology (Indian School of Mines), Dhanbad. My research interests are in applying isotopic systematics in better understanding petrogenetic and crustal evolution processes primarily during Archaean. He regularly teaches courses on Igneous Petrology, Isotope Geology, Stratigraphy and Mathematics for geoscientists. He has over 8 years of teaching experience and prior to taking up his current teaching position he worked in Geological Survey of India for 5 years. He has extensive experience in handling mass spectrometers for isotope analysis.

### **COURSE PLAN :**

**Week 1:** An introduction to nucleosynthesis and the distribution of elements in the Solar System; Fundamentals of radioactive

**Week 2:** Geochronometry; Mass spectrometry: Techniques and Applications; Sampling strategy and processing

**Week 3:** K-Ar and Ar-Ar methods of dating and their applications

**Week 4:** Rb-Sr and Sm-Nd methods of dating and their applications

**Week 5:** Re-Os and Lu-Hf methods of dating and their applications

**Week 6:** U-Th-Pb geochronology

**Week 7:** Isotope Geology of Pb

**Week 8:** Processing and presentation of raw isotope geochemical data

**Week 9:** Application of Sr, Nd, Pb and Hf isotopes in petrogenetic studies

**Week 10:** Fission Track method of dating; U-disequilibrium methods of dating

**Week 11:** Cosmogenic radionuclides and their applications

**Week 12:** Extinct radionuclides and cosmochronology