Earth Sciences at Memorial University of Newfoundland

The following undergraduate programs are available:

120 credit hour programs

1. [Chemistry and Earth Sciences Joint Honours](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/10/2/#d.en.304003)
2. [Earth Sciences and Geography Joint Honours](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/10/2/#d.en.303998)
3. [Earth Sciences and Physics Joint Honours](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/10/2/#d.en.303989)
4. [Earth Sciences and Physics Joint Major](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/10/1/#d.en.303977)
5. [General](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/11/5/#d.en.304146) or [Honours](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/11/5/#d.en.304142) degrees in Earth Sciences
6. [Geophysics and Physical Oceanography Joint Honours](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/10/2/#d.en.303986)

135 credit hour program

1. [Biology and Earth Sciences Joint Honours](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/10/2/#d.en.303997)

24 credit hour program

1. [Minor in Earth Sciences](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-science/11/5/#d.en.304145)

Undergraduate Handbook in Earth Sciences

- Resource: The Department of Earth Sciences Undergraduate Handbook provides detailed information about the undergraduate program, individual courses, and suggested timetables. It is available at www.mun.ca/earthsciences.

Entrance Requirements for Major Programs in Earth Sciences

1. - First-Year Course Requirements:
2. - 3 credit hours in each: English, Mathematics, Earth Sciences, Chemistry, and Physics
3. - Courses must be selected from the list required for degree programs in Earth Sciences
4. - Advice for Students: Declare major in the first year of study

- Note: Most 2000 level Earth Sciences courses have Physics and Chemistry prerequisites, recommended to be completed in the first year. Entry to 3000 level Earth Sciences courses requires completion of all 1000-level courses in the Common Block of Required Courses.

11.5.3 Minor in Earth Sciences

- Requirements:

1. - Earth Sciences 1000 and 1002
2. - Eighteen credit hours from Earth Sciences courses at 2000 level or higher, with at least 5 credit hours from 2000 level courses
3. - Excluded courses: Earth Sciences 2150, 2311, 2914, 2915, 2916, 2917, 2918, 4310, 4950
4. - Note: Prerequisite structure and course availability at the 3000 level or higher depend on courses taken at the 2000 level.

11.5.4 Major Programs in Earth Sciences

- Common Block of Required Courses:

1. - Six credit hours in Critical Reading and Writing (CRW) courses, including at least 3 credit hours in English courses
2. - Mathematics 1000 and 1001
3. - Earth Sciences 1000 and 1002
4. - Chemistry 1050 and 1051 or Chemistry 1200 and 1001
5. - Physics 1050 and 1051 or Physics 1020 and 1021
6. - Earth Sciences 2030, 2031, 2401, 2502, 2702, 2905, 3420, 3905
7. - Mathematics 2000 or Statistics 2550
8. - Either Biology 2120 (or Biology 1001 and 1002); or both Physics 2055 and Physics 2820

11.5.5 Honours B.Sc. Degree in Earth Sciences

- Additional Requirements for Honours B.Sc.:

1. - Earth Sciences 499A and 499B
2. - At least 27 additional credit hours from Earth Sciences courses at 3000 and/or 4000 levels, with a minimum of 12 credit hours at the 4000 level
3. - Six credit hours from Science Faculty courses numbered 2000 or higher
4. - Additional credit hours to achieve a total of 120 credit hours
5. - Three credit hours from Biology, Chemistry, Computer Science, Statistics, Physics (or Mathematics if Mathematics 2000 not taken)

11.5.6 General B.Sc. Degree in Earth Sciences

- Requirements for General B.Sc.:

1. - Eighteen additional credit hours from Earth Sciences courses at 3000 and/or 4000 levels, with a minimum of 9 credit hours at the 4000 level
2. - Six credit hours from Science Faculty courses numbered 2000 or higher
3. - Additional credit hours to achieve a total of 120 credit hours

11.5.7 Credit Restrictions for Present Earth Sciences (EASC) Courses with Former Courses

- Course Equivalents:

1. - EASC 1000 equivalent to EASC 1010, Geology 1000, Geology 1010
2. - EASC 1001 equivalent to EASC 1011, Geology 1001, Geology 1011
3. - EASC 2030 equivalent to EASC 203A, Geology 203A
4. - EASC 2031 equivalent to EASC 203B, Geology 203B
5. - EASC 2150 equivalent to Physics 2150
6. - [Further equivalents listed for various EASC courses]

- Notes:

1. - Close contact with the Department is advised for proper course sequencing.
2. - Specific EASC courses are suitable for students not majoring in Earth Sciences.
3. - Most courses include six hours of instruction per week (lectures and laboratory).
4. - Field courses require a participation fee and may be competitive.
5. - Prerequisites for certain courses must be considered.
6. - Some 4000 level courses may not be offered every year.
7. - A maximum of 6 credit hours at the 1000-level can be used towards Earth Sciences requirements for Major, Minor, Joint Major, Honours, or Joint Honours programs.

Certainly! Let's format the course information for the Earth Sciences courses (EASC), keeping in mind that the first digit of the course number indicates the year level and the second digit categorizes the course areas

### First Year Courses

\*\*EASC 1000 Earth Systems\*\*

\*\*Course Information\*\*: Surveys Earth's lithosphere, hydrosphere, atmosphere, and biosphere. Topics include planetary materials' properties, Earth system drivers, and biological impacts, including human influence.

\*\*LH\*\*: 3

\*\*PR\*\*: Science 1807 and Science 1808

\*\*EASC 1001 Evolution of Earth Systems\*\*

- Inactive course.

\*\*EASC 1002 Concepts and Methods in Earth Sciences\*\*

\*\*Course Information\*\*: Introduction to geological record development, field data collection, map interpretation, stratigraphy, paleontology, structure, petrology, and geophysics. Emphasizes practical skills for Earth Sciences careers.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 1000; Science 1807 and Science 1808

---

### Second Year Courses

\*\*EASC 2030 Mineralogy\*\*

\*\*Course Information\*\*: Introduces crystallography, mineral structures, crystal optics, rock-forming minerals, and economically significant minerals. Laboratory work includes mineral structures and symmetries study, rock-forming minerals chemistry, and transmitted light microscopy.

\*\*CO\*\*: EASC 2502

\*\*CR\*\*: Former EASC 203A/B

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 1000 and 1002 (at least 55% in each), Chemistry 1051 (or 1001), Physics 1051 (or 1021 or 1054), Mathematics 1000

\*\*EASC 2031 Mineralogy and Petrography\*\*

\*\*Course Information\*\*: Focuses on rock-forming minerals' optical and chemical properties, igneous and metamorphic rocks petrography and classification, and minerals phase equilibria study. Laboratory includes optical mineralogy and petrography.

\*\*CO\*\*: Mathematics 1001

\*\*CR\*\*: Former EASC 203A/B

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2030, 2502, Mathematics 1001

\*\*EASC 2100 Subsurface Geoscience for Environmental and Humanitarian Challenges\*\*

\*\*Course Information\*\*: Introduces subsurface methods for environmental and humanitarian applications like green economy sourcing, carbon storage, and water monitoring. Covers seismic, gravity, magnetics, and radar methods.

\*\*PR\*\*: EASC 1000 (at least 55%)

\*\*EASC 2150 The Solar System\*\*

\*\*Course Information\*\*: Describes Solar System astronomy, planetary observations, and the origin and evolution of the Solar System. Covers Sun, Moon, planets, comets, asteroids, and meteorites study.

\*\*UL\*\*: Not acceptable for Minor, Major, or Honours in Earth Sciences

\*\*EASC 2311 Geoscience Communication\*\*

\*\*Course Information\*\*: Introduction to writing and oral reporting in geosciences, focusing on organization, terminology, concise description, data integration, and presentation skills. Report topics from 2000 level Earth Sciences.

\*\*LC\*\*: 2

\*\*OR\*\*: Tutorials three hours per week

\*\*PR\*\*: Earth Sciences 2905 and 6 credit hours in English

\*\*EASC 2401 Structural Geology\*\*

\*\*Course Information\*\*: Introduces basic concepts of rock deformation physics, major and minor structures classification, and their relation to stress and strain. Laboratory focuses on structural orientation data and geological maps analysis.

\*\*CR\*\*: Former Geology 3120, EASC 3120, EASC 3400

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2905 or permission for Earth Sciences minors

\*\*EASC 2502 Introduction to Geochemistry\*\*

\*\*Course Information\*\*: Overview of low- and high-temperature geochemistry. Topics include element origin and classification, solar system and Earth chemical differentiation, aqueous geochemistry, radiogenic and stable isotopes. Laboratory emphasizes numerical skills.

\*\*CO\*\*: Mathematics 1001

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 1000 and 1002 (at least 55% in each), Chemistry 1051 (or 1001); Science 1807 and 1808

\*\*EASC 2702 Sedimentology and Stratigraphy\*\*

\*\*Course Information\*\*: Studies sediment origin and composition, depositional processes, and sedimentary structures. Explores deposition environments and stratigraphic framework. Laboratories involve field trips and rock sample analysis.

\*\*CO\*\*: EASC 2030

\*\*CR\*\*: Former Geology 3070, EASC 3070, EASC 3701

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 1000 and 1002 (at least 55% in each

)

\*\*EASC 2905 Introduction to Geological Mapping\*\*

\*\*Course Information\*\*: Based on mapping in Precambrian rocks near St. John's, focusing on rock recognition, geological mapping techniques, and field note-taking. Includes digital map and report preparation.

\*\*AR\*\*: Attendance required

\*\*CH\*\*: 2

\*\*CR\*\*: Former EASC 2310, EASC 2300

\*\*OR\*\*: Field-based course

\*\*PR\*\*: EASC 1000 and 1002 (at least 55% in each), application to Department Head

\*\*EASC 2914 The Earth's Energy Resources: Past, Present and Future\*\*

- Inactive course.

\*\*EASC 2915 The Earth's Material Resources: Past, Present and Future\*\*

- Inactive course.

\*\*EASC 2916 Natural Hazards on a Dynamic Earth\*\*

\*\*Course Information\*\*: Explores geological processes and risks related to earthquakes, volcanic activity, mass movements, water resources, land use, and waste disposal. Provides context for climate change interpretation.

\*\*CR\*\*: Environmental Science 2360

\*\*UL\*\*: Not acceptable for Minor, Major, or Honours in Earth Sciences

\*\*EASC 2917 Gems: The Science and Politics\*\*

\*\*Course Information\*\*: Introduces precious and semi-precious stones, covering their nature, origin, geography, socio-political issues of mining, trade, and cartels. Discusses properties conferring value, enhancement techniques, and fraud detection.

\*\*UL\*\*: Not acceptable for Minor, Major, or Honours in Earth Sciences

\*\*EASC 2918 Earth's Story\*\*

\*\*Course Information\*\*: Overview of Earth's dynamic past including supercontinent events, flooding, climate changes, magnetic field reversals, and continental drift. Ties evolution of life to geological history, focusing on Canadian geology.

\*\*UL\*\*: Not acceptable for Minor, Major, or Honours in Earth Sciences

\*\*EASC 2919 Introduction to Marine Geology\*\*

\*\*Course Information\*\*: Studies ocean formation and evolution, including plate tectonics, ocean ridges, subduction zones, sedimentary environments, and ocean-lithosphere interactions. Covers anoxic events, tides, and climate modulation.

\*\*EQ\*\*: Ocean Sciences 2200

\*\*PR\*\*: EASC 1000 (at least 55%)

Continuing with the formatting of the Earth Sciences courses for the third and fourth years:

---

### Third Year Courses

\*\*EASC 3030 Mineralogy and Materials Science\*\*

\*\*Course Information\*\*: Reviews elementary crystallography, crystal structures, and properties of various solids. Covers crystal growth, zoning, diffusion, and phase changes. Laboratory work emphasizes practical skills in studying solids.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031 or instructor's permission

\*\*EASC 3054 High-Temperature Geochemistry and Igneous Petrology\*\*

\*\*Course Information\*\*: Integrated course on geochemistry, origin, and classification of igneous rocks. Topics include trace element geochemistry, magmas' physical properties, and petrology of specific tectonic settings. Laboratories focus on geochemical calculations and rock examination.

\*\*CR\*\*: Former EASC 3053 in combination with 2503

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031 and 2502

\*\*EASC 3055 Thermodynamics and Metamorphic Petrology\*\*

\*\*Course Information\*\*: Integrated course on geochemistry, origin, and classification of metamorphic rocks. Covers thermodynamics, kinetics, metamorphic facies, and rock assemblages. Laboratories include thermodynamic problems and rock studies.

\*\*CR\*\*: Former EASC 3053 in combination with 2503

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031 and 2502, Mathematics 1001

\*\*EASC 3170 Geophysics for Natural Resource Exploration\*\*

\*\*Course Information\*\*: Introduction to geophysical methods for subsurface investigation, focusing on resource exploration and development. Laboratory component involves data collection, analysis, and interpretation using modern software.

\*\*LH\*\*: 3

\*\*PR\*\*: Physics 1051 (or 1021); Mathematics 1001; Mathematics 2000 or Statistics 2550

\*\*EASC 3172 Environmental and Geotechnical Geophysics\*\*

\*\*Course Information\*\*: Introduces geophysical methods for shallow Earth investigation, with applications to environmental issues. Laboratory involves outdoor surveys and data analysis using modern software. Focus on electrical and electromagnetic methods.

\*\*AR\*\*: Required attendance in the lab

\*\*CO\*\*: EASC 2905 or instructor's permission for non-majors

\*\*LH\*\*: 3

\*\*PR\*\*: Physics 1051 (or 1021); Mathematics 1001; Mathematics 2000 or Statistics 2550; EASC 2905 or instructor's permission; Science 1807 and 1808

\*\*EASC 3179 Mathematical Methods for Geophysics\*\*

\*\*Course Information\*\*: Covers quantitative analysis of geophysical phenomena, including vector calculus, differential equations, tensor algebra, and Fourier analysis. Applications include elasticity theory and electromagnetism.

\*\*LH\*\*: 3

\*\*PR\*\*: Mathematics 2000, Physics 2055 and 2820

\*\*EASC 3210 Economic Mineral Deposits\*\*

\*\*Course Information\*\*: Introduction to mineral deposits study, focusing on genetic models for metallic mineral deposits and their relation to lithosphere-hydrosphere-biosphere interactions. Laboratory exercises involve sample examination and reflected light microscopy.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031, 2502, and 2905

\*\*EASC 3420 Global Tectonic Processes\*\*

\*\*Course Information\*\*: Examines Earth's surface motions in the context of plate tectonics and their influence on the rock record. Laboratories emphasize geologic and geophysical applications of tectonic theories.

\*\*CR\*\*: Former EASC 2070, 2161, 2400, 4901

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031, 2401, 2502, 2702; Mathematics 1000 and 1001; Physics 1021 or 1051

\*\*EASC 3600 Environmental Geology\*\*

\*\*Course Information\*\*: Applies geochemical principles to evaluate natural and human-induced changes in Earth's lithosphere, hydrosphere, atmosphere, and biosphere. Laboratory focuses on the effects of contaminants on global change.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2502; Science 1807 and 1808

\*\*EASC 3610 Hydrogeology\*\*

\*\*Course Information\*\*: Explores groundwater occurrence and geology relationship. Covers groundwater flow systems, interactions, field and lab techniques, and water quality changes due to contaminant transport.

\*\*CR\*\*: Environmental Science 4479

\*\*EQ\*\*: Former EASC 4610

\*\*LH\*\*: 3

\*\*PR\*\*: Physics 1051 (or 1021); Mathematics 2000 or Statistics 2550 or the former Statistics 2510; EASC 2502

\*\*EASC 3611 Engineering Geology\*\*

- Inactive course.

\*\*EASC 3700

Geomorphology\*\*

\*\*Course Information\*\*: Studies geomorphic processes and landforms. Practical work involves field data and sample collection and analytical laboratory techniques.

\*\*EQ\*\*: Geography 3150

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2905 or Geography 2102; Mathematics 1000

\*\*EASC 3702 Lithification, Diagenesis and Sedimentary Rock Properties\*\*

\*\*Course Information\*\*: Conceptual and practical overview of sediments transformation into sedimentary rocks and resultant modifications in composition, fabrics, and porous media characteristics. Laboratories include petrology and geological analysis.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031, 2702, and 2905

\*\*EASC 3705 Field Course in Sedimentology, Reservoir Architecture and Sequence Stratigraphy\*\*

\*\*Course Information\*\*: Field and lecture course focusing on sedimentological and palaeontological data for palaeoenvironmental analysis. Demonstrates sedimentary facies models and sequence stratigraphy in reservoir geology.

\*\*CO\*\*: EASC 3811, 3905

\*\*CR\*\*: Former EASC 4700 or Geology 4700

\*\*OR\*\*: Field-based course

\*\*PR\*\*: EASC 2702, 3811, 3905

\*\*EASC 3811 Paleontology\*\*

\*\*Course Information\*\*: Outlines life form changes from Archean to present, including invertebrate and vertebrate faunas and major floral groups. Covers mechanisms and effects of evolution and extinction in the fossil record.

\*\*EQ\*\*: Biology 3811

\*\*LH\*\*: 3

\*\*PR\*\*: Either Biology 2120 (or Biology 1001 and 1002) and EASC 1002; or Biology 2122 and 2210

\*\*EASC 3905 Field Methods in Structural Geology and Stratigraphy\*\*

\*\*Course Information\*\*: Geological mapping course in Precambrian rocks focusing on structural analysis techniques. Evening sessions dedicated to data analysis, structural maps, and sections creation.

\*\*AR\*\*: Required attendance

\*\*CH\*\*: 1

\*\*OR\*\*: Field-based course

\*\*PR\*\*: EASC 2401 and 2905; application to Department Head

---

### Fourth Year Courses

\*\*EASC 4053 Petrogenesis of Igneous Rocks\*\*

\*\*Course Information\*\*: Investigates igneous rocks' origin, including experimental petrology, phase equilibria, and geochemical tools application. Studies volcaniclastic rocks and physical volcanology. Laboratory emphasizes practical igneous petrology aspects.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 3054 and 3420

\*\*EASC 4054 Metamorphic Petrology\*\*

\*\*Course Information\*\*: Examines metamorphism-tectonics relationships, thermodynamics, thermobarometry, and P-T-t paths determination. Laboratories involve electron microprobe data collection and metamorphic petrology software application.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2401, 3055, and 3420

\*\*EASC 4105 Field Course in Applied Geophysics\*\*

\*\*Course Information\*\*: Field course emphasizing environmental and mineral exploration applications. Includes data collection and interpretation modules using techniques like radar, seismic, magnetic, and electromagnetic methods.

\*\*AR\*\*: Required attendance

\*\*OR\*\*: Field-based course

\*\*PR\*\*: EASC 3170, 3172, and Mathematics 2000

\*\*EASC 4171 Seismic Methods\*\*

\*\*Course Information\*\*: Explores seismic data acquisition, processing, and interpretation techniques. Covers elastic properties of rocks and subsurface imaging techniques. Laboratory provides hands-on data processing and interpretation experience.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 3170 and 4179

\*\*EASC 4173 Advanced Electrical, Electromagnetic and Potential Fields Methods\*\*

\*\*Course Information\*\*: Examines theory and application of electrical, electromagnetic, and potential fields methods in geophysics. Laboratories apply computer modeling and interpretation to real-life examples.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 4179; non-majors with Mathematics 3202 may enroll with instructor's permission

\*\*EASC 4179 Signal Processing in Geophysics\*\*

\*\*Course Information\*\*: Introduction to digital signal processing theory and techniques in geophysics. Topics include sampling, Fourier transformation, digital filters, deconvolution, and spectral analysis. Laboratory component included.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 3170, 3172, 3179, and Physics 2820; non-majors may substitute some courses

\*\*EASC 4211 Economic Geology\*\*

\*\*Course Information\*\*: Detailed study of mineral deposit study methodologies and techniques with case history applications. Laboratory exercises involve problem-solving using data from case studies.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 3054 or 3055; and 3210

\*\*EASC 4302 Advanced Marine Geology\*\*

\*\*Course Information\*\*: Examines the geology and geophysics of ocean basins, exploring methods of oceanic exploration and the history and development of ocean basins. Discusses interrelationships between ocean water, organisms, and geological processes.

\*\*PR\*\*: EASC 1001 or 1002; completion of 15 credit hours in core courses at the 3000/4000 levels in related sciences.

\*\*EASC 4310 Earth Science Concepts, Materials and Techniques for Archaeologists\*\*

- Inactive course.

\*\*EASC 4400 Advanced Techniques in Structural Geology\*\*

\*\*Course Information\*\*: Focuses on modern structural analysis techniques for fold and fault systems. Topics include progressive deformation, strain analysis, fold mechanisms, and construction of balanced cross-sections.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2401 and 3905; minimum of 6 credit hours in Earth Sciences at the 3000 level

\*\*EASC 4405 Field Course on the Geology of Newfoundland\*\*

\*\*Course Information\*\*: Field-based course with classroom lectures and seminars, including a week-long field trip in Newfoundland. Introduces geological history and tectonic development of Newfoundland.

\*\*OR\*\*: Lecture and field-based course

\*\*PR\*\*: 15 credit hours in Earth Sciences at the 3000/4000 levels including EASC 3420; instructor's permission

\*\*EASC 4420 Tectonics and Crustal Evolution\*\*

\*\*Course Information\*\*: Lecture and seminar course covering Earth's tectonic evolution from the Archean to Mesozoic, with examples from North America. Links concepts from various Earth Science disciplines.

\*\*CR\*\*: Former EASC 4901

\*\*OR\*\*: Seminar

\*\*PR\*\*: EASC 3420

\*\*EASC 4502 Advanced Geochemistry\*\*

\*\*Course Information\*\*: Focuses on trace, radiogenic, and stable isotope geochemistry applications to understand Earth's lithosphere and asthenosphere. Assignments reflect career interests in geochemistry.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031, 2502; minimum of 6 credit hours in Earth Sciences at the 3000 level

\*\*EASC 4503 Mineral Exploration Geochemistry\*\*

\*\*Course Information\*\*: Examines geochemistry application in mineral exploration. Covers lithogeochemical characteristics, sampling principles, statistical analysis, and survey design. Emphasizes case studies relevant to Newfoundland and Labrador.

\*\*LH\*\*: 3

\*\*OR\*\*: Seminar

\*\*PR\*\*: EASC 3210

\*\*EASC 4601 Petroleum Origin and Occurrence\*\*

- Inactive course.

\*\*EASC 4605 Environmental Geoscience Field School\*\*

\*\*Course Information\*\*: Field-based course investigating anthropogenic impacts on the environment using geochemical, hydrological, and microbial methods. Emphasizes site investigation and analytical techniques.

\*\*AR\*\*: Required attendance

\*\*OR\*\*: Field-based course

\*\*PR\*\*: EASC 2502, 3600; Mathematics 1001; one of Mathematics 2000, Statistics 2550, or former Statistics 2510

\*\*EASC 4620 Groundwater Modelling\*\*

\*\*Course Information\*\*: Examines groundwater flow and contaminant transport processes from a numerical modelling perspective. Focuses on methods for numerical modelling with hands-on experience using software packages.

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 3610 (or former 4610) or Environmental Science 4479; or instructor's permission

\*\*EASC 4702 Sedimentary Basins and Hydrocarbon Exploration\*\*

\*\*Course Information\*\*: Reviews sedimentary basin types and petroleum systems. Explores petroleum generation, migration, accumulation, and regional-scale stratigraphic and structural concepts. Laboratories include data analysis and exploration techniques.

\*\*CR\*\*: EASC 4601

\*\*EQ\*\*: Former EASC 4602

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2401, 2702, 3170, and 3420

\*\*EASC 4703 Environmental Change and Quaternary Geography\*\*

\*\*Course Information\*\*: Covers methods for reconstructing Quaternary environments and their effects on landforms, particularly in North America. Discusses glacial and non-glacial climates.

\*\*EQ\*\*: Archaeology 4150, Geography 4150

\*\*LH\*\*: 3

\*\*PR\*\*: 6 credit hours in Earth Sciences or Physical Geography at the 3000-level; or instructor's permission

\*\*EASC 4704 Reservoir Characterization\*\*

\*\*Course Information\*\*: Reviews sedimentary, stratigraphic, and structural settings of hydrocarbon reservoirs. Explores geological controls on reservoir quality and methods to evaluate key properties for hydrocarbon development.

\*\*CR\*\*: EASC 4601

\*\*EQ\*\*: Former EASC 4603

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2401, 2702, 3170, and 3702

\*\*EASC 4720 Carbonate Depositional Environments and Diagenesis\*\*

\*\*Course Information\*\*: Examines carbonate environments, facies models, diagenetic controls on rock properties, and chemostratigraphy application. Laboratories apply various methods to investigate carbonates from different settings.

\*\*CO\*\*: EASC 3811

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 2031, 2702, and 3811

\*\*EASC 4800 Advanced Paleontology\*\*

\*\*Course Information\*\*: Field, lecture, laboratory, and seminar course on general and applied paleontology. Covers evolution, extinction, paleoecology, and applications in various industries. Laboratories and seminars included.

\*\*EQ\*\*: Biology 4800

\*\*LH\*\*: 3

\*\*PR\*\*: EASC 3811; Statistics 2550 or courses listed in credit restrictions of Statistics 2550 or Mathematics 2000

\*\*EASC 4902 Early Evolution of the Earth\*\*

- Inactive course.

\*\*EASC 4903 Global Change\*\*

\*\*Course Information\*\*: Lecture and seminar course studying the interaction of the atmosphere, biosphere, and lithosphere. Topics include biosphere evolution, global geochemical budget, and environmental changes.

\*\*OR\*\*: Seminar

\*\*PR\*\*: EASC 1001 or 1002; Biology 2120 (or Biology 1001 and 1002); completion of 15 credit hours in core courses at 3000/4000 levels in related sciences; or instructor's permission

\*\*EASC 4905 Field Course in Geological Mapping and Regional Tectonics\*\*

\*\*Course Information\*\*: Two-week field school on Appalachian geology of western and central Newfoundland. Focuses on mapping techniques and tectonic introduction. Reports submitted for grading in the fall semester.

\*\*OR\*\*: Field-based course

\*\*PR\*\*: EASC 2401, 3055, 3420, and 3905; Department Head's permission

\*\*EASC 4912 Planetary Geology\*\*

\*\*Course Information\*\*: Classroom- and laboratory-based course on the geology of the Moon, Mars, asteroids, and outer solar system satellites. Covers meteorites, impact cratering, and planetary exploration instrumentation.

\*\*PR\*\*: EASC 2031, 2702, 2905, and 3420

\*\*EASC 4910-4920 (Excluding 4912) Special Topics in Earth Sciences\*\*

\*\*Course Information\*\*: Lecture and seminar courses on specialized Earth Sciences topics. The Department considers student suggestions but requires approval at least three months before the semester start.

\*\*PR\*\*: Department Head's permission

\*\*EASC 4950 Technical Report on Geoscience Employment\*\*

\*\*Course Information\*\*: Requires a technical report based on a study during geoscience employment. Involves seminars, organization and writing guidance, and directed reading.

\*\*PR\*\*: 9 credit hours in Earth Sciences at 3000 level; Department Head's permission

\*\*UL\*\*: Can only be used as an "additional course" for General and Honours degrees. Cannot be based on the same study as EASC 499A/B.

\*\*EASC 499A and 499B Dissertation\*\*

\*\*Course Information\*\*: Independent study with subject consultation with Faculty Advisors. Involves background reading, field/laboratory work, dissertation outline, and formal thesis.

\*\*CH\*\*: 6

\*\*PR\*\*: Admission to the Honours program

\*\*UL\*\*: Cannot be based on the same study as EASC 4950. May be used as Science credits by non-Honours students with Department Head's permission.