University of St Andrews | FOUNDED 1413

MSc in Mineral Resources

2017 Entry

Bingham Canyon open pit Copper mine, Utah, USA.

MSc in Mineral Resources (one year – full time)

The MSc involves written examinations, coursework and a 15,000 word research project. For all Masters degrees there are exit awards available that allow suitability-qualified candidates to receive a Postgraduate Certificate or Postgraduate Diploma.

Features

The School of Earth & Environmental Sciences has 20 full-time academics, 15 research fellows and 6 technical staff members, with a student population of about 170. We have a wide range of expertise in the fields of economic geology, field geology, petrology, and geochemistry. Research in mineral resources in the School uses a mineral system approach and covers critical metal resources, sediment-hosted stratiform copper deposits, unconformity-related uranium deposits, volcanogenic massive sulphide deposits and orogenic gold deposits.

Postgraduate community

A dynamic and research-intensive atmosphere is encouraged and supportive of all students. Our School engenders cohesive and friendly collaborations between staff, postdoctoral research fellows and postgraduate students. We are part of the "IAPETUS" NERC Doctoral Training programme, along with the universities of Durham, Glasgow, Newcastle and Stirling, and the British Geological Survey.

Our PhD and Masters students are studying a wide range of topics across the Earth and environmental sciences based within our five major research themes: Global Change, Solid Earth and Planetary Science, Geobiology and Earth System Evolution, Earth Surface Processes, Economic Geology and Energy. Skills development within these area of current research are part of the core training for all postgraduate students.

Careers

Economic geologists are multidisciplinary scientists who use geochemistry, mineralogy, geophysics, petrology and structural geology to understand, describe, and exploit mineral resources. Geologists with mineral resource training are employed in the mineral industry (mineral exploration, mining and metallurgy), oil, gas and petroleum, engineering, environmental, and financial (risk analysis, financial advisor) sectors as well as by geological surveys, consultancy companies, and academia (research and teaching) due to the far-reaching impact that the mineral industry have on society, the economy, and the environment.

Masters-level training in mineral resources provide the skills necessary to fast track a career in the mineral sector. Students who wish to pursue PhD research will benefit from exposure to industry and researchers that are the experts in their fields.

Professor Adrian Finch conducting fieldwork in the Paatusoq intrusion, Greenland.

Alteration front at the Betze-Post open pit, Nevada, USA.

Facilities

The School houses state-of-the-art stable and radiogenic isotope geochemistry and geobiology laboratories. Our research equipment includes five high-precision isotope mass spectrometers (two MAT 253s, two Nu Plasma, and one Neptune Plus installed in 2015), two Class 100 clean labs, an XSeries quadrupole ICP-MS, ICP-EOS, and a Finnegan Delta Plus XP gas source mass spectrometer. All materials, and particularly gases, liquids, minerals, rocks, organisms and soils, can be analysed for isotopes and major and trace elements within research projects.

In addition to the isotope laboratories, the School host a range of laboratories dedicated to luminescence spectroscopy (luminescence dating by optically stimulated luminescence (OSL) and thermoluminescence (TL), mineral spectroscopy, time-resolved spectroscopy, and cathodoluminescence), rock magnetism, SEM, electron microprobe, X-Ray diffraction, and X-Ray fluorescence as well as an experimental petrology facility capable of simulating conditions from the mid-crust to upper mantle (pressures between 0.5-4.5 GPa and 300-2000°C).

MSc in Mineral Resources

Economic Geology is at the heart of the world we live in. The majority of resources we use in our day-to-day lives are derived from mining activities.

The St Andrews MSc in Mineral Resources delivers postgraduate level knowledge and skills training essential to pursue a career in the mineral industry sector and prepare students for PhD research. The degree is aimed at providing high levels of practical training and extensive experience with methodologies and technologies currently employed in the mineral exploration industry while integrating and interpreting complex and large datasets, such as geochemical assays and geological log data. A visit to a world-class ore deposit in the UK and to the Rio Tinto mine, an acid mine drainage remediation site, is part of the programme.

The final individual project can be tailored towards an industry-orientated project or can be original and investigative research aimed at preparing for PhD research. Training, teaching and supervision is provided by academic staff, many of whom have direct industry experience, and by visiting industry professionals.

Degree programme
Semester 1: • *Magmatic-related Ore Deposits* • *Mineral Exploration* • *Advanced Petrogenesis* • *Applied Geological Mapping*
Semester 2: • *Hydrothermal Ore Deposits* • *Geodynamics* • *GIS for Earth Scientists** • *3D Geological Modelling*
Summer: • *Research Project*

* If a proficiency in GIS is demonstrated this module can be substituted with one from our current curriculum to tailor to student interests (requires approval by the Programme Convener).

Students conducting core logging and underground mapping fieldwork at the Cononish gold mine, Scotland, UK.

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Photographs by Jonathan Cloutier, Adrian Finch and Rhona Rutherford
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Curriculum Development
As a research intensive institution, the University ensures that its teaching references the research interests of its staff, which may change from time to time. As a result, programmes are regularly reviewed with the aim of enhancing students' learning experience. Our approach to course revision is described at: www.st-andrews.ac.uk/media/teaching-and-learning/policies/course-revision-protocol.pdf