National Professional Practice Examination (NPPE) Blueprint – 2017

Blueprint Outline

I. Professionalism (7 to 10 questions)

I.1 Definition and Interpretation of Professionalism and Professional Status

The defining elements of a professional (the context is that of the self-regulating professions: engineers, geoscientists, doctors, lawyers, etc. versus other occupations):

- Have advanced technical knowledge and skills that the public takes on trust
- Give service to the public and in the public interest
- Are bound by a distinct ethical code
- Belong to self-governing organizations that regulate the profession to maintain standards
- Right to self-regulate is earned
- Requires participation of members to fulfill self-regulating function
- Undergo long and intensive preparation
- Requires continued study and development

I.2 The Role and Responsibilities of Professionals in Society

Skilled and regulated practice

Personal accountability and responsibility for own professional practice

Accountable for the professional practice of those under their supervision

Dependence on the confidence of stakeholders: employers, clients, authorities, public

Justify and uphold trust from the stakeholders

Protection of the public

Definition of the public in different circumstances—general public, client, employer, fellow workers

Definition of protection—physical safety, physical protection, physical failures, environmental protection, economic safety

I.3 Engineering and Geoscience Professions in Canada; Definitions and Scopes of Practice

This topic is considered at a high level. What is considered is who, what, when, source of authority, reason for, etc. Detailed processes and requirements are considered in other blueprint sections.

- Provincial and territorial regulators
- Authority to license and self-regulate the professions
- Authority to discipline and enforce
- Jurisdiction and independence between regulators
- Right to title and exclusive scope of practice
- Definition of engineering—"advising, evaluating, designing … matter, materials …math, chemistry, physics…"
- Definition of geosciences—"advising, evaluating, interpreting… earth sciences… discovery development …math, chemistry, physics…"
- Professional seals
- Engineers Canada and Geoscientists Canada: regulator of regulators, non-regulatory roles
- Brief histories
- The iron and earth rings

I.4 The Value of Engineering and Geoscience Professions to Society

Economic benefits of work and projects

Technology applications

Technology research and development

Infrastructure development

Energy research, development, production, and generation

Products research and development

Manufacturing and processing

Resource research and development

Limits and sustainability

II. Ethics (17 to 21 questions)

II.1 The Role of Ethics in Society; Cultures and Customs

Ethics – the study of right and wrong (morality)

Moral principles are developed by societies and groups

Laws of a society flow from its moral principles

II.2 Ethical Theories and Principles

Recognition that there are different and contrasting ethical theories/perspectives that can result in different outcomes each considered correct within the given theory

Ethics applied to professional issues from the perspectives of the classical and modern theories

The ethical perspectives/theories that form the basis in establishing the Code of Ethics for the professions and that guide disciplinary actions

Ethical perspectives/theories – classical (exam candidates are not required to know these theories by rote but rather should recognize the principles of the different theories in application)

- Greater good/maximum benefit – utilitarianism
- Duty
- Human rights
- Virtue

II.3 Codes of Ethics of Professional Engineers and Geoscientists in Canada

Source and legal authority of the codes of ethics:

- Derived from the acts
- Status

Understanding of the core tenets:

- Protect the health, safety and welfare of the public
- Have regard for the public
- Practice only in areas of competence
- Conduct themselves with integrity, honesty, fairness and objectivity in their professional activities
- Compliance with applicable statutes, regulations and bylaws
- Uphold and enhance the honour, dignity, and reputation of their professions
- Avoid conflicts of interest
- Maintain competence of self and of subordinates
- Present the possible consequences of ignoring professional judgments
- Report illegal or unethical professional decisions or practices
- Promote the equitable treatment of all individuals

Use of the codes of ethics in regulating the professions

Recognition that minor differences exist between regulators

II.4 Common Ethical Issues and Dilemmas; Making Ethical Decisions

Issues and cases concerning ethical dilemmas looked at through the lens of the code of ethics and other approaches to seek solutions

- Conflict of interest from the perspective of ethical dilemmas, solutions, and decisions
- Conflicts between technical authority and management authority
- Duty to report/whistle blowing as an ethical dilemma
- Loyalty to the employer
- Limiting practice to areas of competence
- Plagiarism and copyright infringement
- Professional responsibility vs employment issues
- Professional competence
- Reviewing work of others
- Confidentiality
- Foreign assignments

III. Profession Practice (27 to 32 questions)

III.1 Professional Accountability for Work, Workplace Issues, Job Responsibilities, and Standards of Practice

Professional responsibility for work

- How it comes into being
- Where it rests
- Responsibility for work of junior members and subordinates
- Responsibility for work created by several members in multiple disciplines

The corporate world

- Corporate ethics and pressures on the professional
- Corporate responsibilities and loyalty vs professional responsibilities
- Confidentiality vs professional responsibilities, transparency or accountability
- Confidentiality or ownership of data and knowledge

Due diligence

Globalization

- Responsibilities of international work (when laws differ, what governs?)
- Responsibilities of using products and knowledge developed internationally

Legality

- Practise within the boundaries and intents of the law
- Meet the spirit of the law

Professional responsibilities in developing software

Relying on work prepared by others

III.2 The Role and Responsibilities of Professionals to Employers and Clients

Duty to the employer/client

Loyalty, confidentiality, competence, diligence

Conflict of interest – recognition of

- avoidance of
- expected conduct when in a conflict of interest

Personal interest vs employer's/client's interest

Duty to the employer/client vs duty to the public

Professional environment and development

- Recognition of the code of ethics by the employer as necessary to support professionals in their work and career

III.3 Relations with Other Professionals and Non-Professionals; Business Practices

Roles of technicians, technologists, scientists in multidisciplinary teams

Respect and consultation with other professions

Reviewing the work of another professional

Need to consult with experts outside of own field of practice

III.4 Statutory and Non-Statutory Standards and Codes of Practice

Professional, legal, social

Generally accepted professional practices

Finality and interpretation

Limitation of standards

The role of standards (international, national, government)

Legal authority responsible for codes (municipal, provincial, national)

Application of codes and standards

Standards and code setting bodies

III.5 Risk Management, Insurance, Quality Management and Due Diligence

Risk Management

- General principles and benefits (basic requirement of public protection)
- Legal framework (general)
- Overview of current methods of analysis
  - Risk assessment
  - Hazard identification
  - Types of hazards
  - Types of risks
  - Analysis and estimation
  - Evaluating the risks
- Risk management for professional practice
- Transfer, retention and monitoring of risk
- Hazard reduction and failure analysis
- Case studies

Insurance

- Commercial general insurance (purpose)
- Professional errors and omissions insurance
  - Purpose – what is covered
  - Statute of limitations – retroactive date
  - Compulsory vs optional (where so)
  - Corporate vs individual
  - Consultant vs employee

Quality Management

- General principles (basic requirement of public protection)
- Legal Framework (general)
  - Overview of quality management standards
  - Overview of current methods of analysis (ISO, 6Sigma, CSA, LEAN, TQM)
  - Application to professional practice
  - Management of technical quality
  - Communication and records

Due Diligence

- Concept and requirements
- Concepts of foreseeability, preventability, controllability

III.6 Environmental Responsibilities and Sustainable Development

As considered from a non-politicized perspective

- Understanding environmental and sustainability issues in the field of expertise
- Use of environmental or sustainability specialists when necessary
- Application of professional and responsible judgment to environmental and sustainability considerations
- Ensuring that environmental planning and management are implemented
- Consideration of environmental costs when evaluating the economic viability of projects
- Recognition of the value of environmental efficiency and sustainability
- Responding to environmental concerns in a timely fashion
- The desire to meet or exceed regulatory environmental and sustainability practices
- Working with others to improve environmental understanding and sustainability practices
- Examples and case studies

III.7 Use of Software, Computers and Internet-based Tools; Liability for Software Errors

Validation of (analysis and design) software

- Responsibility for the outputs of software

The role of computers in professional practice

Respect of copyright law: software piracy and plagiarism

Computer system security from the perspective of licensed professionals

Internet ethics (harassment, courtesy, "netiquette")

III.8 Document Authentication and Control

Authentication of documents

Use of stamp or seal, verification stamps

Electronic authentication of documents

Review of documents

Document revision control

As-built drawings - responsible for

Record keeping and turning over records when required

Preservation of records in a usable format (8" floppies, faded paper, etc.)

Responsibility for control of personal stamp or seal

III.9 Duty to Inform; Whistleblowing

To clients or employers, regulatory agencies, the public

Communicate openly, honestly and truthfully (the WHOLE story)

Whistleblower protection

III.10 Communication

Legal, Ethical, and Practical Aspects of Communication

- and problems of internet based communications
- Issues concerning electronic documents and records
- Proper use of the professional title

The Professional Relationship

Communication Skills (meta aspects)

- Important aspects of technical writing and reports
- Important aspects of presentations
- Oral communication
- Technical writing
- Internet communication
- Languages

IV. Law for Professional Practice (23 to 28 questions)

IV.1 The Canadian Legal System

The Canadian Constitution

The Canadian court system

The creation of law

Common law – what it is and where it applies

- Case law and the role of precedent

Civil Code in Quebec - as compared to Common Law

Claims and disputes

International law

Some additional items

- Types of law: private vs public, criminal law, civil law, administrative law
- Constitutional framework
- Charter of Rights and Freedoms

IV.2 Contract Law – Elements, Principles, and Applications

Essential elements of contracts

- General principles of contact information – invitation to treat, offer, acceptance
- Consideration

Agreements to agree, letters of intent, memorandum of understanding

Amendment of contracts

Waiver and estoppel

Quantum meruit

Breach of contract

Remedies of breach of contract; damages

Termination of contract

Repudiation and anticipatory breach

Principles of interpretation of contracts

Agency and authority

Using contractual terms to manage risk

- Changed circumstances
- Conditional agreements

- Limitation of liability clause
- Exemption clause
- Liquidated damages clause
- Transfer of risk or obligation
- Indemnification clauses

Misrepresentations and important mistakes

Selected contract topics and issues

- Procurement approaches and methods
- The formal tendering and bid process
- Qualifications based selection (QBS) in hiring consultants
- Project delivery
- International and interprovincial trade agreements
- Requirements of writing for certain contracts to be enforceable (statue of frauds)

Specific types of contracts

- Common and standard clauses
- Standard form contracts
- Fixed price; time and charges, unit rate, etc.
- Professional service agreements
- Licensing agreements
- Design and build

IV.3 Tort Law – Elements, Principles, and Applications

Definition of torts

Categories and types of torts

- Negligence
- Trespass
- Nuisance (Rylands v. Fletcher)
- Defamation

Negligence

- **Steps to negligence action**
- **Professional standard of care**

Duty to warn (of impending danger)

Professional liability – negligent misstatement

- to clients
- to third parties
- disclaimers

Products liability

Managing tort risk in professional practice

- Common issues in contract and tort
- Concurrent liability in contract and tort
- Limitation periods
- Joint and several liability
- Vicarious liability
- Codes and standards

IV.4 Civil Law in Quebec

Contracts (conditions of formation of contracts, interpretation of contracts, effects of contracts)

Civil liability (conditions of liability, contractual liability, extra-contractual liability, modalities of obligations: solitary, joint, divisible and indivisible)

Performance of obligations (right to enforce performance, default, specific performance, resolution or termination (reciliation) of contracts, extinction of obligations)

Contract of enterprise or for services (nature and scope of the contract, rights and obligations of the parties)

IV.5 Business, Employment, and Labour Law

Business organizations: forms, advantages and disadvantages

Labor Law

- Trade unions and collective agreements
- Layoffs and seniority

Employment Law

- Implied terms
- Restrictive covenants
- Employment standards legislation
- Termination
- Independent contractor vs. employee

Human rights in the context of employment

- The Charter of Rights and Freedoms

IV.6 Dispute Resolution

Litigation

Arbitration

Negotiation

Mediation

IV.7 Intellectual Property (Patents, Trade Secrets, Copyright, Trademarks); Intellectual Property Issues

Patents

Trade Secrets

Copyright

- as related to professional designs and documents
- in relation to Software

Trademarks

Intellectual Property Issues

- Software issues
- The creation and ownership of intellectual property
  - Assignment and licensing
  - Consultant versus employee

IV.8 Expert Witness

Role

Neutrality

Fees

IV.9 Bonds and Construction Liens

Bonds

- Roles and responsibilities of parties
- Indemnities
- Types
  - Bid
  - Performance
  - Payment

Construction Liens

- Making a claim
- Who may claim
- Holdbacks

IV.10 International Law

Trade agreements

Human rights

Environmental

Laws of jurisdiction

Applicability of home code of ethics, Engineering & Geoscience Act, regulations and bylaws

International treaties and organizations (tax, goods)

Registration requirements (licensure), codes, laws, regulations

Work permits

IV.11 Environmental Law

Federal and provincial laws

Jurisdiction

Environmental offences

Duty to report

Site assessments and audits

The environmental assessment process

IV.12 Workers Compensation and Occupational Health & Safety

Of concern is that which is common for all engineering and geoscience regulators in Canada

Occupational health and safety law

- Federal and Provincial Law
  - Criminal code provisions
- Responsibilities
- Role of the prime contractor
- When an accident occurs
- OH&S Regulators

Worker's compensation law

- Torts
- Worker insurance for injuries
- Prevention of worker lawsuits against employers

IV.13 Human Rights and Privacy Legislation

Human rights

The Charter of Rights and Freedoms

Privacy law

IV.14 Further Areas of Law

Real property and chattels

Delay and impact claims

Aboriginal Law

Securities Law

V. Professional Law (7 to 10 questions)

V.1 The Acts, Regulations, and Bylaws of Provincial and Territorial Regulators

Self-regulation; the regulators

The acts, regulations, and other laws

Right to title

Definitions of engineering and geosciences

Scope of practice

The role of Engineers Canada and Geoscientists Canada

V.2 Admission to the Professions

Meaning of licensure

Registration

- Experience
- Academics
- Examinations

Interprovincial mobility agreements; international agreements

Licensing of Corporations

- Permit to Practice, Certification of Authorization, for consultants and firms

V.3 Illegal Practice, Enforcement Against Unlicensed Practice, and Misuse of Title

Practice related

Title related

V.4 Professional and Technical Societies

Purpose and benefits

Comparison with the regulatory regulators

VI. Regulation of Members & Discipline Processes (7 to 10 questions)

VI.1 Discipline Procedures

Unprofessional conduct

Unskilled practice

Purpose, procedure consequences

- Response to complaints (from clients, public, fellow members, etc.)
- Response to unethical or unskilled practice
- Consequences of unethical practice or unskilled practice

VI.2 Practice Review of Individuals

Purpose, procedure consequences

VI.3 Practice Review of Firms

Purpose, procedure consequences

VI.4 Continuing Professional Development

The common high level requirements across all engineering and geoscience regulators in Canada

- Purpose
- Requirements