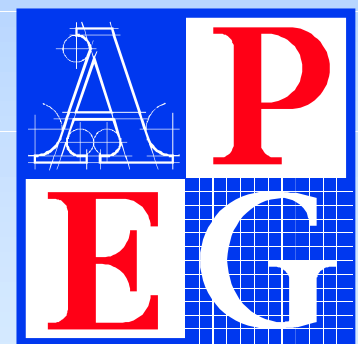


# Professional Engineering in the 21<sup>st</sup> Century



Professional Engineers  
and Geoscientists of BC

[www.peg.bc.ca](http://www.peg.bc.ca)

# Outline

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## ☰ Introduction to the profession

Engineers & Geoscientists Act of BC

Major activities of APEGBC

General registration requirements

## ☰ Specific issues

Software Engineering

Computer & Software Engineering Division

Emerging Disciplines of Engineering

# Engineers & Geoscientists Act of BC (Act)

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☐ APEGBC is its members

☐ Self-Regulating via the Act Governed by a Council

13 elected members

Faculty appointee if none elected

4 lay members appointed by Lieutenant Governor

# Engineers & Geoscientists Act of BC (Act)

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☰ Professionalism based on concept of:

Competence and Ethical Behavior

Adherence to the Code of Ethics

☰ The Act requires the profession to

Ensure only qualified persons registered

Ensure competent and ethical practice

# Major Activities of APEGBC

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☐ Member Services

☐ Enforcement

☐ Professional Practice

☐ EIT Program

# Member Services

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## Member Benefit Plans

Looking for ways to continually improve value

Current plans include:

- Home, Life, Health and Disability Insurance
- Digital Phone Plans

# Member Benefit Plans

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Future plans under consideration:

- Financial and Investment Services
- Private Health Services Plans
- Travel

# Member Services

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## ☰ Continuing Professional Development

Continuing Professional Development Policy supports life-long learning

Web-based CPD Database of offerings

Many Branch/Division CPD initiatives

Annual Conference focuses on both technical and business/personal skills

# Member Services

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## Employment Services

Employment listing service available to APEGBC Members

Employment opportunities posted on web site and in Innovation

Future plans for on-line resume service

Compensation Survey

# Member Services

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## ☰ Mentoring

Peer advice from non-employer can provide guidance based on your needs

Many large firms have own programs

Cross-discipline matching to broaden scope of experiences

# Member Services

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## Branch/Division Networking

APEGBC Encourages Members to get involved in Branches/Divisions

15 geographic branches provide regional CPD and networking events

Currently 5 Divisions that address technical and policy issues

Computer/Software, Forestry, Women's Status, Municipal Engineering and Structural

Branches/Divisions plan speakers, tours, training and networking

# Enforcement

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## ☰ Prohibition on Practice- Enforcement

Prohibits anyone not registered from

- Engaging in the practice of professional engineering
- Assuming the title of professional engineer
- Holding oneself out as an engineer if not registered

## ☰ Industrial Exemption

**NO** exemption for industry

All who practice must be registered

# Professional Practice

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## ☰ Quality Management

- Concept reviews of structural designs
- In-house design checks
- Field reviews of projects during construction

## ☰ Practice Reviews

- General review of members practice
- Technical review when a “product” is produced

## ☰ Complaint Process

- Investigation
- Discipline

# THE ENGINEER-IN- TRAINING (EIT) PROGRAM

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- ☐ What is it?
- ☐ Major activities
- ☐ Program Improvements
- ☐ Questions/Answers

# WHAT IS IT?

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- ▣ Aim of the EIT/GIT program is to provide you with an effective means to gain the experience to meet the requirements for registration as a P.Eng.

- ▣ Grade of membership

- ▣ Right to use appropriate title to recognize education and experience

- ▣ Networking Opportunities

# GRADE OF MEMBERSHIP

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☐ EIT is specified in the Act

# RIGHT TO USE APPROPRIATE TITLE

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☐ May use a job title containing the word engineer, subject to:

Supervision of work by P.Eng.

Being an EIT, and

Identifying yourself as an EIT

# NETWORKING OPPORTUNITIES

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## Branch

Share experiences

Learn new things

Others will learn from you

Contribute to profession and  
community

# MAJOR ACTIVITIES

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- ☐ Apply for EIT
- ☐ Follow EIT program guide
- ☐ Record work experience
- ☐ Pass Professional Practice Exam
- ☐ Apply for registration as a P.Eng.
- ☐ Prepare for experience interview

# APPLY FOR EIT STATUS

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- ☐ Complete EIT application form
- ☐ Send birth certificate/permanent resident paper
- ☐ Ask University to send transcript to APECBC

# FOLLOW EIT GUIDE

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- ☐ Tell APEGBC about your supervisor
- ☐ APEGBC sends information to him/her
- ☐ Discuss program with him/her
- ☐ Sign up for member services

# RECORD EXPERIENCE

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- ☐ Keep a log of your work
- ☐ Ask for guidance as required
- ☐ Refer to experience criteria

# General Experience Criteria

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Should be supervised by P.Eng., and include:

☐ Familiarization

☐ Communication

☐ Management

☐ Application of

☐ Social Impact of  
your work

Theory (Analysis,  
Design, Testing,  
Implementation)

# PASS PPE

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- ☐ After 3 years of work experience
- ☐ Is offered quarterly in Vancouver, Victoria and for others – at your workplace under P.Eng. Supervision
- ☐ 2 hour multiple choice and 1 hour essay question

# APPLY FOR REGISTRATION AS P.ENG.

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- ☐ Complete application for P.Eng.
- ☐ Send overall chronology of work experience
- ☐ Send reference forms to P.Engs.
- ☐ Verify that references have been received at APEGBC

# PREPARE FOR EXPERIENCE INTERVIEW

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- ☐ Once all references have been received, you will be informed of the status of your application within 5 – 6 Weeks
- ☐ If required, you will be invited to an interview to discuss your work experience

# PROGRAM IMPROVEMENTS

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☐ Law & Ethics Seminar

☐ Online Reporting

# LAW & ETHICS SEMINAR

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☰ Canadian legal system

contract administration

insurance

risk management

occupational safety and health

# LAW & ETHICS SEMINAR

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## ☰ Ethics and Professionalism

ethical aspects of engineering

practice review

discipline and enforcement

case studies

video

group discussion activities

# ONLINE REPORTING

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- ☐ Planned for mid 2002 implementation
- ☐ Credit based system
- ☐ Keep an online journal
- ☐ Report every 6 months
- ☐ Receive feedback

# GENERAL REGISTRATION REQUIREMENTS

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- ☐ Accredited degree + 4 years experience + good character & repute
- ☐ Non accredited degree / no degree: case-by-case
- ☐ Transfer of registration from/to another province
- ☐ Satisfactory Engineering Experience Guidelines

# EMERGING DISCIPLINES

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☐ Bioengineering

☐ Environmental Engineering

☐ Nanoengineering

☐ Software Engineering

# Outline - Software Engineering

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- ☐ Context: Software Engineering
- ☐ Current status for SW and Computer P.Eng.
- ☐ APEGBC Criteria for SW Eng. Experience
- ☐ Why Should I Get Registered
- ☐ Other Items Worthy of Note

# Context: Software Engineering

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We build software products that are important to the well-being and to the safety of the public, using science and technology, and sound engineering principles.

# Context: Software Engineering

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## ☰ Theory and Practice

- Academic disciplines: computer org, algorithms, logic, math, digital electronics, management, ...

## ☰ Practice

- body of knowledge, standards, de facto standards, best industry practices, tools and technologies

## ☰ NOT “Computer Science”

# Context: Software Engineering

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☰ IEEE: “The application of a

- *systematic*
- *disciplined and*
- *quantifiable*

approach to the development, operation, and maintenance of software - that is, the application of engineering to software.”

# Classification of Software

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- ☐ MIS / IT Applications
- ☐ Outsourced MIS Applications
- ☐ Commercial software products
- ☐ Systems software
- ☐ Military software projects

“Software Assessments”, Capers Jones, 2000

# How to Protect the Public?

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- ☐ Certify software products themselves
- ☐ Certify individual software practitioners
- ☐ Certify software engineering processes

All have their benefits and drawbacks...

Will these lead to **high quality** software?

# Current status for S/W, Computer P.Eng. In APEGBC

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- ☐ Computer Engineering - 118 registered
- ☐ Software Engineering – 27 registered
- ☐ CSED interest group created
- ☐ Software - specific experience criteria for registration
- ☐ BC Engineering Act mods to include SWE
- ☐ Work in progress to re-evaluate syllabus, courses and exam equivalencies

# Elements of A Profession

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- ☐ A Body of Knowledge as its foundation (theory and practice)
- ☐ Ethics / Code of Conduct
- ☐ Education, and experience requirements
- ☐ Ongoing education, practice review
- ☐ Ongoing development of best practices
- ☐ Accountability to customers, employer, the public, and the profession

# Requirements for Registration - Computer, Software Engineering

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- ☐ General requirements same as for other disciplines (See earlier slide)
- ☐ Accredited degree
- ☐ 4 years valid and appropriate experience applying engineering principles
- ☐ PLUS discipline specific experience criteria

# APEG Criteria: SW Eng.

## Experience by Sub-disciplines

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### ☐ Software requirements management

- Elicitation, capture, evaluation, tracing

### ☐ Software design and construction

- Design methods, modeling, notations...
- Implementation methods and tools

### ☐ Software testing

### ☐ Software quality management

- Defect metrics, assessment of quality,  
Conformance to requirements, Certification

# Criteria: Experience by Sub-disciplines (cont.)

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## ☰ Software project management

- Different lifecycle models,
- Estimation and metrics
- Risk management

## ☰ Software process management

- Process metrics
- Software process improvement
- Process engineering

# Criteria: Experience in optional sub-disciplines

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## ☐ Safety-critical systems

- Transportation, nuclear industry, biomedical, etc....

## ☐ Legal issues

- Licensing, IP, etc...

## ☐ Security: privacy, authentication, etc.

## ☐ Telecommunications

## ☐ Human factors, ergonomics

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# Evaluating SW Engineering experience

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☐ 4 years is needed but maybe not sufficient!

☐ Standards (Technical and de-facto)

☐ Current technologies

☐ Current best practices

- A recognized “good way” of doing things

Above all, demonstrate application of principles, and understanding of many engineering trade-offs

# Exclusions: Not Software Engineering

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- ☐ Network design or management
- ☐ System administration
- ☐ Just *use* of software
- ☐ Multimedia design
- ☐ Pure technology investigation
- ☐ Work lacking software elements
- ☐ Work lacking engineering duties or responsibility

# Why Should I Get Registered?

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- ☐ Joining a network of skilled professionals with same interests - colleagues!
- ☐ Statement to your potential employers
- ☐ Incentives, focus on continued professional development
- ☐ Individual benefits from CSED
- ☐ Personal commitment to professionalism, and SW Engineering as a profession

# Benefits in creating the profession

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- ☐ Professional respect from public at large
- ☐ Better understanding of Software Engineering by senior management
- ☐ Dialogue with engineering managers
- ☐ Closer monitoring and mentoring for engineers themselves
- ☐ Improved structure for career paths

# Decisions for S/W, Computer Engineers

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- ☐ How important is professionalism for me?
- ☐ How important is it for my company?
- ☐ How important is it for my career?
- ☐ Is Registration legally required? Will it be?
- ☐ Do I believe in a SWE profession?
- ☐ What do I want that SWE profession to be?

# Items Worthy of Note

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- ☐ [Www.apeg.bc.ca/csed/csed.htm](http://www.apeg.bc.ca/csed/csed.htm)
- ☐ Registration packages available from APEG (request via phone or email)
- ☐ APEG BC's efforts are leading edge - evolving!
- ☐ Canadian collaboration and consensus
- ☐ [www.swebok.org](http://www.swebok.org)
- ☐ Steve McConnell's "After The Gold Rush"

# Questions ?

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