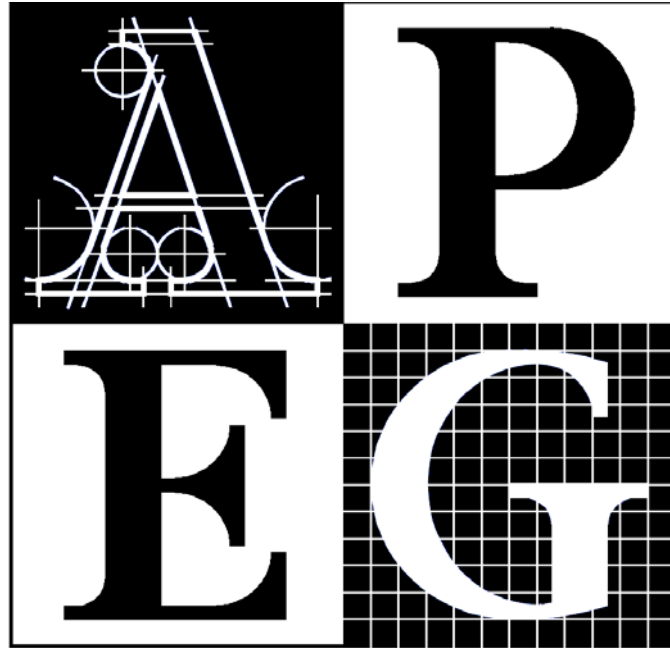


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# ***GEOCHEMISTRY UNIFORM SYLLABUS***

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**Professional Engineers  
and Geoscientists of BC**

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**The Association of Professional Engineers and  
Geoscientists of the Province of British Columbia**

- Note:**
- 1. This Syllabus May Be Subject To Change**
  - 2. These Courses Are Required In Addition To The Courses Required In The Common-To All Uniform Syllabus**

The current geoscience syllabi will be replaced by new syllabi on January 1, 2007. Individuals applying for registration before this date will have their choice of the current or new syllabi. Individuals applying for registration after this date will have their applications evaluated with respect to the new syllabi.

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## **GEOCHEMISTRY NEW SYLLABUS – Group A (6 of 7 Required)**

### **COMPULSORY COURSES.**

#### ***06-GC-A1. Introduction to Geochemistry.***

Origin, distribution and cycles of elements in the Earth. Evolution of the ocean and atmosphere. Introduction to geochemical process in natural waters, sedimentary, igneous and metamorphic rocks.

#### ***06-GC-A2. Exploration Geochemistry OR Applied Geochemistry.***

Exploration Geochemistry: distribution of elements in rocks, soils, sediments and other natural media in relation to mineralisation; application of geochemical techniques to mineral exploration.

Applied Geochemistry: studies emphasising the application of geochemical principles and techniques to environmental problem solving.

#### ***06-GC-A3. Analytical Geochemistry.***

Application of chemical and instrumental methods to the analysis of silicate rocks, minerals and related media; decomposition techniques, analytical quality control and assurance, sampling problems in geochemistry.

#### ***06-GC-A4. Hydrogeology.***

Theory of groundwater flow; flow nets, regional groundwater resources evaluation; role of groundwater in geologic processes; well hydraulics; groundwater chemistry and sources of contamination.

#### ***06-GC-A5. Introduction to Geomorphology.***

The processes and principles of landform development and distribution. Introduction to air photo interpretation and terrain analysis in land development and resource applications.

#### ***06-GC-A6. Introduction to Applied Geophysics.***

Instrumentation, applications and limitations of gravity, magnetic, electromagnetic, electrical, acoustic and seismic methods in the exploration for minerals and energy resources and in environmental and engineering applications. Survey navigation.

#### ***06-GC-A7. Introduction to Soil Science.***

Physical, chemical and biological properties of soils; weathering and soil formation; principles of identification; classification; nature and distribution of major kinds of soils.

## **GEOCHEMISTRY NEW SYLLABUS – Group B (1 of 1 Required)**

### **COMPULSORY COURSES.**

#### ***06-GC-B1. Field Work.***

A minimum of 12 days of actual field work done under academic supervision as part of a university curriculum.

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## **GEOCHEMISTRY NEW SYLLABUS – Group C (9 of 21 Required)**

### **ELECTIVE COURSES.**

#### ***06-GC-C1. Igneous Petrology.***

Applications of physical and chemical principles to the origin and occurrence of igneous rocks. Crystallisation from silicate magmas, heat transfer and mineral phase equilibria.

#### ***06-GC-C2. Metamorphic Petrology.***

Nature and origin of common metamorphic rocks, heat flow during metamorphism, partial melting, metamorphic and metasomatic phase equilibria.

#### ***06-GC-C3. Sedimentary Petrology.***

Description and interpretation of ancient and modern sediments. Origin, depositional environment, composition, textures, structures diagenesis and geochemistry of clastic, carbonate and chemical sediments. Introduction to sedimentary basin analysis.

#### ***06-GC-C4. Mineral Deposits.***

Mode of occurrence, distribution, genesis evaluation of and exploration for metallic and industrial mineral deposits. Includes ore petrology and geochemistry as well as theory of ore deposition in hydrothermal systems.

#### ***06-GC-C5. Ore Petrology.***

Mineralogy of ore deposits using optical microscopy and electron beam techniques.

#### ***06-GC-C6. Advanced Mineralogy.***

The crystal chemistry of minerals; x-ray diffractometry, scanning and transmission electron microscopy, electron microprobe analysis and spectrometric methods applied to the characterisation of minerals.

#### ***06-GC-C7. Statistical Interpretation of Geochemical Data.***

Introduction to the application of statistical methods in the interpretation of geochemical data.

**06-GC-C8. Quaternary Geology.**

Glacial processes and deposits, properties of glacial sediments and stratigraphy; landscape development during the quaternary era, emphasising the history of glaciation; glacial geomorphology; applications of geomorphological information in resource development and land management.

**06-GC-C9. Physical Hydrology.**

Principles of hydrology at site, watershed and larger regional scales; precipitation patterns, snow and ice, soil moisture, groundwater, runoff formation, flow in channels, lake storage. Introduction to techniques of measurement and analysis of surface and subsurface water.

**06-GC-C10. Groundwater Contamination.**

Introduction to principles of groundwater chemistry; chemical evolution in natural groundwater flow systems; sources of contamination; mass transport processes; hydrochemical behaviour of contaminants; hazardous waste disposal in the terrestrial environment.

**06-GC-C11. Applied Geomorphology.**

Application of geomorphological principles and techniques to analyse problems caused by geomorphological conditions related to engineering and resource development and to the determination of land surface conditions pertinent to land use planning; case histories. Must include advanced study and experience of surficial geology mapping and terrain analysis methods.

**06-GC-A12 Pedology.**

Advanced treatment of topics in soil science; soil physics; soil chemistry; soil biology and soil classification.

**06-GC-C13. Geographic and Spatial Data Analysis.**

Theory and principles of Geographic Information System design. Creation and Storage of geoscientific databases. Manipulation, analysis and interpretation of spatially distributed geoscience information.

**06-GC-C14. Remote Sensing of the Earth's Surface.**

Electromagnetic spectrum; principles of remote sensing at optical and other wavelengths; interpretation of geoscientific information from satellite and air photo images; image rectification.

**06-GC-C15. Air Photo Interpretation.**

Principles of stereoscopic imaging; identification of landforms, surface materials and processes, and geological structures from aerial photographs; measurements using the parallax principle; introduction to photogrammetry; principles of image rectification. Must include substantial practice in air photo interpretation.

**06-GC-C16. Advanced Course in Geochemistry.**

Any advanced course in geochemical principles or methods.

**06-GC-C17. *Advanced course in Geochemistry.***

Any advanced course in geochemical principles or methods.

**06-GC-C18. *Advanced course in Geoscience.***

An advanced course in geoscience acceptable for a degree in Earth Science.

**06-GC-C19. *Advanced Course in Geoscience.***

An advanced course in geoscience acceptable for a degree in Earth Science.

**06-GC-C20. *Thesis in Geoscience.***

**06-GC-C21 GC-A1, A2, A3, A4, A5, A6, A7, A8**

Candidates who have taken all the courses in 06-GC-Compulsory (6 of 7 required) can use the extra course here