

Civil Engineering Department

Engineer and Geoscientists Training Program Guide













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Appendix No. 1 Engineers and Geoscientists In Training Program Guide

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1.0 Background

Chatwin Engineering's Civil Engineering Department has been operating in the Province of British Columbia for the past 30 years. Over that period of time, they have involved young graduate engineers in their engineer-in-training (EIT) program. Their process and program involves a calculated process for the development of a young engineer over the 4 years of their EIT career.

Chatwin Engineering values the work that an EIT does and attempts to ensure that each EIT candidate undertakes a diverse and comprehensive program, in order that they can qualify for certification after 4 years. Each EIT candidate will be working during their 4 year program under the sponsorship of a professional engineer sponsor.

It is envisioned that the EIT will move from sponsor to sponsor in order to obtain different skills and approaches to engineering problem solving from the various sponsors.

This document is to provide the EITs with an understanding of the blue print for how we envision them achieving the necessary skills to become qualified as a Professional Engineer in our Province.

The Chatwin Engineering Ltd. EIT Training Program is consistent with the "Engineers and Geoscientists in Training Program Guide", published by the Engineers and Geoscientists of BC and attached as Appendix No. 1. The following information outlines the program in a more specific way, as it deals with the work of Chatwin Engineering's Civil Engineering Department.

2.0 Experience After Four Years

It is envisioned that each EIT candidate in Chatwin Engineering's Civil Engineering Department shall obtain experience in the following major categories over their 4 year program.

1. Construction Engineering

This will be undertaken through part time or full time resident engineering inspection programs on construction programs that have been designed by professional engineers. This experience allows the young engineer with real on-the-ground training of how projects are constructed and facilitated prior to proceeding to the design phase of the training program.

2. Contract Administration

As a young engineer moves forward in their construction inspection program, they will be trained by a supervisor on how to interpret contracts and provide contract administration for the performance of contracts. It is recommended that EIT's should enroll in Contract Administration courses recommended by their sponsor.



3. Surveying

During the EIT program, the young engineer will be required to obtain experience in construction inspection and preliminary surveys. This experience is not to teach the EIT to be an experienced surveyor when they become a professional engineer, but to be able to supervise surveyors on project teams as they move through their career.

4. Autocad Experience

The EIT will learn various skills of autocad for utilizing this technology in the development of civil engineering designs. This is not necessarily to create a professional engineer that has full autocad capabilities, but a professional engineer that can understand the capabilities of autocad and capacity of the technicians and be able to better utilize the technology in the process of developing designs.

5. Design Experience

The EIT will move from their construction experience into a junior design function and move forward through more complicated design. Experience gained through construction inspection, survey and autocad drafting/design on previous engineering design projects, prior to the EIT undertaking designs, is of great benefit in understanding the design process.

6. Junior Project Management

In the final phases of an EIT training program, the EIT will obtain experience in junior roles of project management in projects, under the direct supervision of a Professional Engineer.

3.0 Skills Acquired After Four Years

As EIT candidates are moved through the experience that is afforded them by Chatwin Engineering's Civil Department, it is expected that the following skills will be learned:

- Planning
- Scheduling
- Budgeting
- Supervision
- Communications
 - o oral
 - \circ written
- Approval processes
- Social implications of engineering
- Engineering ethics



4.0 A sample program

Work afforded to an EIT candidate under this Training Program will be subject to the availability of existing and ongoing projects in the Company. A sample program, under ideal conditions, would take the following forms.

Year 1

- Construction Inspection (full time or part time resident inspector)
- Basic preliminary Survey (topographic collection)
- Construction Survey
- Contract Administration

Year 2

- Junior Design Position
- Basic engineering design
- Autocad Civil 3D

Year 3

• Intermediate Design Position

Year 4

- Senior Design Position
- Junior Project Management Roles



Appendix No. 1

Engineers and Geoscientists In Training

Program Guide



Engineers and Geoscientists In Training Program Guide



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EIT & GIT Program Guide



VISION

B.C.'s Professional Engineers and Professional Geoscientists enhance and protect the quality of life and are recognized and respected by Industry, Government and the public.

MISSION

To advance and support a professional membership dedicated to protecting the public and the environment, and creating economic value through innovation and ingenuity.

*The policies and procedures in this Guide are subject to change.

PROFESSIONAL ENGINEERING AND PROFESSIONAL GEOSCIENCE IN BRITISH COLUMBIA

n Canada, the professions fall within the jurisdiction of the provinces and territories. In British Columbia the practices of professional engineering and geoscience are controlled through an act of the provincial legislature, as are those of other professions such as accounting, architecture, dentistry, forestry, law, medicine, pharmacy, etc. Specifically, engineering and geoscience are covered by the Engineers and Geoscientists Act (the Act), which gives the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) the responsibility for its administration.

By virtue of the Act, Bylaws and Code of Ethics, APEGBC establishes and regulates standards of admission to membership, disciplines members for incompetent or unethical practice, and enforces the provisions that restrict the practice of engineering and geoscience in British Columbia to APEGBC members and licensees.*

APEGBC's proposed new legislation for 2004 defines the **practice of professional engineering** as

any act of advising, composing, designing, directing, evaluating, inspecting, interpreting, maintaining, operating, planning, reporting, supervising or managing any of the foregoing that relates to:

 (i) any act of agricultural, aerospace, bio-chemical, biological, bio-medical, bio-resource, bio-systems, building, chemical, civil, communications, computer, electrical, electronics, engineering physics, environmental, food, forest, geological, geomatics, geophysical, industrial, information, manufacturing, marine, materials, mechanical, metallurgical, mineral process, mining, naval architectural, nuclear, ocean, oil and gas, petroleum, software, structural, systems or survey engineering; or (ii) other disciplines of engineering that may be designated by council,

that requires the application of engineering principles and concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment.

The **practice of professional geoscience** is similarly defined as

any act of advising, directing, evaluating, inspecting, interpreting, maintaining, measuring, operating, planning, reporting, sampling, supervising or managing any of the foregoing that relates to:

- (i) any act of geochemistry, geology, geophysics or environmental geoscience; or
- (ii) other disciplines of geoscience that may be designed by Council, that requires the application of geoscience principles and concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment.

*At the time of printing of this Guide, the memberships of APEGBC and the Applied Science Technicians and Technologists of B.C. (ASTTBC) have strongly supported merging the two organizations into one Association of Professionals in Engineering and Geoscience. This Association will regulate the practices of engineering, engineering technology, geoscience and geoscience technology. A formal request has been made this month to the Ministry responsible for APEGBC's Act (Advanced Education) asking that amendments be introduced for legislative consideration in the spring of 2004. New legislation will include definitions for the practice of engineering technology and the practice of geoscience technology.



APEGBC's ROLE

APEGBC's roles include both legislated functions that benefit the public and member services that benefit its members.

Legislated Responsibilities

In discharging its responsibility under the Act to serve and protect the public and the environment in matters relating to professional engineering and professional geoscience, APEGBC is responsible for:

- providing counsel and encouragement to those considering engineering or geoscience as a career
- establishing and maintaining standards of education and qualifications for registration of members and licensees
- registering or licensing those who are qualified to practice professional engineering and professional geoscience
- establishing and maintaining standards of practice to enhance the quality of the practice of professional engineering and professional geoscience by its members
- promoting the professions of engineering and geoscience by educating the public about the roles and responsibilities to society of professional engineers, professional geoscientists, licensees and members in training
- enforcing the provisions of the Act in prosecuting those who attempt to practice without a licence and disciplining members who contravene the Act, Bylaws or Code of Ethics
- prescribing and enforcing standards of ethical conduct
- mediating disputes concerning fees and standards of practice

- promoting continuing education for it's members to maintain their competence and to enhance their overall value to society
- enhancing inter-Association mobility of its members through the Canadian Council of Professional Engineers and the Canadian Council of Professional Geoscientists
- upholding and protecting the interests of its members in their role of serving and protecting the public and the environment

Member Services

(http://www.apeg.bc.ca/members/affinity.html) APEGBC's core business of regulating the practice of the professions and safeguarding the public and the environment provides key professional benefits relied upon by members and licensees.

APEGBC also provides exclusive member services in the form of:

- Insurance Programs

 (Auto, Accident Protection, Disability, Dental, Extended Health, Group Term Life, Home, Home Business, Professional and Secondary Liability)
- Health Services
- Financial Services/Financial Planning
- Fuel Discount
- Family Entertainment
- Auto Rental
- Mobile Phone
- Internet Services
- Innovation magazine keeps members informed of the local, provincial and national events affecting the professions
- An active public relations program makes PEng/PGeos and their achievements widely known by circulating information internally as well as opening channels for external communications

- A resume posting service to assist members in communicating their availability for employment
- A Compensation Survey to advise members and employers of appropriate levels of remuneration

Online Services

(http://www.apeg.bc.ca)

A number of secure, online systems for members are available on the APEGBC Web Site. These include:

- An Engineering-in-Training (EIT)/Geoscientistin-Training (GIT) Experience Reporting and Review System that provides EIT/GITs with on-going feedback on their work experience
- A Continuing Professional Development (CPD) Recording Centre that gives members a convenient, secure place to record their professional development activities
- Registration for Continuing Professional Development courses and seminars
- Member Forums to provide members with a venue to discuss topics of interest to the professions
- Member Surveys and Polling by which members are encouraged through emails and surveys to voice their opinions on issues affecting practice sectors and the professions
- The Membership Directory
- Member Contact and Demographic Information Update for members to keep their information current
- Member Fee & Dues Payment that features a secure convenient Visa[™] and MasterCard[™] payment system

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GRADES OF MEMBERSHIP

Registered Member

Registered Members are Canadian citizens or permanent residents of Canada and who have satisfied the requirements for registration as professional engineers or professional geoscientists.

Non-Resident Licensee

This type of license is given to applicants who are not Canadian citizens nor permanent residents of Canada, but who possess all other qualifications required for registration as professional engineers or professional geoscientists.

Limited Licensee

The Limited License recognizes and formalizes the fact that certain individuals, whose academic background or experience is not sufficient for them to become registered as professional engineers nor professional geoscientists, can be permitted to practice professional engineering or professional geoscience within a specifically and clearly defined scope of work.

Provisional Member

At the time of printing of this Guide, APEGBC's Council has approved 'in principle' the category of Provisional Member. This grade of membership can be made official after approval by two-thirds of the members at the time of the bylaw ballot in the fall of 2003.

Provisional Members will be individuals who are Canadian citizens or permanent residents of Canada, who have met all the requirements^{*} for registration as professional engineers or professional geoscientists, but do not have at least one year of experience in a Canadian environment. Provisional Membership is only valid for 1 year from the date of issue but may be extended by the Registrar.

Member in Training

Engineer-in-Training or Geoscientist-in-Training membership may be granted to an individual who is a Canadian citizen or permanent resident of Canada, has met the academic requirements and who will gain the experience required for professional registration.

Membership Advantage Program for Students (MAPS)

One of APEGBC's goals is to make it easier for students - aspiring engineers or geoscientists- to launch their career. MAPS is a special class of membership in APEGBC that allows students to begin shaping their future. The MAPS program focuses on:

- Increasing the interaction between students and industry professionals.
- Providing students with the means to gain education, contacts and employment, through access to APEGBC services.
- Elevating the level of knowledge that students have about their future profession.
- Acting as a guide to students in their transition from graduation to EIT or GIT.

*These requirements include academic requirements, successful completion of the Law & Ethics Seminar, Professional Practice Examination, four years experience, training and development requirement in engineering or geoscience satisfactory to Council.

A P E G

Structural Engineer of Record

A Structural Engineer of Record (SER) is a Professional Engineer who has demonstrated six years of structural engineering experience, at least two of which must be in responsible charge of significant engineering work; who has completed a technical examination in Structural Engineering and a B.C. Codes & Practice Examination and who has demonstrated a commitment to Continuing Professional Development.^{*}

Other Grades of Membership

The grades of membership of Registered Engineering Technologist, Registered Geoscience Technologist, Registered Professional Technologist(Engineering), Registered Professional Technologist (Geoscience) and Certified Technician are contemplated for members of ASTTBC as they become members of the merged Association in late 2004/early 2005.

*The name of this designation may be changed to 'Designated Structural Engineer' (Struct.Eng.) in the fall of 2003.

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THE ENGINEER AND GEOSCIENTIST-IN-TRAINING PROGRAM

INTRODUCTION

he EIT/GIT Program (the Program) plays a decisive role in enabling graduates to join the engineering and geoscience professions in British Columbia.

One of the main requirements for the success of this developmental program is its committed implementation by the employer. It is naturally expected that employers will provide an environment that allows trainees to receive the appropriate guidance, education and work experience to enable them to fulfill the requirements for registration as professionals. APEGBC encourages employers to provide trainees with in-house training, while motivating them to achieve levels of excellence and empowering them with challenging assignments that will encourage them to assume increasing levels of responsibility.

To support trainees in making informed choices as they gain their experience for registration, APEGBC provides:

- The EIT/GIT Online Reporting and Review System that provides experience credits and commentary every six month period
- Opportunities for networking through the regional branches and committees of APEGBC
- Education for employers of EIT/GITs regarding APEGBC's registration requirements

PROGRAM OBJECTIVE

APEGBC aims to bridge the gap from university studies to professional registration by monitoring the progress of the trainees, identifying areas for correction and providing timely feedback to the trainees at regular intervals during the program.

Although university programs can expose students to the basic principles involved in a discipline and instil an attitude of lifelong learning, they cannot be realistically expected to teach them everything about practicing engineering or geoscience. The objective of the Program is to support students and graduates as they gain varying experience that will in turn allow them to make reliable professional judgements.

It is important that an EIT be under the supervision of a PEng and that a GIT be supervised by a PGeo. Ideally, the supervising PEng or PGeo will be employed in the same company as the trainee. If this is not possible, the trainee is encouraged to contact APEGBC's Registration Department for guidance in identifying potential options for professional guidance and supervision. Periods of employment without professional supervision will be assessed on a case-by-case basis.



ROLE OF THE SUPERVISOR

A new graduate will likely lack some of the skills and knowledge required to work effectively. While enrolled in the Program, trainees should engage in the continuing professional development of their non-technical skills as well as technical skills. Non-technical skills are becoming important factors in recruitment and career advancement decisions. Trainees should, in consultation with their supervisors/mentors, develop skills in areas such as business, communication, interpersonal interaction, problem solving, project management and management.

Supervising professionals are also, to an extent, mentors for those who report to them; and as such, they should be prepared to guide both the professional and personal development of trainees. They should expose trainees to a majority of the components of acceptable engineering and geoscience experience and ensure that they are given ample opportunities for progression both in involvement and responsibility over time.

The focus of the training should be to provide experience that will enhance the skills of the trainee in the application of his or her profession while demonstrating the importance of subscribing to the Code of Ethics and practicing to the benefit of the public.

WORK EXPERIENCE REQUIREMENTS

In addition to academic qualification, applicants for registration/licensure must demonstrate their ability to put their engineering/geoscience education into practice for a specified period of time and in a supervised engineering/geoscience environment. A minimum of four years of acceptable engineering/geoscience work experience ('work experience' or 'experience') is required, including at least one year in a Canadian Environment for engineering applicants and in North America for geoscience applicants. University studies will not be credited toward fulfilling this one-year requirement. Upon graduation, applicants are expected to enrol in the EIT/GIT program while fulfilling their work experience requirements.

General Requirements

All work experience will be evaluated against the criteria for acceptable work experience. All work experience obtained during postgraduate studies, while teaching engineering/geoscience subjects, sales, consulting, government, or any other experience, will be evaluated against these criteria. Academic experience will be neither automatically granted nor discounted.

Acceptable engineering/geoscience work experience:

- comprises the practice of professional engineering/ geoscience
- is normally consistent with the field of academic qualification
- is current
- includes the application of engineering theory/knowledge of geoscience principles and practice
- includes exposure to the broad areas of practical engineering experience (for engineering), management, communication, and the social implications of engineering/geoscience
- demonstrates progression and growth
- is normally obtained following academic qualification(with pre-graduation experience limited to one year)
- is normally obtained under the guidance and supervision of a PEng/PGeo
- is recorded and reported to APEGBC

It is recognized that the number of occupational specializations within engineering/geoscience continues to increase, matched by an 0

increasing number of specialized university programs. It is important that the academic study be relevant to the experience gained if the trainee is to become registered after the minimum allowable period of experience. The less correlation there is between the academic training and the experience, the longer the qualifying period. Experience must be sufficiently current to be meaningful. APEGBC reserves the right to deny credit for experience gained early in the career of an applicant whose work has since been outside the professions.

A trainee whose experience is in an area markedly different from the field of the degree may be required to have more experience and/or education to qualify. Registration through certain disciplines such as computer, environmental, integrated, marine, naval architectural, or software engineering requires fulfilment of specific academic and/or experience criteria. Disciplines such as structural engineering may require more than four years of experience and/or additional postgraduate work related to the discipline. For further details please contact the Registration Staff.

Experience in a Canadian Environment

This section does not apply to geoscience applicants for whom the local experience criterion is a minimum of one year of geoscience experience in North America.

One year of an applicant's engineering work experience must be obtained in a Canadian environment to ensure that the applicant is familiar with the applicable Canadian engineering laws, practices, standards, customs, codes, conditions and climates. The term 'Canadian Environment' is defined as:

- work experience obtained in Canada, supervised by a PEng, licensed in the applicable Canadian jurisdiction; or
- work experience acquired outside Canada where applicants demonstrate a good knowledge of local Canadian engineering laws, practices, standards, customs, codes, conditions, and climates.

Pre-Graduation Experience

Up to a maximum of one year of pre-graduation experience may be accepted, if it is supervised by a PEng/PGeo (or foreign equivalent), and if it otherwise satisfies the work experience criteria. The following conditions apply:

- for graduates of Canadian Engineering Accreditation Board (CEAB) accredited engineering programs or Canadian undergraduate geoscience programs, the pre-graduation experience must have been obtained following the completion of at least one-half of the undergraduate program's coursework;
- for examination candidates, the preacademic qualification experience must have been obtained following the completion of at least one-half of the examinations assigned;
- for confirmatory engineering examination candidates, the pre-academic qualification experience must have been obtained following the completion of at least one-half of the undergraduate program's coursework; and
- for technologists who subsequently obtain engineering/geoscience degrees, experience obtained prior to academic qualification may be acceptable.

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Teaching of Engineering/Geoscience Subjects

Generally, the teaching of engineering/geoscience subjects that include significant engineering science/geoscience and engineering design content (typically third- and fourthyear courses) is considered to be the practice of professional engineering/geoscience, while the teaching of basic mathematics and science courses is not. Teaching first- and second-year university courses and community-college courses is not normally considered to be acceptable engineering/ geoscience work experience.

Acceptable Engineering Work Experience

Work experience is an essential element in determining whether or not an individual is acceptable for professional registration/licensure. The responsibility for providing the proper environment, opportunities, range and progression of activities necessary to meet the work experience requirements rests with the employers of applicants, and the individuals who provide supervision during the internship period. Acceptable engineering work experience must include the application of theory and should provide exposure to, or experience in the broad areas of practical experience, management, communication, and the social implications of engineering. Assessment of the acceptability of the work experience is based on the extent to which the applicant's experience includes these areas, each of which is outlined in the following sections.

1. Application of Theory

The skilful application of theory is the hallmark of quality engineering work, and an applicant's experience shall include meaningful participation in one or more of the following:

a. Analysis

scope and operating conditions, feasibility assessment, safety and environmental issues, technology assessment, and economic assessment, etc.;

b. Design and Synthesis

functionality or product specification, component selection, integration of components and subsystems into larger systems, reliability and maintenance factors, human and environmental aspects, and the societal implications of the product or process, etc;

c. Testing Methods

devising testing methodology and techniques, functional specification verification, and new product or technology commissioning and assessment, etc.; and

d. Implementation Methods

technology application, engineering cost studies, optimization techniques, process flow and time studies, quality assurance implementation, cost/benefit analysis, safety and environmental issues and recommendations, and maintenance and replacement evaluation, etc.

2. Practical Experience

Practical experience allows applicants to understand the practical limitations of real systems. Practical experience should include:

- a. site visits to existing engineering works, with opportunities to see equipment and systems in both operational and maintenance circumstances;
- **b.** application of equipment as part of the larger system, including, for example, the merits of reliability, the role of computer software, and understanding the end

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product or engineering work in relationship to the equipment;

- c. opportunities to experience and understand the limitations of practical engineering and related human systems in achieving desired goals, including limitations of production methods, manufacturing tolerances, performance minima, maintenance philosophies, etc.; and
- d. opportunities to experience the significance of time in the engineering process, including workflow, scheduling, equipment wear-out and replacement scheduling, etc.

3. Management of Engineering

Management of engineering works includes the supervision of staff, project management, general exposure to an engineering business environment, and the management of technology.

Engineering management includes:

- a. planning, from conception through to implementation. This includes: needs assessment, concept development, assessment of resources required, and assessment of impacts, including societal and project implementation;
- b. scheduling, from establishing interactions and constraints, developing activity or task schedules, and allocation of resources, through to the assessment of delay impacts and beyond to broader aspects, such as interactions with other projects and the marketplace;
- c. budgeting, including the development of preliminary and detailed budgets, identifying labour, materials and overhead, risk analysis, life-cycle analysis, and tracking;
- supervision, including leadership, professional conduct, organization of human resources, team building, and management of technology;

- project control, including co-ordination of work phases, tracking and monitoring costs and progress, and implementing changes to reflect actual progress and needs; and
- **f.** risk-analysis related to operating equipment and system performance, product performance evaluation, and evaluation of societal and environmental impacts.

4. Communication Skills

Developing and practicing communication skills is an essential experience requirement. This applies to all areas of the work environment including communication with superiors, colleagues, regulators, clients, and the public.

Applicants should have regular and progressive opportunities to participate in:

- a. preparation of written work, including day-to-day correspondence, recordkeeping, and report writing;
- b. making oral reports or presentations to colleagues, supervisors, senior management, and an exposure to, or participation in, reports to clients and regulators; and
- c. making public presentations.

5. Social Implications of Engineering

The overriding objective of the "social implications of engineering" requirement is to provide experiences which increase awareness of an engineer's professional responsibility, to guard against conditions dangerous or threatening to life, limb, property, or the environment, and to call any such conditions to the attention of those responsible.

The social implications of engineering are an important aspect of the practice of engineering. The work environment should provide opportunities for applicants to heighten their awareness of the potential consequences of engineering work. This should include:

- a recognition of the value and benefits of the engineering work to the public;
- an understanding of the safeguards required to protect the public and methods of mitigating adverse impacts;
- **c.** an understanding of the relationship between the engineering activity and the public;
- **d.** a demonstrated interest and involvement in the broader social implications of engineering;
- an appreciation of the role of regulatory bodies on the practice of engineering; and
- **f.** an understanding of the provincial health and safety of the workplace legislation.

6. Sponsorship

Referees provide confirmation of the EIT's experience. References are required from practicing PEngs familiar with details of the EIT's work during the internship. Present and past direct supervisors are the most suitable referees. If a candidate claims experience from several positions, extra references may be required.

All EITs are asked to obtain four or more Canadian referees. All should be PEngs with first-hand knowledge of the EIT's work. At least two of the referees should have directly supervised the EIT and at least one PEng familiar with the EIT's work from outside his or her company should be nominated if possible. PEngs with indirect knowledge of the EIT's work may be used if absolutely necessary. If experience outside Canada must be verified, additional referees are required. It is recognized that these international referees may not be PEngs. The EIT should aim to cover his or her entire work history with a least one reference for each period of time. A separate letter is required to explain if the EIT cannot nominate the required referees. Please refer to the reference forms for more information.

Acceptable Geoscience Work Experience

The following criteria are designed to provide guidance to GITs, employers and supervisors with respect to the level of experience expected of a GIT applying for professional registration or licensure.

1. Application of the Knowledge of Geoscience Principles and Practice

The skilful application of geoscience knowledge is essential to earning a professional registration or licensure. To be accepted, a candidate's experience must include active and responsible participation in several aspects of geoscience:

- a. geoscience training and familiarization;
- b. technical geoscience experience;
- c. development of geologic concepts: preparation of reports concerning deposits of rocks, minerals or other naturally-occurring earth materials;
- mapping and systematic geoscience evaluation (with specific reference to bedrock, unconsolidated earth materials and/or snow, ice, groundwater, surface water and constituents thereof); and
- e. identification of geologic hazards and risk to the public and the environment.

2. Management

Management in Geoscience includes supervision of staff, project leadership, budgeting and the socially responsible application of geoscientific principles and practices. GITs must be able to document reasonable progression toward increasing management involvement and responsibility over time.



3. Communication Skills

During the training period, GITs should be required to communicate effectively with superiors, co-workers, government regulators, clients and the general public. They should become proficient in the written and oral presentation of geoscience from daily record keeping to major reports.

4. Social Implications of Geoscience

The practice of geoscience has significant impact on the public in the fields of public and environmental safety, industry, finance and education. GITs should become aware of the PGeo's role in society and the social impact of projects in which they are involved. They should understand the role of the PGeo from these points of view, including environmental, economic and the advancement of knowledge. The objective is to foster an awareness of the PGeo's professional responsibility to guard against conditions that threaten life, property or the environment and to call such conditions to the attention of those responsible.

5. Sponsorship

Referees provide confirmation of the GIT's experience. References are required from practicing PGeos familiar with details of the GIT's work during the internship. Present and past direct supervisors are the most suitable referees. If a candidate claims experience from several positions, extra references may be required. All GITs are asked to obtain four or more Canadian and/or US referees. All should be PGeos with firsthand knowledge of the GIT's work. At least two of the referees should have directly supervised the GIT and at least one PGeo from outside the company, who is familiar with his or her work should be nominated if possible. PGeos with indirect knowledge of the candidate's work may be used if absolutely necessary. If experience outside Canada/United States must be verified, additional referees are required. It is recognized that these international referees may not be PGeos. The GIT should aim to cover his or her entire work history with at least one reference for each period of time. A separate letter is required to explain if the candidate cannot nominate the required referees. Please refer to the reference forms for more information.

Reporting and Review of Work Experience

An online experience reporting system is available to EIT/GITs to improve feedback on experience prior to their applying for PEng/PGeo registration. Through this system, trainees and senior student members of APEGBC (MAPS) can report their experience online each six months so that experience credits can be accumulated during the pre and post graduation periods as part of the 48-month experience requirement to apply for PEng/PGeo. Trainees will get the most value from this system by using it early in their work experience so that they can be given feedback in terms of experience credits (in months) and comments from the experience reviewers. Experience can be recorded retroactively, starting from any experience the trainee or MAPS member may have gained after second year of university studies in engineering/geoscience.

When a trainee decides to begin her/his six month work summaries, he or she should first verify that her/his PEng/PGeo supervisor is available to use this system. Then, he or she should start with the oldest experience, including any pre-graduation experience (co-op or summer) gained after the second year of university studies under the supervision of a PEng/PGeo. He or she will be notified of the experience credits assigned for that particular work period as soon as possible.

The following flowchart depicts each six-month reporting cycle:



Once a trainee has received 42 months of credit, he or she will then be working on his or her last summary. After having obtained 48 months of experience, the trainee should visit www.apeg.bc.ca to submit an application for registration as a PEng/PGeo, ask references to submit a reference form (available on the APEGBC website) on his or her behalf, and submit the last six-month work summary for review. An assessment of the trainee's application will be completed, and he or she will be informed of the result. Typical results will include registration as a PEng/PGeo, an invitation to attend an interview to discuss the trainee's experience, or an assignment of specific experience and/or training.



GOOD CHARACTER AND REPUTATION

EIT/GITs must demonstrate good character and reputation. The underlying objectives of this requirement are public protection, the maintenance of high professional standards, and the maintenance of public confidence in the engineering/geoscience professions.

An applicant may not meet the definition of good character when he or she:

- obtains or attempts to obtain registration/ licensure by fraudulent means. This may involve providing forged/fraudulent documentation, cheating on examinations, or making or causing to be made false statement(s) in the application processes, etc;
- has committed an act or acts that are inconsistent with the Code of Ethics and has not been rehabilitated or has not made adequate reparation; or
- has been convicted in Canada or elsewhere of an offence that, if committed in British Columbia, would be an offence under an enactment of the Province or of Canada , and that the nature or circumstances of the offence render the person unsuitable for registration or licensing.

Good character is assessed through self-disclosure questions in the application form, direct contact during the application process, and the comments of referees.

LANGUAGE REQUIREMENT

An applicant must be able to communicate effectively in English with the public, colleagues, employers, and others. Communication should be clear and professional, both orally and in writing. English language skills are assessed through various means such as the written documentation submitted by the applicant, the applicant's performance in the Professional Practice Examination, and the comments received from the applicant's references.

THE PROFESSIONAL PRACTICE **EXAMINATION**

The examination is designed to ensure that trainees are aware of the principles of professional practice, have a general understanding of Canadian law as it applies to PEng/PGeos and understand the laws and regulations governing the practice of engineering and geoscience in British Columbia. Approximately one-half of the examination tests the applicant's understanding of professionalism; while the remaining one-half tests the applicant's knowledge of engineering/geoscience law and familiarity with various statutes, rules and regulations.

Although it is recognized that engineering/geoscience practice is not always distinct from engineering/geoscience law, the subject matter to be covered by the professional practice examination has been broadly categorized under the headings of "professionalism" and "engineering/geoscience law".

A P E G

Professionalism

Topics covered by the examination in the general areas of engineering/geoscience practice and ethics include, but are not limited to: the definition of professional engineering/geoscience; the role of APEGBC and the responsibilities associated with self-governance; professional accountability, conduct and ethics, the PEng/PGeo's responsibility to the public and duty to report illegal or unethical engineering/geoscience practice; the ethical use of the PEng/PGeo's seal; continuing competence; and the social and environmental impacts of engineering/geoscience on society.

Engineering/Geoscience Law

Topics covered by the examination in the area of the law as it relates to PEng/PGeos and to the practice of engineering/geoscience include, but are not limited to: the basic structure of the Canadian legal system, common law, statute law and the provincial court system; tort law, liability and liability issues; business organizations; contract law, specifications and tendering, discharge and breach of contract, bonding, estoppel and construction lien legislation; intellectual property, patents, technology transfer, copyrights, trademarks, industrial designs and trade secrets; fiduciary responsibility; professional advertising, unfair competition and merchandising rights; dispute resolution, negotiation and arbitration; litigation and the PEng/PGeo as expert witness; the Canadian Human Rights Act; environmental legislation; worker's compensation and occupational health and safety legislation.

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THE LAW AND ETHICS SEMINAR

All applicants for registration as PEng, PGeo or limited licence in British Columbia must complete the Law and Ethics Seminar. This can be done in one of two ways:

- 1. by attending the seminar in person; or
- by purchasing and viewing the CD version of the seminar. Upon completion, the candidate must sign a declaration that he or she has viewed the contents of the CD set in their entirety.

The Law Session

Practical Law for PEng/PGeos

This session reviews a variety of legal practices pertaining to engineering and geoscience. It gives information about Contract Law, Tort Law, Liability, and Dispute Resolution.

Occupational Health and Safety

This topic covers Occupational Health and Safety Regulations and gives information on codes, standards and legislation that govern workers and workplaces in BC.

Employment Law

This topic covers Employer and Employee duties as well as the laws that govern the rights of individuals in the workplace. Emphasis is placed on Common Law, the Employment Standards Act, the Human Rights Code, and the Labour Relations Code.

The Ethics Session

The Professions - Engineering and Geoscience APEGBC, Canadian Council of Professional Engineers (CCPE) and Canadian Council of Professional Geoscientists (CCPG) play a key role in the practice of PEng/PGeos. This session examines the activities and responsibilities of these three organizations.

Professional Practice and Ethics

Professional Practice and Ethics are important cornerstones in the practice of PEng/PGeos. This session addresses issues such as quality management, practice review, discipline and enforcement with active participation from the audience.

A Case Study

The audience will participate in discussions regarding the ethical issues and disciplinary processes of this case study.

Discipline Hearings

This section reviews the investigation and discipline process when a member's conduct is questioned.

PROFESSIONAL DEVELOPMENT

n EIT/GIT's professional development activities are considered by APEGBC as part of the experience, training, and development requirements of the EIT/GIT program. Trainees are responsible for acquiring technical skills; they may require some supplementary technical training in specialized areas. Also, technical training may be required to bridge the gap for those who practice outside their disciplines of study. It is expected that, in most cases, the employer will provide any specialized training required by the trainee. Some means through which professional developmental may be pursued are:

FORMAL METHODS

Formal activities are those provided as a structured course or program: often for credit, occasionally with an evaluation process. Delivery methods might include traditional classroom settings, and remote techniques such as written correspondence, video, or interactive electronic exchange. Formal activities could include:

- Courses provided through universities, technical institutes and colleges
- Industry sponsored courses, programs and seminars
- Employer training programs and structured on-the-job training
- Short courses, technical sessions, seminars and workshops provided by technical societies or educational institutions

INFORMAL METHODS

These are activities not normally offered by an educational institution or other non-structured course, but which nevertheless expand your knowledge, skills or judgement. They include:

- Self-directed study
- Instructing/lecturing for courses or seminars
- Writing technical or professional papers
- Attendance at conferences and industry trade shows
- Attendance at meetings of technical, professional or managerial associations or societies
- Structured discussion of technical or professional issues with one's peers



PARTICIPATION

Activities that promote peer interaction and provide exposure to new ideas and technologies both enhance the profession and serve the public interest. These activities include:

- Mentoring/ tutoring others
- Private reading, including current publications
- Networking with other professionals outside work (i.e. through committees)
- Community/professional activities

PRESENTATIONS

Technical or professional presentations that you prepare and present outside your normal job functions. Presentations might occur at:

- A conference, workshop or seminar
- An event sponsored by a technical or professional association

CONTRIBUTIONS TO KNOWLEDGE

This category includes activities that expand or develop the technical knowledge base in the discipline of engineering or geoscience. These activities include:

- Development of published codes and standards
- Patents
- Publications of paper or articles
- Reviewing articles or editing publications for a paper.

APEGBC supports a searchable database of both technical and non-technical Continuing Professional Development (CPD) opportunities for EIT/GITs. Please check the website <u>www.apeg.bc.ca</u> for further information on programs and offerings.

IT & GIT Program Guid

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For more information on the EIT/GIT Program, please contact:

Registration Department Association of Professional Engineers & Geoscientists of BC

#200 – 4010 Regent Street Burnaby, BC V5C 6N2

Tel: (604) 430-8035 or 1-888-430-8035 (Toll free in Canada) Fax: (604) 430-8085

Email: eriou@apeg.bc.ca Web site: www.apeg.bc.ca

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