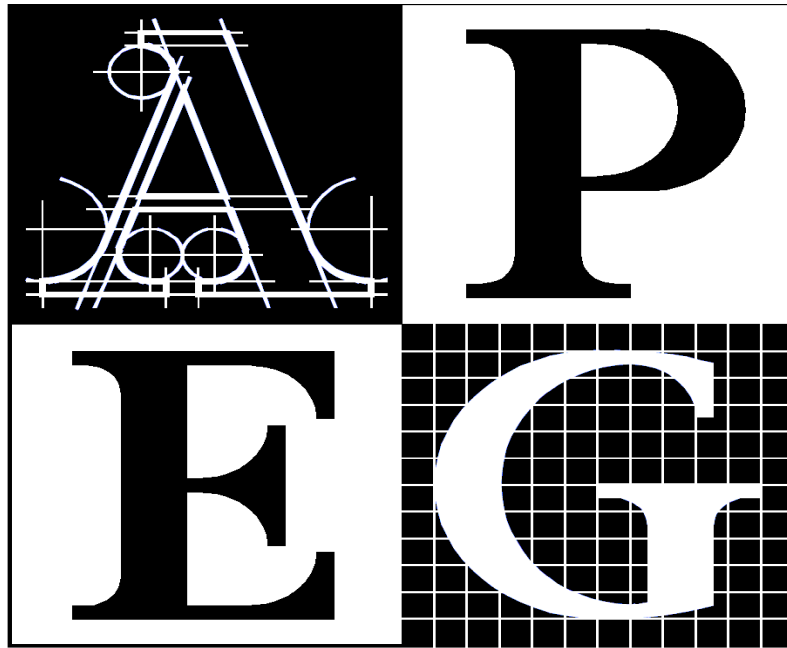

ENVIRONMENTAL GEOSCIENCE UNIFORM SYLLABUS



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.

ENVIRONMENTAL GEOSCIENCE NEW SYLLABUS – Group A (6 of 7 Required)

COMPULSORY COURSES

06-EG-A1. 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-EG-A2. Introduction to Geochemistry.

Origin, distribution and cycles of elements in the earth. Evolution of the ocean and atmosphere. Low temperature aqueous solution geochemistry.

06-EG-A3. Introduction to Hydrology.

Description and analysis of water movement and storage at site, watershed and regional scales. Effects of climatic variation and land use on the hydrologic cycle. Techniques of measurement, data analysis and practical applications.

06-EG-A4. Quaternary Geology.

Glacial processes and deposits, properties and stratigraphy of glacial sediments, landscape development during the Quaternary era emphasizing the history of glaciation. Glacial geomorphology. Applications of geomorphological information in resource development and land management.

06-EG-A5. Introduction to Soil Science.

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

06-EG-A6. Introduction to Applied Geophysics.

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

06-EG-A7. 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.

ENVIRONMENTAL GEOSCIENCE NEW SYLLABUS – Group B (1 of 1 Required)

COMPULSORY COURSE

06-EG-B1. Field Work.

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

ENVIRONMENTAL GEOSCIENCE NEW SYLLABUS – Group C (9 of 25 Required)

ELECTIVE COURSES

06-EG-C1,C2. Advanced Geomorphology.

One or more of the following topics. Fluvial Geomorphology; flow and sediment transport in river channels, river morphology and fluvial sedimentation. Hillslope Geomorphology; geomorphic events on slopes and slope evolution over long periods. Coastal Geomorphology; waves and tides, nearshore currents and sediment transport, shoreline configuration. Glacial Geomorphology; Snow, ice frost; mechanical properties and deformation of snow and ice, avalanches, properties of frozen ground, geomorphological phenomena in frozen ground especially in permafrost.

06-EG-C3. Applied Geomorphology.

Application of geomorphological principles and techniques to analyze 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-EG-C4. Analytical Geochemistry.

Application of chemical and instrumental methods to the analysis of silicate rocks, minerals and related media; sampling problems in geochemistry.

06-EG-C5. Analytical Hydrology.

Magnitude-frequency-duration analysis of hydrologic events; rationalization; time sequence analysis; hydrograph analysis; statistical models for hydrologic prediction; simulation models.

06-EG-C6. Groundwater Contamination.

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

06-EG-C7. Fluid Mechanics.

Fluid properties, hydrostatics, kinematics and fluid dynamics, energy and momentum methods with applications. Dimensional analysis, modeling, introduction to flow in pipes and forces on immersed objects; introduction to open channel flow, consideration of turbulence.

06-EG-C8. Soil Mechanics.

Origin, nature and composition of soils; phase relationships; grain shape, mineral composition and size distribution; soil structure; plasticity of fine grained soils; field identification and classification; compaction; permeability, capillary phenomena and frost heave; analysis of seepage in one and two dimensional flow nets; principle of effective stress; stress distribution in soil masses; primary and secondary consolidation.

06-EG-C9. Rock Mechanics.

The mechanical properties of rock material at the laboratory and field level; the principles of rock behaviour as influenced by excavation; influence of structural geology, groundwater and shaking on the stability of rock bodies; rock bursting, stability analysis, stabilisation and monitoring to assess rock behaviour. The application of such knowledge to common geoscience problems.

06-EG-C10. Engineering Geology.

Applications of the principles and techniques of geology, geophysics, soil mechanics, rock mechanics and hydrology at engineering sites. Analysis of projects and problems on a local and regional scale. Case histories.

06-EG-C11. Palaeoenvironmental Interpretation Methods.

Interpretation of past environments based on evidence of fossils, soils, sediments and landforms. Geochronology, especially radiometric and other methods of absolute dating applicable to the last million years; relative dating methods, including weathering signatures and pedological development of soils; stratigraphic methods.

06-EG-C12. Sedimentology.

Description and interpretation of ancient and modern sediments. Origin, depositional environment, composition, textures, structures, diagenesis and geochemistry of sediments and sedimentary rocks. Introduction to sedimentary basin analysis. Should include some emphasis on terrigenous clastics.

06-EG-C13. 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-EG-C14. Advanced Geophysics.

Advanced techniques in geophysical data acquisition and interpretation, including the theoretical bases. Physical properties of earth materials; potential field methods; basic inversion techniques; time sequence analysis.

06-EG-C15. Geophysical Hazard Evaluation.

Concepts of hazard and risk; extreme event statistics, encounter probability, vulnerability analysis and risk assessment; hazard identification for extreme meteorological events; floods, waves and tsunami effects; debris flow, landslides and avalanches; volcanic hazards. earthquake hazard.

06-EG-C16. Introduction to Ecosystems.

Biotic environmental relationships and dynamics, ecological concepts, population dynamics, variation, adaptation and evolution.

06-EG-C17. Weather and Climate.

The principles of meteorology and climatology at the synoptic and regional scales. Atmospheric energy, moisture and motion. Weather systems, forecasting and regional climates.

06-EG-C18. Computer Applications in Geoscience.

Applications of mathematical modelling and geostatistical procedures to practical problems with a geoscience context.

06-EG-C19. Geographic and Spatial Data Analysis.

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

06-EG-C20. 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-EG-C21. Aerial 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-EG-C22. Advanced Course in Geoscience.

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

06-EG-C23. Advanced Course in Geoscience.

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

06-EG-C24. Thesis in Geoscience.

Topic must be geoscience, not bioscience or chemistry

06-EG-C25 EG-A1, A2, A3, A4, A5, A6, A7 not used above

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