

NEPAL ENGINEERING COUNCIL

LICENSE EXAMINATION PREPARATION COURSE FOR CIVIL ENGINEERS ON ENGINEERING PROFESSIONAL PRACTICE AND ENGINEERING REGULATORY BODY

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10.5 Engineering Professional Practice

- Environment and Society
- Professional ethics
- Regulatory environment
- Contemporary issues/problems in engineering
- Occupational health and safety
- Roles/ responsibilities of Nepal Engineers' Association (NEA)

Environment and Society

Environment :

Environment refers to the **natural world** and its **surrounding**, including the air, water, land, flora, and fauna. It encompasses all living and non-living things that exist on Earth, as well as the interactions between them.



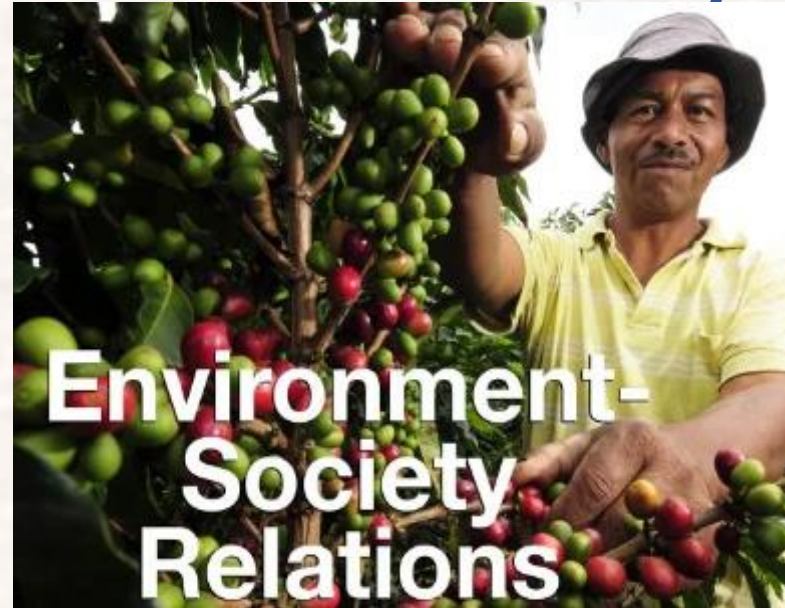
Society :

Society refers to a **group of people** living together in a community or organized group, sharing a common culture, values, and institutions.



Relation between environment and society

- Environment and society have interdependent relationship.
- Society relies on the environment for resources
- The environment is affected by human activities
- The environment also has a significant impact on society, particularly in the face of natural disasters or climate change.



Characteristics of Society

- a. Population
- b. Likeness
- c. Differences
- d. Interdependence
- e. Cooperation
- f. Conflict
- g. Dynamic
- h. Culture
- i. Abstract Concept

Types of Society

a. Pre-industrial Society:

- Main economic activity is food production through human and animal force.

Classification on the basis of Technology

a.1 Tribal Society:

- Society of hunter and gatherers (Foragers)
- No permanent villages



a.2 Pastoral Society:

- People depend on domesticated animals for food
- Spend nomadic life
- Support large populations due to ample supply of food



a.3 Horticultural Society:

- Fruits and vegetables obtained from garden made by clearing forests
- Simple tool invented to help work in garden
- Plantation by rotation is adopted
- Semi permanent or permanent settlement is formed



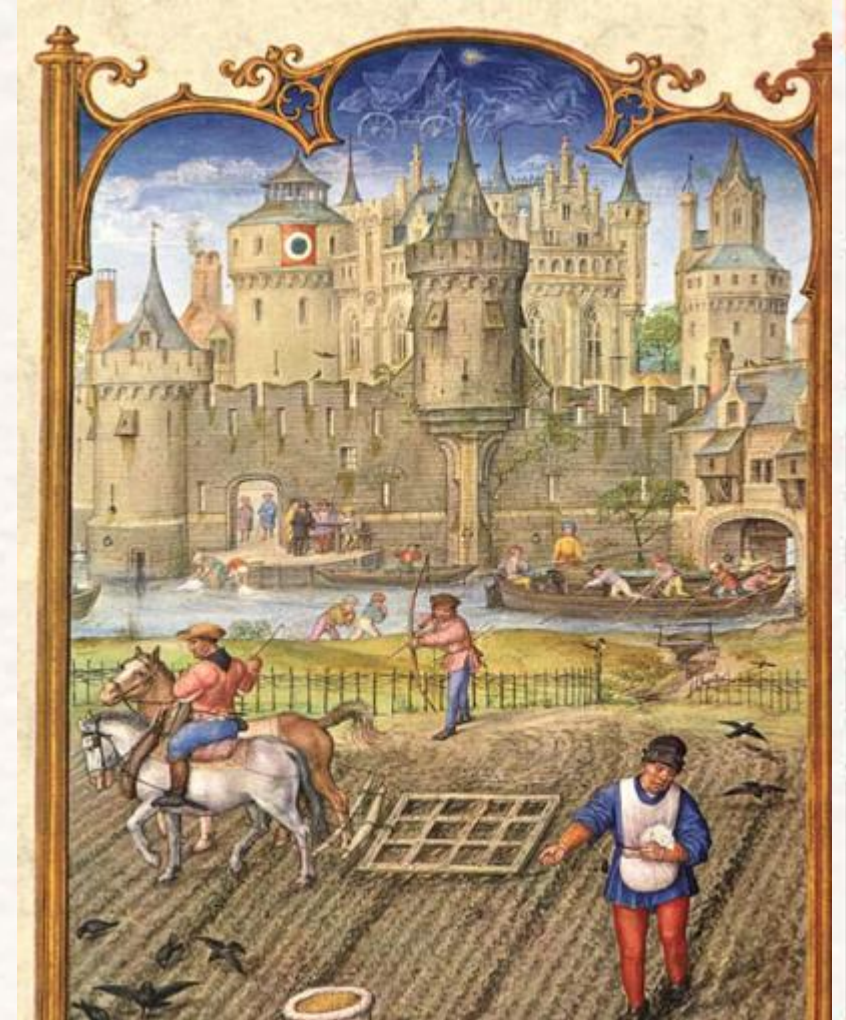
a.4 Agricultural Society/ Agrarian Society:

- Started nearly about 11000 B.C. (Y. N Harari)
- Domesticated the wheat and other staple crops gradually
- Population explosion due to sufficient food and need of manpower in agriculture
- Class of peoples like educators, crafters, scholars, army etc. were formed
- Large scale war was invented/ occurred



a.5 Feudal Society

- Owners of large portion of land were called feudals or lords
- In exchange of military protection, the lords exploited the peasants into providing food, crops, etc.
- The families of peasants cultivated their lord's land for generations.



b. Industrial society

- Economy shifted from agriculture to industries
- Marked by industrial revolution (1760 – 1830 (Ashton))
- Surplus of food and goods were produced
- Research, science and inventions boomed
- Population explosion occurred
- Increased life expectancy of people
- Increased inequality between capitalists and common man



c. Post Industrial Society

- Modern society
- Economy dominated by information, services and technology
- Computers and internet are the backbone of the world
- Rapid shift in IT sector



Environmental Challenges due to societal effect:

- Climate change
- Pollution
- Deforestation
- Loss of bio diversity

Social impacts of Environmental Degradation:

- Health impacts
- Economic Impacts
- Hindrance to sustainable development
- Impacts on Vulnerable Populations
 - Children
 - Pregnant women
 - The elderly
 - Low-income individuals,
 - People with disabilities
 - Communities of color or indigenous populations.



Morals and ethics

- Morals refer to the **personal beliefs** and **values** that guide an individual's behavior and decision-making.
- They are deeply fixed within an **individual's conscience** and are influenced by various factors such as **culture, religion, and upbringing**.
- Morals are **subjective** and vary between individuals and communities.
- Ethics refer to the **set of principles** and **standards** of conduct that are **universally accepted** within a profession, organization, or society.
- Ethics are **objective** and are based on **reasoning and critical analysis**, rather than personal beliefs or feelings.

Professional ethics

- Professional ethics refers to the **principles and standards** of behavior that guide **individuals and organizations** in their professional conduct.
- Encompasses the **moral values and obligations** that govern the relationships between professionals, clients, stakeholders, and society at large.
- Includes a **code of conduct** that outlines the ethical principles and standards expected of professionals in their respective fields.

Importance:

- The purpose of professional ethics is to ensure that **professionals act in the best interests** of their **clients or stakeholders**, maintain their professional integrity and reputation
- **Uphold the trust and confidence** of the public.

Regulatory environment

- Regulatory environment refers to the **set of laws, rules, and regulations** that govern the behavior and activities of individuals, organizations, and industries, and **ensure compliance with standards for safety, fairness, and accountability.**
- Examples of regulatory environment/ components of regulatory environment:
 - Nepal Engineering Council
 - Nepal Telecommunication Authority
 - Building Codes
 - Environmental Impact Assessment (EIA)
 - Civil Aviation Authority of Nepal (CAAN)



Contemporary Issues/Problems in Engineering

Some of the issues in engineering sector, the modern world is facing are:

Climate Change:

- Climate change is the **most frightening** issue that has put the entire planet into the **threat of destruction**
- Engineers are working in developing **renewable energy sources**, **sustainable building materials**, and **green infrastructure** to cope with climate change



Cybersecurity:

- With the increasing reliance on technology, cybersecurity has become a critical issue.
- Engineers are working to ensure the security of information and protect against cyber attacks.



Contemporary Issues/Problems in Engineering

Aging Infrastructure:

- Many countries are facing challenges with aging infrastructure, including bridges, roads, and water systems.
- Engineers are working on developing innovative solutions to repair and replace these infrastructures.



Water Scarcity:

- Water scarcity is a significant issue in many regions of the world.
- Engineers are developing new technologies **for water treatment** and **desalination** to help alleviate this problem.
- Also various environmental revive programs are being run to ensure water security.



Contemporary Issues/Problems in Engineering

Energy Efficiency:

- With energy costs on the rise, engineers are working on developing more energy-efficient systems for buildings, transportation, and industry.



Sustainable Materials:

- The production and use of materials have a significant impact on the environment.
- Engineers are developing sustainable materials and finding ways to reduce waste and pollution



Contemporary Issues/Problems in Engineering

Urbanization:

- Rapid urbanization is putting a strain on infrastructure, transportation, and resources.
- Engineers are working on developing sustainable urban infrastructure and transportation systems.



Artificial Intelligence:

- The rapid development of artificial intelligence (AI) is creating new opportunities and challenges for engineers.
- They must find ways to integrate AI into existing systems while ensuring safety and security.



Contemporary Issues/Problems in Engineering

Biotechnology:

- Advances in biotechnology are changing the way we approach health, agriculture, and the environment.
- Engineers are working on developing new technologies and materials to support these innovations.



Disaster Response:

- Natural disasters such as earthquakes, hurricanes, and wildfires are becoming more frequent and severe.
- Engineers are working on developing technologies and systems to help mitigate and respond to these disasters.



Occupational Health and Safety

Occupational health and safety is the **practice** of ensuring the **physical** and **mental well-being** of employees in the **workplace**.

Some provisions on occupational health and safety in context of Nepal

- The Government of Nepal has established the **Department of Labor and Occupational Safety** to oversee and enforce occupational health and safety regulations in the country.
- The **Labor Act, 2074** provides the legal framework for ensuring the safety and health of workers in Nepal.

Status of Occupational Health and Safety in Nepal

- Workers in Nepal are often exposed to **hazardous chemicals, dust, and other harmful substances** in the workplace.
- Occupational health and safety training is **not widely available** in Nepal, particularly in rural areas.
- **Workplace accidents** and **illnesses** are common in Nepal, particularly in the construction and manufacturing sectors.
- Many Nepali workers are not provided with appropriate **personal protective equipment (PPE)** or are **not properly trained** on how to use it.



Labor Act and provisions on health and safety

- Current Labor Act : **Labor Act-2074** (Effective from Bhadra 19, 2074)
- Previous Act : **Labor Act-2048**

Some provisions of Labor Act regarding health and safety :

- Employers are required to provide a **safe and healthy working environment** for employees.
- Employers must **identify workplace hazards** and take measures to prevent or minimize risks to employees.
- Make proper arrangement for the **safe entry** and **exit** from the workplace

- Employers must provide **training** and **information** to employees on occupational health and safety.
- Employers must conduct **periodic health and safety inspections** and maintain records of these inspections. (**At least once in a year**)
- **Separate toilet** for male and female.
- Provision of **No Smoking zone**.
- Adequate drinking and cleaning water, fire extinguisher
- Employers must provide **personal protective equipment (PPE)** to employees and ensure that it is properly used.
- Employers must provide **medical care** and **compensation** for work-related injuries and illnesses.
- The **Department of Labor and Occupational Safety** is responsible for enforcing occupational health and safety regulations and can **inspect workplaces, issue fines**, and **take legal action** against employers who violate the law.

Some important points of Labor Act

- Working hours should be **8 hours** a day and **48 hours** a week
- A worker is not allowed to work continuously for more than **5 hours**
- **30 minutes** of break is provided
- Duration of overtime = **24 hours** a week (**4 hours a day**)
- Remuneration for overtime = **1.5 times** the remuneration for regular pay
- Remuneration should be increased **once a year**
- Amount equivalent to the **monthly remuneration** is provided **once a year as the festival expenses**

Nepal Engineers' Association (NEA)

- Nepal Engineers Association (NEA) is a professional organization of engineers in Nepal, established in **1962 (2019)** registered under the Social Service Act .
- NEA aims to **promote the professional development** of engineers in Nepal, as well as to promote engineering education and research in the country.
- NEA has about 36,359 members from various fields of engineering, including civil engineering, mechanical engineering, electrical engineering, electronics engineering, etc.
- NEA is governed by an elected executive council of **25 members**, led by the President of the association for a tenure of **two years**.



Objectives of NEA

- To promote development of the engineering science and technology in Nepal.
- To promote fellowship goodwill and cooperation assistance among the Nepalese engineers and safeguard their rights and interests.
- By utilizing, to the highest extent possible, the participation of the national engineering manpower of the country in the national development activities of Nepal, make effort towards ending foreign dependency in this regard.
- To continuously enhance the highest professional ideals among the members and widen it.
- To develop relations, fellowship and goodwill with international engineering associations and institutions.

Roles/ Responsibilities of NEA

- Promote the professional development of engineers in Nepal.
- Advocate for the interests of engineers
- Promote engineering education and research
- Provide a platform for networking and knowledge-sharing
- Foster international collaboration



10. 6 Engineering Regulatory Body

- Nepal Engineering Council
- Acts
- Regulations

Nepal Engineering Council

- Nepal Engineering Council (NEC) is a **regulatory body** established by the Government of Nepal to **regulate and oversee the engineering profession** in the country.
- Established under **Nepal Engineering Council Act, 2055**
- It is responsible for maintaining and promoting the standards of engineering education, practice, and professional conduct in Nepal
- It provides **accreditation** and **recognition** to engineering programs and institutions in Nepal
- It **registers** and **licenses** engineering professionals who meet the council's standards and requirements.



Objectives

- To **prepare policies, plans and programs** for the smooth functioning of the engineering profession and to execute them
- To **set norms and standards** for **engineering education** in Nepal
- To **grant permission and approval** to carry out engineering education to those engineering colleges and institutions that meet the required norms and standards and to **honor their degrees and certificates**
- To **monitor and inspect** the quality of engineering education provided by the engineering colleges and institutions
- To **fix the qualification** necessary in order to practice engineering profession and to register their name in the Council
- To **remove their name** from the registration of the engineering council if found to violate the code of ethics.

NEC Act 2055

- Date of publication : 2055-11-27
- Chapters: 7
- Clauses: 38
- Amendment : 2079-05-05

Some provisions of NEC Act 2055

- Members = 21
1. President=1 (Bachelor's degree + 15 years experience, Nominated by GoN)
 2. Vice President=1(Bachelor's degree + 10 years experience, Nominated by GoN)
 3. Members = 7 (Bachelor's degree + 7 years experience, one from each province, at least three women, Nominated by GoN)
 4. Member=1(President of NEA)
 5. Members = 5 (Elected from NEA)
 6. Member=1 (Campus chief of any Engineering Campus, Nominated by GoN) Member=1 (Representative from the universities teaching engineering in Nepal, Nominated by GoN)
 7. Member=1 (Representative from Institute of Engineering, T.U , Nominated by GoN)
 8. Member=1 (Representative from the universities teaching engineering in Nepal, Nominated by GoN)
 9. Members=2 (Bachelor's degree + 7 years experience, at least one woman, Nominated by Council)
 10. Member Secretary=1(Registrar)

Some provisions of NEC Act 2055

- Tenure of members = 4 years
- Disqualification for being a member
 - Non Nepalese citizen
 - Person whose name has been removed from book
 - Person whose property has been divided proportionately among the creditors for being bankrupt
 - Person who has been punished by law
 - Mentally disordered person
 - Person who has received permanent resident (PR) certificate of any foreign country
- Meetings of council should be held minimum 4 times in a year.
- Minimum 50% of the members should be present in a meeting to fulfil the quorum
- Decisions are authenticated by the Member-secretary

Some provisions of NEC Act 2055

- To register the name, an applicant should pass the exam conducted by the council
- Minimum of **2 exams** will be conducted by the council
- A **5- member exam committee (having at least one woman)** will be formed to conduct exams with the **registrar** as **member secretary** and the **NEC member as coordinator**.
- **Name of the engineer will be removed from the book in following case:**
 - If he/she has qualities which make him/her ineligible to become a member of council(mentioned earlier)
 - If a motion submitted to a meeting of council to remove the name from the book on charge of violating professional code of conduct is passed by **two third majority**
 - If the name of a person who does not possess the required qualification has happened to be registered by fraud or error.
- The council shall **recognize the certificates of academic qualification** in an engineering subject.
- Any institution should take permission from the council before they start teaching any engineering subject

Some provisions of NEC Act 2055

- If any person practices engineering profession without getting name registered in council, he/she may be liable to a punishment with fine amount upto **Rs. 3000** or **imprisonment of 3 months** or **both**.
- The council should make contact with the GoN through **Ministry of Physical Infrastructure and Transportation**.
- The council has right to make rules and regulations in accordance with **clause no. 37**.
- No of engineering disciplines recognized by NEC = **54** (As of Nov. 2021)
- Total no. recognized universities = **810** (As of Nov. 2021)
- No. of countries whose universities have been recognized = **45** (As of Nov. 2021)
- No. of universities in Nepal running engineering programs = **6** (As of Nov. 2021) (Manmohan Technical University added as 7th)

NEC Regulations 2057

- Date of publication : 2057-03-08
- Chapters: 7
- Clauses: 38
- Established under NEC Act- 2055, Clause 37

Some provisions of NEC Regulations 2057

Registration categories of engineer

A.General Engineer:

- Minimum **BE**
- Registration charge **Rs. 3000** for students studied in **Nepalese Universities**
- Registration charge **Rs. 4000** for students studied in **foreign Universities**
(* **Additional Rs. 400 for NEC batch and Identity card**)

Some provisions of NEC Regulations 2057

B. Professional Engineer:

- Minimum **Master's degree**
- Registration charge = **Rs. 10,000**
- Registered for **5 years**

C. Foreign Engineer:

- Minimum **BE degree** and **10 years** of experience
- Registration fee = **Rs. 15000**
- Registered for **2 years** (Renewed for 1 year at once for **any no. of times** on request of **employer**)

Some provisions of NEC Regulations 2057

- 3 registration books should be maintained for each category of engineers.
- Book of **general and professional** engineers should be maintained in **Nepali language** and book of **foreign engineers** should be maintained in **English language**.
- **Every year**, a registered list should be published having the names of registered engineers.
- The registered list should be updated **every four year**.
- The **name of foreign engineers** will **not be published** in registered list.

Some provisions of NEC Regulations 2057

- Code of conduct of engineers (There are **8 code of conducts** mentioned in NEC Regulations)
 1. Discipline and honesty
 2. Politeness and secrecy
 3. Non-discrimination
 4. Shall have to do only the concerned professional work
 5. Not to do such works, which may cause harm to engineering profession
 6. Personal responsibility
 7. State name, designation and registration no.
 8. No publicity or advertisement shall be made which may cause unnecessary effect

Some provisions of NEC Regulations 2057

- A **3-member examination** committee is formed under the co-ordination of any one member of the council to examine the violation of code of conduct or ineligibility of any engineer after a complaint has been filed for so.
- The bank account operated in the name of council will be operated by the signatures of a. **President** or **Registrar** and b. **Account Officer** of the council



MCQs

1. Society is the group of people having common

- a. Culture
- b. Values
- c. Institutions
- d. All of the above

2. The presence of more than % of members of NEC is considered as the fulfilment of minimum quorum

- a. 30
- b. 40
- c. 50
- d. 60

MCQs

3. Which type of membership is not categorized in NEC ?

- a. Senior divisional engineer
- b. Chief engineer
- c. Superintending engineer
- d. All of the above

4. Tenure of registrar of NEC is

- a. 1 year
- b. 2 years
- c. 4 years
- d. 5 years

MCQs

5. Tenure of president of NEA as a member of NEC is ...

- a. 1 year
- b. 2 years
- c. 4 years
- d. 5 years

6. The minimum educational qualification required for professional engineer is

- a. Diploma in Engineering
- b. Bachelor in Engineering
- c. Masters in Engineering
- d. PhD in Engineering

MCQs

7. Workers are not allowed to work continuously more than

- a. 4 hrs .
- b. 5 hrs .
- c. 6 hrs .
- d. 7 hrs .

8. The code of conduct should be followed to maintain high level of standard of good behavior in society. This applies to.....

- a. Lawyers
- b. Doctors
- c. Engineers
- d. All of the above

MCQs

9. Ethics is the science which deals with

- a. Rightness of professional
- b. Wrongness of professional
- c. Both
- d. None

10. The no. of members in NEA and NEC are

- a. 15 and 18
- b. 25 and 21
- c. 15 and 20
- d. 25 and 18

MCQs

11. NEA was established in B.S

- a. 2019
- b. 2020
- c. 2022
- d. 2024

12. The registered general engineers in NEC should have to renew their registration in

- a. Every year
- b. Every two years
- c. Every four years
- d. Never

MCQs

13. What is the minimum no. of female members in NEC ?

- a. 3
- b. 4
- c. 5
- d. 6

14. The registration book of foreign engineers is maintained in Language.

- a. Nepali
- b. English
- c. Both Nepali and English
- d. Language of respective foreign engineer

MCQs

15. Which one of the following is the example of a regulatory body ?

- a. Nepal Engineering council
- b. Nepal Telecommunication Authority
- c. Civil Aviation Authority of Nepal (CAAN)
- d. All of the above

16. Which is the current Labor Act of Nepal ?

- a. Labor Act 2048
- b. Labor Act 2066
- c. Labor Act 2074
- d. Labor Act 2078

MCQs

17. Which organization is responsible to oversee and enforce occupational health and safety regulations in the country?

- a. Department of Labor and Occupational Safety
- b. Department of Health and Population
- c. Department of Home Affairs
- d. Department of Civil Aviation and Tourism

18. What is the minimum qualification of president of the NEC ?

NEC 2079 [Vice-Chairman]

- a. Masters in Engineering and 15 years Experience
- b. Bachelors in Engineering and 15 years Experience
- c. Masters in Engineering and 10 years Experience
- d. Bachelors in Engineering and 10 years Experience

MCQs

19. According to Nepal Engineering Council Act, 2055 (Revised, 2079), all engineering academic institutions shall be in the Council.

- a) affiliated
- b) united
- c) recognized
- d) associated

20. In which of the following society, people used to seek their existence on growing plants for their cattle and domestic animals

- a) pastoral society
- b) tribal society
- c) horticultural society
- d) agricultural society

THANK YOU