



# ENGR 110 / 112 – Design I

## Engineering Profession

Professionalism, Sustainable  
Design, and EDI

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# Engineering Profession

In 1919, after the second collapse of the Quebec Bridge (1907 & 1916), provinces throughout Canada began regulating Engineers through legislation.

The **Engineering Profession Act** of 1920 created the Association of Professional Engineers of the Province of British Columbia (APEGBC) to regulate and license professional engineers. The Association is now called Engineers and Geoscientists British Columbia (EGBC)





# Engineering Profession

The Association has as the main purpose to uphold and protect the public interest in terms of health, safety, and the environment

The regulatory functions are

- *Register qualified Individuals*
- *Enforce standards of admission and practice*
- *Investigate and discipline*
- *Enforce against unlicensed or unlawful practice*

The use of the word ‘Engineer’ as a title is similarly legally restricted to use by registered Professional Engineers (i.e., with a P.Eng. designation).

The term and practice of Engineering as a regulated activity and profession has important legal implications. There is a new Professional Governance Act: [Professional Governance Act \(egbc.ca\)](http://egbc.ca)



# Engineering Profession

In order to practice as a professional engineer or geoscientist, you must be registered with EGBC.

You have right to title of **P.Eng.** or P.Geo., and you receive a stamp & seal.

Students can register with EGBC (\$25.00 annual fee). The **Student Program** has been designed to help ease the transition from student life to professional life. Through this program, there are

- Networking opportunities
- Scholarships for undergraduate students
- Student portal (access to resume samples, interview advise, etc.)
- Competency experience

[Student Program \(egbc.ca\)](http://egbc.ca)



# Engineering Profession

After graduation, you need to complete 4 years of experience before you can apply for professional registration.

During this period, you can apply to become an **Engineer-in-Training (EIT)**. As an EIT you gain access to EGBC programs, such as Employment Centre and Continuing Education Programs (Annual Fee EIT: \$276.00)

[EIT First Time Applying in Canada \(egbc.ca\)](http://egbc.ca)

The **Continuing Education (CE)** Program is mandatory and applies to all registrants with practice rights (EIT are exempt). Registrants with a Non-practising or Retired designation will have to complete minimum requirements to maintain ethical and regulatory competency.



# Engineering Profession

A registrant must adhere to the following Code of Ethics (New 2021) :

1. **Act in the public interest.** Hold paramount the safety, health, and welfare of the public, including the protection of the environment and the promotion of health and safety in the workplace.
2. **Know your limits.** Practice only in those fields where training and ability make the registrant professionally competent;
3. **Follow the law.** Have regard for the common law and any applicable enactments, federal enactments, or enactments of another province;
4. **Follow the standards of government or Engineers and Geoscientists BC.** Have regard for applicable standards, policies, plans, and practices established by the government or Engineers and Geoscientists BC;



# Engineering Profession

5. **Maintain your competence.** Maintain competence in relevant specializations, including advances in the regulated practice and relevant science;
6. **State qualifications accurately.** Provide accurate information in respect of qualifications and experience;
7. **Distinguish facts from assumptions and opinions.** Provide professional opinions that distinguish between facts, assumptions, and opinions;
8. **No conflicts of interest.** Avoid situations and circumstances in which there is a real or perceived conflict of interest and ensure conflicts of interest, including perceived conflicts of interest, are properly disclosed and necessary measures are taken so a conflict of interest does not bias decisions or recommendations;



# Engineering Profession

- 9. You have a duty to report.** Report to Engineers and Geoscientists BC and, if applicable, any other appropriate authority, if the registrant, on reasonable and probable grounds, believes that:
- a) the continued practice of a regulated practice by another registrant or other person, including firms and employers, might pose a risk of significant harm to the environment or to the health or safety of the public or a group of people; or
  - b) a registrant or another individual has made decisions or engaged in practices which may be illegal or unethical;
- 10. Stand your ground.** present clearly to employers and clients the possible consequences if professional decisions or judgments are overruled or disregarded;





# Engineering Profession

- 11. Each professional is responsible.** Clearly identify each registrant who has contributed professional work, including recommendations, reports, statements, or opinions;
- 12. Work diligently and follow the standards of documentation.** undertake work and documentation with due diligence and in accordance with any guidance developed to standardize professional documentation for the applicable profession; and
- 13. Do unto others.** Conduct themselves with fairness, courtesy, and good faith towards clients, colleagues, and others, give credit where it is due and accept, as well as give, honest and fair professional comment.



# United Nations Sustainable Development



## SUSTAINABLE DEVELOPMENT GOALS





# Sustainability

As Engineers, we have a responsibility to the public to provide sustainable solutions that adhere to the **basic pillars of sustainability** (environmental, social and economic). This requires that we consider the long-term consequences that flow directly and indirectly from our actions. (*EGBC, 2021*)

Sustainable engineering is the process of designing or operating systems such that they use energy and resources sustainably, in other words, at a rate that does not compromise the natural environment, or the ability of future generations to meet their own needs. (*Wikipedia, 2021*)



# Sustainability

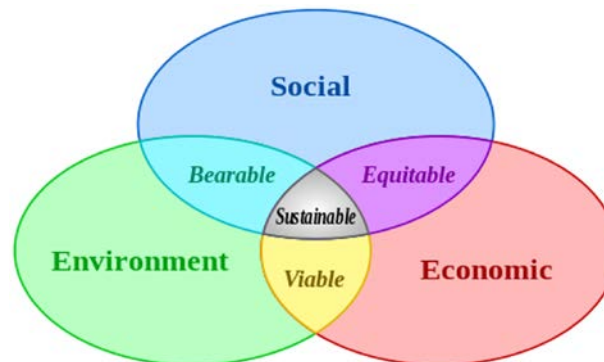
## EGBC Guidelines for Sustainability:

Sustainability has three pillars that must be integrated in a balanced way:

**a) environmental:** to stay within the biophysical carrying capacity of our region/country/planet (e.g. minimize resource use, minimize waste, protect nature from degradation);

**b) social:** to maintain and protect quality of life and the values that we aspire to live by; and

**c) economic:** to ensure that an adequate material standard of living is provided for all members of society.





# Sustainability

EGBC professionals have a responsibility to

1. **Maintain the current knowledge of sustainability:** The knowledge, concepts and opportunities for sustainable solutions are rapidly evolving and EGBC professionals should strive to keep skills up to date, and advance the understanding of sustainability in their field of practice.
2. **Integrate Sustainability into professional practice.** EGBC professionals must consider the combined environmental, social and economic aspects that take into account the direct and indirect impacts over the full project life-cycle.
3. **Collaborate with peers and experts from concept to completion.** At key stages of the project life-cycle, collaborate with peers and experts across disciplines to identify appropriate alternatives and new opportunities for sustainable results



# Sustainability

4. **Develop and prepare clear justifications to implement sustainable solutions.** Discuss opportunities and document decisions made related to the integration of environmental, social and economic metrics. These discussions should occur early enough to enable the client or employer to make informed decisions about how to implement an appropriate level of sustainability considerations in the task or projects, products, processes, or systems.
5. **Assess sustainability performance and identify opportunities for improvement.** Identify opportunities to improve knowledge and professional practice related to sustainability, where best practice is to assess actual performance of implemented solutions against the original design goals and metrics.



# Sustainable Design

When designing a product, system or infrastructure, we must consider the impact that this product will have during its life cycle. We must think

How the design will serve our needs today, but also make sure this design will not have an *impact in future generations*.

As a target, we can think of the **seven generations sustainability principle** from the indigenous people which urges the current generation of humans to live and work for the benefit of the seventh generation (about 140 years) into the future



# Sustainable Design

As a designer, your design decisions will have an impact on the outcome of the life cycle of a product.

- **Problem Definition:** How can you include sustainability as a criteria and its weight?
- **Conceptual Design:** Your design decisions during this stage will have the most critical impact of the product's life cycle. The selection of the means within a function can have an impact.
- **Preliminary Design:** Your selection is based on decisions that you make, for example the metrics may indicate the scale in which a design is sustainable.
- **Detailed Design:** How can you refine/optimize your product to abide the principles of sustainability?





# Sustainable Design

As a designer, you must consider the impact that it will have at every stage, from


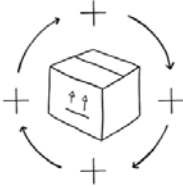

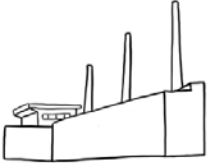

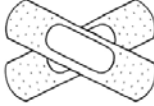







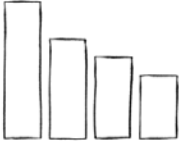

- Extraction of raw materials
- Manufacturing
- Distribution
- Consumption
- Reusing and remanufacturing
- Recycling
- Waste



Retrieved from Repak, 2021 [Link](#)



# Sustainability

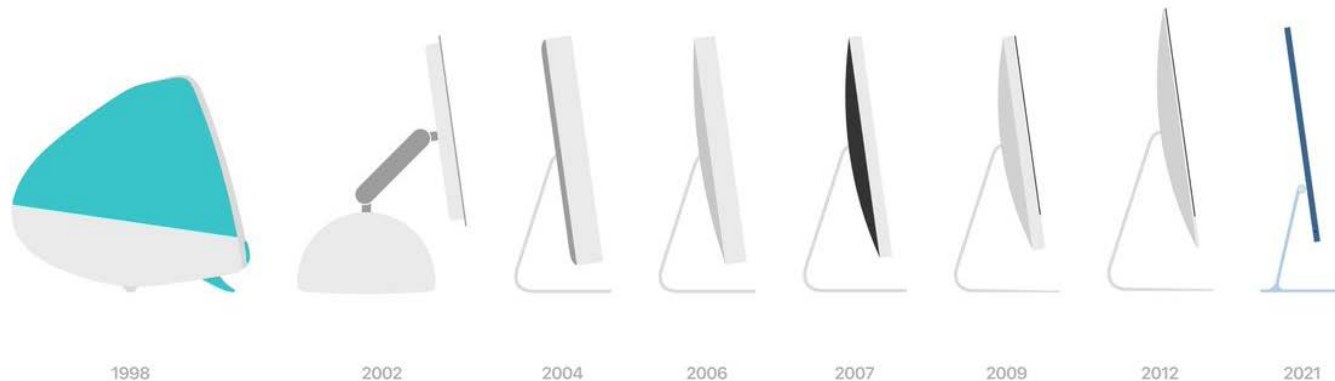
SUSTAINABLE DESIGN STRATEGIES	 PRODUCT SERVICE SYSTEMS MODELS	 PRODUCER STEWARDSHIP	 DEMATERIALIZATION
 REMANUFACTURE	 RECYCLABILITY	 REPAIRABILITY	 REUSABILITY
 DISASSEMBLY	 SYSTEMS CHANGE	 LONGEVITY	 EFFICIENCY
 MODULARITY	 INFLUENCE	 EQUITY	 DISRUPT DESIGN

Retrieved Sustainable Design Strategies by Leyla  
Acaroglu, Disruptive Design, 2021. [Link](#)



# Sustainability

**Apple** have been working to make their products more sustainable, in terms of material use and power efficiency.



**IKEA**, not only revolutionized the market with their self-assemble strategy and no-language dependent instructions, but also has succeeded by embracing sustainable packaging. Renewable and recyclable materials, flat packages (easier loads and transportation which reduces emissions), optimized space (motto – *we hate air*).





# Equality, Diversity and Inclusion

## Equality, Diversity and Inclusion in Design

In addition to Sustainability, as a designer we must take into consideration equality, diversity and inclusion while designing.

This can be applied to consumer products but also to large scale systems. On many occasions, we design a product for an intended consumer, but this could have an **unintended impact** to other members of the community.

We must also be aware of **unintended biases** that exist in some designs. For example, some facial recognition algorithms may have inherent biases against racial groups because of the data in which the algorithms were trained with.

Design of Wheelchair: [Link](#)



# Recommended Videos

**Solar Cooking | National Geographic: [Link](#)**

**Design of Shelter: [Link](#)**