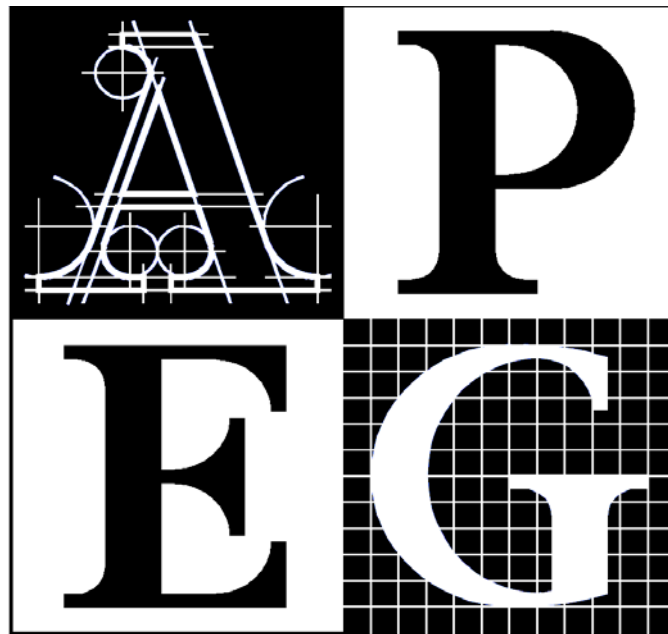


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# ***GEOPHYSICS UNIFORM SYLLABUS***

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

### **COMPULSORY COURSES**

#### ***06-GP-A1. Exploration Geophysics.***

Basic principles of geophysical survey design and interpretation, including gravity, magnetic, electric, electromagnetic and seismic methods.

#### ***06-GP-A2. Physics of the Earth.***

Origin, evolution, structure and processes of the planet Earth. Structure of the core, mantle, lithosphere, hydrosphere, atmosphere and magnetosphere. Emphasis on Earth as a complex system in which interactions play a decisive role, eg. plate tectonics, volcanism and the development of atmospheres and oceans.

#### ***06-GP-A3. Electricity and Magnetism.***

Electric and magnetic potentials and fields, static charge distributions, currents, fields of moving charges, Maxwell's equations and applications.

#### ***06-GP-A4. Potential Field Theory.***

The theory and quantitative interpretation of potential field methods in geophysical exploration.

#### ***06-GP-A5. Physical Properties of Geological Materials.***

The physical properties of geological materials and their implication for geologic interpretation of geophysical data.

#### ***06-GP-A6. Seismology.***

Reflection and refraction methods for exploration, plane waves in an infinite medium and interaction with boundaries; body wave seismology, inversion of travel-time curves, generalised ray theory; crustal seismology, surface waves and earthquake source studies.

#### ***06-GP-A7. Time Series Analysis in Geophysics.***

Computer techniques applied in applied geophysics; continuous and discrete Fourier transforms, correlation and convolution; spectral estimates, optimum least squares filters, deconvolution and prediction, and frequency-wave number filtering.

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

### **COMPULSORY COURSES.**

#### ***06-GP-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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## **GEOPHYSICS NEW SYLLABUS – Group C (10 of 22 Required)**

### **ELECTIVE COURSES**

#### ***06-GP-C1. Electronics***

AC circuits, resonant circuits and the response of RLC circuits to sinusoidal and transient signals; an introduction to digital electronics.

#### ***06-GP-C2. Mechanics.***

Equilibrium of rigid bodies, kinematics, rectilinear motion, dynamics, Newton's Laws, impulse, momentum, work and energy, stress and strain tensors.

#### ***06-GP-C3. Heat and Thermodynamics.***

Laws of thermodynamics. Thermodynamic potentials. Thermal properties of matter, heat transfer by conduction, convection and radiation.

#### ***06-GP-C4. Electromagnetic Theory.***

The application of Maxwell's theory to the propagation of electromagnetic waves in media of varying electrical properties.

#### ***06-GP-C5. Applied Mathematics.***

Integrals involving multi-valued functions, power series methods, boundary value problems, separation of variables, Laplace and Fourier transforms.

#### ***06-GP-C6. Numerical Methods Computing.***

Numerical techniques for basic mathematical processes involving discretisation and their analysis. Interpolation and approximation, including splines and least squares data fitting; numerical differentiation and integration; introduction to numerical initial value ordinary differential equations.

#### ***06-GP-C7. Advanced Applied Exploration Geophysics.***

The application of advanced techniques in practical applied exploration geophysics emphasising interpretation theory, including inversion techniques and constraining solutions by incorporating *a priori* geological information.

**06-GP-C8. *Geomagnetism, Palaeomagnetism and Rock Magnetism.***

Theory and methods of electromagnetic induction as applied to the Earth; interpretation of geomagnetic data. Rock magnetism; measurement and interpretation of palaeomagnetic signatures

**06-GP-C9. *Geophysical Interpretation.***

The practical application of geophysical interpretation methods to solving geologic situations using the basic techniques of magnetics, seismic, electrical and electromagnetic methods.

**06-GP-C10. *Advanced Seismology.***

Seismic source theory, wave propagation in layered media, anelasticity, free oscillations, instrumentation data analysis and interpretation.

**06-GP-C11. *Advanced Earth Physics.***

Quantitative methods for determining the physical properties and structure of the Earth. Basic inversion interpretation techniques for gravity, magnetic, seismic, palaeomagnetic, radiometric methods; thermal history and evolution of the Earth.

**06-GP-C12. *Nuclear Physics.***

The major phenomena in the field of atomic physics.

**06-GP-C13. *Marine Geophysics.***

Geophysical exploration methods applied in the marine environment. Methods for estimating the properties of the water column, seafloor and submarine geology; remote sensing of the ocean.

**06-GP-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-GP-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; wave and tsunami effects; debris flow, landslides and avalanches, volcanic hazards, earthquake hazards.

**06-GP-C16. *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-GP-C17. *Hydrogeology.***

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

**06-GP-C18. *Advanced Course in Geophysics.***

Any 300 level or higher geophysics course acceptable for a degree in Geophysics.

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

An advanced course in a geoscience field acceptable for a degree in Earth Sciences.

**06-GP-C20. *Advanced Course in Geoscience.***

An advanced course in a geoscience field acceptable for a degree in Earth Sciences.

**06-GP-C21. *Thesis in Geoscience.***

**06-GP-C22 *GP-A2, A3, A6, A7 not used above***

Candidates who have not used the above courses in 06-GP-Compulsory (6 of 7 required) can use the extra course here.