GEEM 445 – SA

L01

14/06

GEEM 445: General Edu. Ethics and Management

Engg. Ethics & Professional Practices

1. Professionalism maintain in workplaces
2. Communication
3. Importance of professional practice

Ethics: Guidelines for moral and/or socially accepted conduct.

Moral: Principal of right/wrong.

Law: Create rules for guidance.

Basic ques be appear from today's class

Professional practice:

Professional: A person who has a job that needs skills, education and training.

Profession: One's main paid occupation.

Professionalism: A set of characteristics that display your ability to be hardworking, dependable, & respectful in formal setting.

How do you maintain your professionalism in work env.?

Ethical, attire, etiquette, punctual, organized

Communication: transmission of information & meanings.

Mode of communication: up: supervisor; lateral: coworker; down: ...; diag: ...

Importance of professional practice

Project: ...

- - -

categories of project proposal: Internal, external, solicited, unsolicited

LO2 18/06

Meeting : A formal gathering of a group of people for structured discussion guided by a designated chairman

Necessity : coordinate,
collaborate,
acquire support,
sell ideas,
solve problems,
consensus based decisions.

Key points for engagement

1. Reasons
2. Discussion points
3. Attendees
4. Result / outcome

Planning considerations

1. Objective (s)
2. meeting necessity
3. Location
4. Facilities
5. Invitees
6. Contact details
7. Agenda
8. Evaluation

Task to be performed

1. Location
2. Accommodation — overnight
3. Travel arrangement
4. Catering
5. Invitation & agenda
6. Audio-visual arrangement
7. Speakers
8. Recreation facilities
9. Printing
10. Gifts & awards

Meeting room arrangement

Main steps

1. Notice
2. Preparation agenda (example)
3. Record of meeting (minutes of meeting)

LO 3 21/06

Professional communication (comm)

1. Defⁿ
2. Importance
3. Types

Defⁿ: Communication related to profession

Importance: Work together
Can perform basic functions
Direction & coordinate

Types: Internal: Mode of internal communication → memos
External: Brochures, planned publication, Ad → PR
Personal

Principles of eff. comm.:
1. Completeness — adequate
2. Correctness
3. Conciseness
4. Consideration — visualize
5. Courtesy
6. Clarity
7. Concreteness

Barriers of prof. comm.

- meaning
- Perception
- culture

Human factors (no memo; may ask to explain individual term)

a. Technical words / Jargon
b. Unfamilian term Granulous
c Taboo words
d. Lack of attention
e Emotion
f. Physical problems
g. Accent
h. False assumption

Types of barrier

1. Physical
2. Psychological
3. Non-verbal distraction
4. Language
5. Thought speed
6. Faking attention
7. Grandstaning

Semantic barriers:

1. Bad expression
2. Word of different meaning (e.g., cranes) ← bird or lift)
3. Denotation & connotation — KFC — Finger Licking Goods

L04

25/06

Project Proposal

1. what is it
2. Importance
3. Types
4. Reasons for rejection
5. Steps to write

Strategies to overcome barriers to communication

1. Clarity
2. Communicate as per need
3. Convey as values
4. Consistency of msg
5. Beware of language & tone
6. Feedback
7. Follow up
8. Be a good listener & reader

1. what is it

a. To get approval
b. Also for fundings

Document - describe the proposed project
- purpose
- scope

Difference between proj. proposal & contract

2. Importance

a. vendor comparison
b. Project understanding
c. Credibility to be established
d. Timeliness & budget
e. Expectation to be set
f. Helps in planning stage

3. Types

1. Formally solicited — through RFP
2. Informally " — No RFP
3. Unsolicited
4. Continuation
5. Renewal
6. Supplementary

4. Rejection of project proposal

1. Poorly defined
2. Not aligned with organizational goals
3. Benefits not clearly & credibility not defined
4. Ineffective presentation

5. Steps to write project proposal

Step-1: Define problem
2: Present solution
3: Define delivenables & success criteria
4: State plan - SMART
5: outline schedule & budget
6: Summanies
7: Edit & proofred

Intenesting
Helpful
Realistic
clean
& pursuasive

CT-1 : 2026-07-02

Lec 3, 4

communication

LO5 28/06

1. Research proposal

Defⁿ: Document that explains

a. what you plan to research ? (Topic)

b. Why it is worth researching ? (Justification)

c. How you will do it ? (Practicality)

Explain: Points to be covered

Topic : Clearly articulate

Specific & unambiguous

Exact research topic —— | attainable

What content

Justification: original / unique

Gap in current literature

Rehash - existing research

How : Practicability

Structure of proposal:

1. Topic
2. Background / Introduction
3. Objective (s)
4. Scope & methodology

(Initial) Literature review References

2. Technical proposal

Defⁿ: Document that contains

How to create: Intro
Problem
Solution
Schedule & Cost
Summary

Types: 1. Technical Sales Proposal
2. " Research Proposal
3. " Design Proposal
4. " Implementation Proposal

How to write: 1. Define need of product
2. Benefits
3. Process to make product
4. Vision
5. Your participation

Rough / CT-1 02/07

Lec 03

Professional communication: Communication specifically for professional activities

Importance: 1. work together
2. management to perform basic tasks
3 managers to direct & coordinate

Types: Internal → among employees
upward / downward / horizontal ← same rank
methods: memos, reports, records, email, face to face, ...

External → to people / group outside corporation
methods: brochures, newspaper, radio, ad, call-backs public speeches, replies
Importance: customer satifaction ↑ sucess ↑ clarity, understanding

Personal → ...

Principles of eff. communication:

1. Completeness
2. Conciseness
3. Clarity
4. Concreteness
5. Courtesy
6. Consideration
7. Correctness

Barriers: Frequent errors and misunderstanding in prof. communication sender's meaning and receiver's understanding →

1. Conventional meaning
2. Values, opinion, attitude
3. Perception of reality

Human factors leading to communication barriers:

1. Technical words / jargon
2. Unfamilian words
3. Taboo words
4. Lack of interest / distraction
5. Physical problems
6. False assumptions
7. Accent
8. cultural differences
9. Emotion

Ethical aspects:

1. Fairness
2. Honesty
3. Integrity
4. Compassion
5. Quality
6. Dignity

Strategies to overcome barriers

1. Clarify before communicate
2. Communicate as per the need of receiver
3. Consult w/ others
4. Be aware of language, tone, and content of message
5. Convey as value to the receiver
6. Ensure feedback
7. Follow-up
8. Consistency
9. Be good listener / reader

Lec 04

Project proposal: A doc that describes,

1. Proposed project
2. Purpose & outcomes
3. steps

Project proposal vs. contract

↳ formal agreement betwn parties to execute
Legal binding holding accountable
To lock in mutual deliverables

↳ Communicate plan to greenlight
Not legally binding
To get funding and approval

Key elements

1. Background
2. Objective
3. Project scope

Importance

1. Vendor comparison
2. Project understanding
3. Establish credibility
4. Set expectations
5. Set timeline & budgets
6. Informed planning

Types

1. Formally solicited → In response to RFP (Req for Project)
2. Informally " → No RFP
3. Unsolicited → None asked for it
4. Continuation
5. Renewal
6. Supplementary

Important things to consider:

1. Audience
2. Data & research

Reasons why proposals get rejected:

1. Project not clearly defined
2. Doesn't align w/ organizational goals
3. Benefits not credibly defined
4. Ineff. presentations

How to write project proposal:

1. Define problem — start strong & use facts
2. State solution
3. Set deliverables & success criteria
4. State plan / approach
5. Outline schedule & budget
6. Tie it all together
7. Proofread

1. Financial proposal
   - Defn
   - Importance
   - Key points to write
2. Engg as profession
   - Who is engg.
   - Key issue facing
   - Chars of engg. profession
   - Attributes

Financial proposal

Defn: written report that details future economy of a project by addressing

a. Monetary needs — all financial resources [CapEX, opEX, Contingency]
b. Budget

** Importance :

OPP
1. Existing project
2. New project
3. Project managment
   - Viable
   - Res allocation
   - Risk management
   - Clear accountability

Key points to write:

1. Overview
2. Identify key players → PM / PD
   → Head of account
3. Aim to succeed
4. Timeframe
5. Tidying up
6. Create budget
7. Create summary

Engg. as profession

Defn: A specialized person
entrusted by the society
to create a sustainable world
to enhance global quality of lifes

Civil engg. serve completely
master planner
...
(may be asked to explain any individual)

Key issues

Characteristics of enggn. as profession:

- Engg. education
- Engg. challenge
- Engg. practices — Innovation, tacit knowledge

Five attributes:

2. Systematic body of knowledge:
2. Authority
3. Community sanction → fellow of IED
4. Ethical codes
5. A culture

L07 09/07

Professional Ethics

1. Defⁿ
2. Contemporary Ethical Theories
3. Engg. Ethics
4. Categories of Applied Ethics

Contemporary Ethical Theories:

M-something
Normative Ethics
Applied Ethics

Engg. Ethics
Moral, Ethics, and Law

Classification of actions

As an engg. what you think of yourself

Ethical triangle – Applied Ethics

Contemporary Ethical Theorem

1. meta ethics
2. Normative ethics
3. Applied ethics

Ref. Everlun meade

1. Ethical triangle
2. Morale spectrum

Ethical triangle — Applied ethics

Character-based ethics

1. virtue based — Virtuous man
2. Describe as good person

Principle-based ethics

1. duty-base on deontological based
2. obligation to be truely morale
3. Truely impartial

Consequence based ethics : — Susan Jacob Janice

→ Focuses on result
→ Greatest happiness principles

Moral spectrum ⟶ Philosophical and psychological framework to evaluate right on wrong.

"He would never lie"
End never justify means

Relativism or cultural relativism
Pluralism

L09

19107

Code of Ethics

1. Defⁿ
2. Reasons to support
3. Functions
4. Fundamental Canons & guidelines to use

Recap:

1 Ethical Triangle → Types of Applied Ethics

- → Character based
- → Principle duty based deontological
- → Consequence result based

2. Moral Spectrum of Ethics

- → Absolutism
- → Relativism
- → Pluralism

Defⁿ: A set of guiding principles, intended to instruct the professionals to act in a manner that is honest and beneficials to stakeholdens.

Reasons to follow:

1. Protect
2. Assure
3. Make
4. Obligate fairness & generate benefits

Functions of code of Ethics:

1. Serve as collective recognition
   " as guide on reminden
   " as education tools
2. Create an enun
3. Process of developing & modifying
4. Indicate othens

Terms of Code of Ethics:

1. Principles — Fundamental doctrine
   ↳ formalized set of beliefs
2. Canon —
3. Standards
4. Rules

ASCE Code of Ethics

1. Using knowledge & skills
2. Be impartial and honest & act w/ fidelity
3. Striving to increase
4. Supporting professionals

Fundamental canons (of ASCE): (7)

1. Hold paramount
2. Competence
3. Public statement
4. Faithful agents
5. Professional reputation
6. Uplift
7. Prof. dev.

Case study: Imminently dangerous ...

Comm [N] → Guideline to practice

L11

26/07

Professional engagement

mid

Next sunday after mid bak
Lec 9 - 11

1. what it is ?

- Formally involvement – RFP
- Allow your career to grow

2. Requirements

statement/scope of the proj.

- secure professional services
- Recognize the situation and need to create (SOW)
- Provide client an alternative approach

Through RFP :

a. Project / business docs
(ad) b. Announces project
c. solicit bids from qualified tenderers
d. outline the bidding process
e. Guidance to complete bidding document

Bid :

a. An offer to purchase an asset or to complete for a contract

Bid solicitation:





→ Process's notifying qualified contractors / bidders / tenderers

Includes: IFB → Invitation for Bids

IFT → Invitation for Tender

for GWS → Goods, Works, Services

RFP → Request for Proposal

RFQ → Pricing & delivery team

EOI → Expression of Interest



Tender

a. Document prescribed by PE (Procuring Entity) to submit

Tender for procurement process

HOPE

→ Head of Procuring Entity

1. Procurement Team
   - ↳ to hire, purchase, to complete
   - → Development of tender
   - → Evaluation criteria
   - → Prequalification criteria

2. PE → Issue & Received 1200, 26.07.26
3. Topic →
4. TEC → Eval. tender based given criteria
   - → Prepa
5. HOPE → Final approval
6. PE → NOA → Notification of Award

L12

30/07

Tender for Procurement Process

IMED

CPTU



Project team — PE — TOC — TEC — HOPE — PE

↓ Prep of docus

↓ Issue & Receive Tender

Criteria → Evaluation Criteria

→ Prequalification

TOC → Open Tenders in presence of all Tenderer

TEC → Eval & Prep ER

HOPE → Approval on retender

Issue → NOA → Award contract

Process of Consultancy Service

Sorting → Tracking → Positioning → Proposal → Review

↓ Internal rep

↓ Go or no go

↓ RFP

Method of selecting consultant

a. QBS → Quality based selection

b. FBS → Fee " " → lump sum

% of total cost

c. Interview → short listing / selection → Negotiation → start proj

↓ final list

Engg. Proposal writing

1. Ident
2. Background
3. Requirements & constraints
4. Clear comm.
5. Alternative tech solution
6. " evaluation
7. Design, plan, budget
8. Op. & maintenance
9. Scheduling

Contract:

A section of statement
- Statement of works
- Scope of "

→ Glue that bind client & engg. to sow

Budget:

Fuel in aircraft with client & engg. on board

Rough / midterm 09/08

Lec 09

Code of ethics: A set of principles, intended to guide a professional to act in a manner that is honest and beneficial to all stakeholders.

Why follow: PAMO

1. Protect from harmful action/ behavior
2. Assure a fair and suitable working environment
3. Make profession a practice
4. Obligate fairness

Core functions: SCS PSI

1. Serve as collective recognition by the members of a profession of its responsibilities
2. Create an env. where ethics is the norm
3. Serve as a guide to follow in specific scenarios
4. Process of developing and modifying is valuable
5. serve as educational tool
6. Indicate to others that the profession is strictly concerned with responsible behavior.

Terms of code of ethics:

Principles → morality; comprehensive doctorine regarding behavior

Canons → broad principles of conduct

Standards → more specific goals towards which one professional should aspire to behave

Rules → mandatory directives; violation → disciplinary action

ASCE → American Society of Civil Engineers

official code of ethics for civil engineers

sets standards on how to conduct w/ clients, stakeholders, peers.

subdivided into → fundamental principles
7 fundamental canons
guidelines to practice

Fundamental principles: KHSS

1. Knowledge → enhance human welfare & env.
2. Honesty → with client employer, public
3. skill/competence → increase
4. support → prof. & technical societies of discipline

7 Fundamental canons

1. **Public safety & sustainability**: hold paramount the safety, health & welfare of public and strive to comply with principles of sustainable dev.
2. **Competence**: Provide service only in their field of competence.
3. **Objectivity**: Issue public statement with objectivity and thought-full manner.
4. **Fidelity & conflict of interest**
5. **Fair competition**
6. Professional honor & **anti-corruption**
7. **Continuous learning**

Guidelines to practice:

1. Public safety & sustainability:
   Only sign docs prepared / reviewed by them and are considered safe for public
2. Competence:
   Undertake assignments only when qualified (by edu xp)
3. Objectivity:
   Give public statement w/o exaggeration
4. Fidelity, conflict of int.
   Do not receive other employments w/o notifying employer
5. Fair competition: Do not secure work through political means.
6. Anti-corruption: Zero-tolerance against bribery
7. Continuous learning: Keep current in their specialty fields by participating on learning.

Case study: Brian Marshall

- Issue: Brian discovers severely corroded beams with holes under an oil tanker during routine maintenance.
- Ethical obligation: Under canyon 1, public safety and welfare require immediate repair. However, after waiting via email to his supervisor, he suggested verbally to continue work w/o repair to avoid service disruption.
- Next move: He consulted w/ internal safety team (AIG, HES). They recommended to wait one year.
- Paper trail: Brian then confirms all parties via email about the decision and acceptance.

  This paper trail would help him mitigate personal legal liability.

Lec 10

IFCE (or FIDIC): International Federation of Consulting Engineers.

— Recognizes that consultancy is required for sustainable dev.

Consulting engg.: An expert in planning, design, and construction of pub/private infrastructures.

Responsibilities of consulting engg.:

- Accept the responsibility of consulting industry to the society.
- Find solutions compatible w/ sustainable dev.
- Uphold the dignity & reputation of consulting industry.

Consultancy firm: Professional service firm providing expertise through the use of consultant for a fee.

BACE → Bangladesh Association of Consulting Engineers
Founded as non-profit to encourage institutional dev of consulting firms.

Characteristics of consulting engg. :

1. **Competence** → Keep updated with skill/management knowledge
   work strictly within skillset
2. **Integrity** → Act at all time in client's legitimate interest.
3. **Impartiality** → Disclose conflict of int.
   Avoid remuneration impairing judgement.
4. **Fairness to others** → Promote Quality Based selection (QBS)
   Do not impair reputation of competitors
   Avoid taking over existing contracts improperly.
5. **Anti-corruption** → Avoid illicit payments or influence impacting judgement
   Cooperate w/ legitimate legal investigations

IEB code of ethics

Public safety & sustainability; **competence**; **continuous development**

Honesty & fidelity; **conflict of interest**; **objective statement**

Fair competition; **financial transparency**; **no political influence**;
avoid corruption → ERB

Support societies; **international practice**; **no criminal conviction**

cont. | Public/safety | Honesty | Fair compete | Law/world

- Public safety, social dev
- competence
- Cont. development

- No conflict of int.
- Fidelity
- Truthful statement

- Merit competition
- No secrete royalties
- No political bribes
- Anti-corruption & ERB

- Support societe
- Ent. practic
- Conviction

Lec 11

Professional engagement: Applying expertise through interaction w/ other professional in both formal and informal ways.

Requirements of prof. engagement:

1. To secure prof. services
2. To recog. situation & need to create statement of work (SOW)
3. To provide client w/ alt. approaches at lower cost.

Services obtained through RFP & proposal phase

RFP — Request for Proposal:

- A doc describing project detail
- solicit bids from contractors who'd complete the project
- Describe bidding process, guidance on format.

Bid: formal doc submitted by contractors / firms to provide goods / works / services and compete against other vendors to secure a project on contract.

Bid solicitation: Process of notifying prospective bidders to receive formal bids for particular project/work.

- IFB (Invitation for Bids): Formal call to contractors to submit proposal on a project for a particular work/service/goods.
- IFT (Invitation for Tender): Typically used in major constructions where owner already knows in detail what they want built. Document includes specification of performance required and qualification for bidders.
- RFQ (Request for Quotation):
  - Similar to IFT but for project and scope of smaller size.
  - Geared towards client seeking exact pricing information for a well defined scope of work
  - Includes layed out project scope, leaving the vendor w/ less options.
- EOI (Expression of Interest): Initial state of procurement; used to gauge interest and assess vendor qualification before issuing full tender.

Steps of tender for procurement process.

Procuring Team
1. Prepare tender doc & eval. criteria
2. Prepare prequalification criteria

Procuring Entity
3. Issue tender
4. Tender briefing

TOC
5. Receive tender
6. open tender in presence of tenderer/rep

TEC
7. Initial eval
8. Shortlisting & prioritizing

TEC
9. Presentation / site visit
10. Negotiation

TEC ← 11. Prepare eval. report

HOPE ← 12. HOPE approval

PE
13. Issuance of NOA
14. Contract award

Statement of work (SOW)

- Goals & objectives
- Be aware of responsibilities of vendors, what to do, how to do, what mats to use, and timeframe

Scope of work

- section within SOW
- Describes the actual work considering the delivenables
- How to accomplish them

Process of professional engagement (consultant POV)

Sorting → Tracking → Positioning → Proposal → Review

↓

Start ← Negotiation ← Selection ← Interview

Quality Based selection (QBS)

Client prepare and releases a Request for Qualification (RFQ) and selects a firm primarily on the basis of merits.

Adv. selects firm based on expertise on relevant needs.
Disadv. Pre-existing trust and relation w/ client lacks.

Steps: Announcement
Short-listing
Interview / Presentation
Ranking
Negotiation or re-announce

Fee Based selection (FBS)

Unilateral scope of work and negotiate a fee.
Fee plays a dominant early role in firm selection.
Flat fee or percent of total cost.

Key components of engg. proposals

- Problem identification
- Demonstrate background knowledge, teamwork, sow
- Understand client's needs, constraints
- Clear communication
- Alternative path
- Alternative eval
- Assist in construction, management
- " in monitoring
- Schedules

Contract — legal doc binding client, engg. w/ sow
Cites: tasks from original RFP
engg.'s task
schedule
budget

Budget — fuel for jet-aircraft w/ pilot and passenger being engg. & client

Consider → management cost (sub/contractor, unforeseen ...)
project cost (mileage)
assume hidden cost
other (delivery, ...)

W09

17/08

Classification of contract

1. Admeasurement
2. Cost reimbursement
3. Lump sum
4. Turnkey
5. Design build
6. Design, build, operate (PPP - contract)

Contract — Main
         — Sub

PE – Award contract

GWS – Goods work service

Tender

TOC

TEC → Responsive Tenderer

↳ Prep ER

↳ PE → NOA

→ sign contract

Contract: Agreement btwn two parties to perform or not to perform certain act

↳ legally enforceable

main contract:

Primary contract ←

→ Outline of SOW
→ Payment terms
→ Timelines
→ others

Sub contract: Agreements to delegate by main contractors

Admeasurement:

BOQ → Bill of quantities
SOR → Schedule rates

Excavation — 444 cum. unit price

Masonry - skilled

cost reimbursement: cost incurred are charged back

Types:
CPFF → cost plus fixed fee
CPFPF → " " % of actual cost
CPFF → " " fluctuating fees

Lump sum:

Total cost are paid after completion

Turnkey: . . . (Also partial turnkey)

Design, build: cost may be unknown

PP Types of PPE

1. Free standing bridge → bridge proj
2. Levies on public sector – new prism project

CT – today + last cls
thursday, 8 am

Rough / CT-2

19/08

Lec 13 Proj. chars & estimates

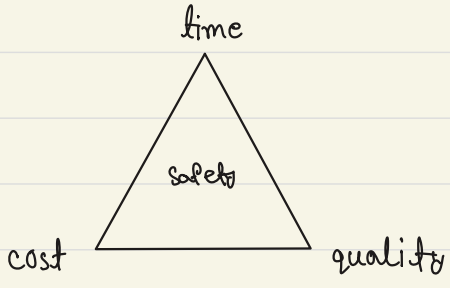
Proj.: A temporary endeavor undertaken to produce a unique product, service, or result under preset conditions.

Characteristics:

1. Objectives
2. Lifespan
3. Single entity
4. Team work
5. Unique
6. Life cycle
7. Uncertainty
8. Change

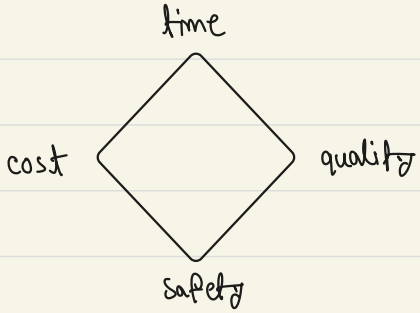
Project triangle:

- complete on time
- within budget
- meet prescribed quality



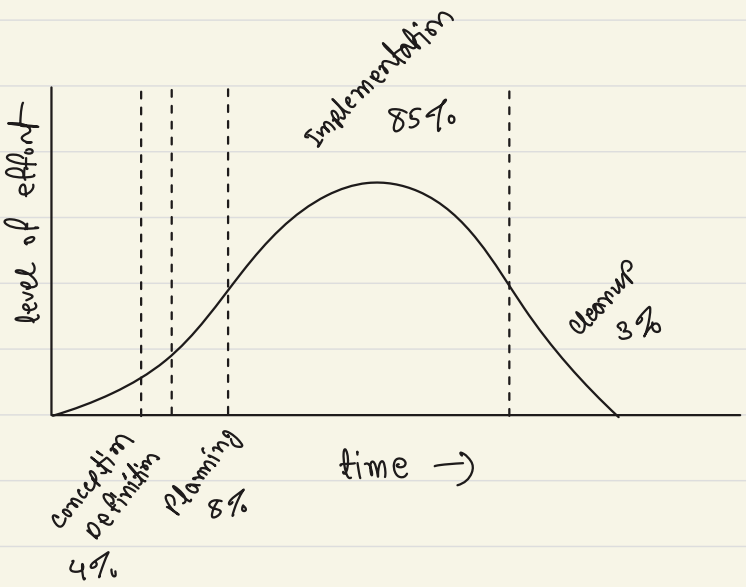
Project diamond:

- Safety



Project lifecycle:

1. Conception
2. Definition
3. Planning
4. Implementation
5. Cleanup



Types of project:

1. Time-bound → sports infrastructure
2. Cost bound → Building
3. Performance bound → Nuclear power plant
4. Safety bound → Nuclear power plant

Types of estimate:

1. Order of magnitude: Proj. identification stage
   Rough idea on investment
   ± 60%
2. Study estimate: Feasibility stage
   Initial approval
   ± 30%
   | reapproval if +20%
3. Preliminary estimate: Schedule of implementation fixed
   Budget frozen
   ± 20%

4. Definitive estimate: Post-zero day estimate
   Actual equipment specs & awarded jobs known
   ± 10%

5. Detailed estimate: much beyond zeroth day
   90% of construction drawings available
   ± 5 %

Importance of project time estimate:

1. Project implementation schedule is set on the basis of time target.
2. Time is not as dependent on the quantum of work as is cost.
   Additional time can be bought by inc. cost
3. Proj duration can be reduced by putting more resources on the job.
4. Time is significantly sensitive in many project.

Basis of time estimate:

1. work breakdown structure
   Duration of each work
   Proper sequencing
2. Matching their build up on a time scale w/ available res
3. Not just what the job takes to do
   but also how much we want it to take

Time study approach:

Normal time = avg x worker_rating

Standard time = normal_time x allowance

Guesstimating approach:

$$t_e = \frac{t_o + 4t_m + t_p}{6}$$

Range estimate:

- time taken v. req
- Estimate from vendors

20/08

Lec 14 Contract

Defⁿ: Agreement between two or more parties to act or not to act certain actions.

Categories (major):

1. main contract
2. sub contract

Main contract: A.K.A primary legal agreement between client & contractor that outlines,

1. SOW
2. Payment terms
3. Timelines
4. other essential obligations

Subcontract: Agreement where a main contractor, having secured a larger project, delegates specific tasks to a company or individual known a subcontractor who'd then perform according to the contract.

Classification of engineering contract:

1. Admeasurement contract:

-> Item of works are specified in Bills of Quantities or Schedule of Rates.
-> Contractor then specifies rates against each item.
-> Payments are based on actual work done measured against agreed unit rates.

Bill of Quantities: Tenderer lists rates against each item of the quantities of work.
Quantities are remeasured during the course of contract.

Schedule of Rates: Agreed upon list of what services, materials or price are expected for a specific period.
May be inaccurate with upper and lower limits.
Separate rates for labor, plant, materials (optional).
Contract value is derived on field via measured man-hours, plant hours, and quantitie of materials consumed, priced at tendered price.

Advantages: Payment for actual work done
Flexibility for change
Easy and fair comparison
Clear work scope

Cost reimbursable contract: Client reimburses contractor for the allowable cost incurred plus an additional fee.
Financial risk on the buyer.
No incentives for the seller to work efficiently / quickly.

Types: Cost Plus Fixed Fee
" " Percent "
" " Fluctuating "

Fixed Price / Lump-Sum contract: Fixed total price for all works defined in drawings and specification.
Contractor absorbs the risk of unexpected expenses.

Design-Build contract: A single entity offering both engineering design and construction, and in some cases technical know-how.

Turn-key: A single org providing design, construction, technical know-how (if any), and financing.
owner payments after project hand over

Partial Turn-Key: Employer is given the responsibility to contract ancillary works and coordinating with turn-key contractor.
Delay in ancillary work is compensated financially by owner to turn-key contractor.

separately to reduce cost

Design-Build operate: Private sector finances, designs, constructs, and operates the infrastructure for given duration, transferring financial and operational risks from public to private sector

Features of PPP:

1. Full financial burden is on private sector and they recoups the cost from operational revenues or levies charged on public sector org.
2. Contractor is chosen on the basis of:
    i. Design concept
    ii Experience
    iii. Technical know-how
    iv. Track record
    v. Financial backing
    o. Viability of business case
3. In many cases, constructor teams up with other specialist contractors, design consultants and financial institutes.

Types of PPE:

Free standing: Cost/profit recovered via end-user tolls (e.g., bridge tolls)

Levies on public sector: Private sector operates the facility for a regular operational fee from the public organization. E.g., prison.

Joint ventures: shared design, construction cost between private and public sector based upon an agreed revenue formula. E.g., road construction

Advantages of PPP:

1. Investments tend to be based on long term view based on short term concerns.
2. Risk and work transferred to private entity who is best able to handle it.
3. Process goes through a competitive process benchmarking against market standard.

Disadvantages of PPP:

1. Number of parties involved and for long duration could end up with complex contracts and negotiations resulting in high transaction and legal fees.
2. Project takes years to complete.
3. Sometimes private entity could become insolvent or make large amounts of profit causing political instability.
4. Some cases public sector could do the project by their own and cheaply.

20/08

w10

Public Procurement Law (PTU)

Procurement → Purchase, Hire on acquisition of goods
Execution of works and performance of services by contracted agreement

Applicability of PPR — PPA – 2004
PPR – 2008

Force majeure

Removal of TEC member

Technical sub committee

- HOPE
- AA
- tenderer
- Force maj—
- Respon—
- delegating ---
- PM

W11 24/08

Procurement method

→ Purchase, hire, or acquisition of goods
Execution of works
Performance of services
through contractual agreement

1. OTM
(Open Tendering Method) — Preferred method for competition under non-discriminatory and equal terms

Aspects of OTM

min time → 14 to 28 CD (Cont. Days)
↳ financial threshold

Others
1. LTM
2. Two-stages Tendering

- Tech proposal
- Final "

3. One-stage Two Envelope

Sealed
- 1 x Tech proposal
- 1 x Financial proposal

TOC →
TEC →
→ HOPE

Responsive Tenderers
↓
Financial proposal

Reasons / Criteria LTM:

1. Goods of specialized nature
2. Limited suppliers
3. Urgent need
4. Impractical
5. Stendend policy

Contractor / Suppliers / Consultants :

1. Single
2. PE website
3. Local press

How the enlishment is done:

Two stage . . .

Reasons / criteria

W12 31/08

1. RFQ
2. DPM
   a. DP
   b. Additional order / Repeat order
   c. EWO
   d. DCP
   e. Force account

} Last Cls

# Tender security # Perf. security # Retention money	Guarantees from contractor to PE, PM

Tender security — Guarantee for the fulfillment of any obligation in tendering process
— To discourage the tenderer for submission with ill motive

as Bank draft
Pay order or
Bank guarantee
from scheduled banks

Amount:

1. Fixed amount 2% to 3% of total est. cost
2% → 2. If tendering is done item by item and lot-by-lot but 5 item in a lot

→ 500,000 /-

3% = 15,000 → 14,000
2% = 10,000 → 9,000
1% = 5,000 → 6,000

nvn cross 3%

→ Not required: DPM, RFQ
Validity →
verification → by TEC

Front loading

Perf. security — Against any risk of failing the fulfillment of contractual obligation

1. Fourvished successfull / responsive tenderer
2. TEC may inc the amount
3. validity → aft. 28 days of completion.

Amount 5 to 10%
5% for divisible commodities
10% for goods & related works
10% " works if advance provision exist
5% for " if no " "
5 to 10% for physical service

Retention money: For ensuring quality & to cover potential defects

→ money deducted from the progressive payment

→ Half of retention money will be returned

→ Half will be returned after issuance Defects liability Certificate

can be returned if unconditional bank gua — - - 1/2 yrs

something abt 28 days

Amount

1. Not required → no advance payed
   → perf. sy 10% submitted
2. Reten & Perf. Sy money ≯ 10% of est. cost.

W12 03/09

Procurement of Intellectual Services

1. Diff btwn G/W and services
2. Preferred methods
3. Other methods

1. Differences

1. Product based
2. Open competition
3. Major criteria — Price —— quality
4. Detailed specs — ToRs
5. Single / Two envelope — Two envelope

Tender Security
Perf. "
Retention money

---

2. Preferred methods

a. QCBS — Quality & Cost based selection
b. FBS — Fixed Budget Selection

Public Ad — Issuance and Receipt of Tender Document

→ Opening → Evaluation → Approval → Issuance of NoA → Award Contract

QCBS → draw fig & explain
FBS →
} diff (check)

ICS

3. Other methods

a. LCS — Least Cost Selection
b. SSS — Single Source selection
c. CSOS — Community Service Org. selection
d. ICS — Individual Consultant selection
e. SBCQ - selection Based on consultant Quality
f. DCS- Design contest selection

Procedure:

1. w/ EOI
2. w/o EOI

ICS v SBCQ

W12 07/09

1. Related to Goods & works
2. Info & cond. set by PE
3. Docu forming contract
4. Struct. of TDs
5. Req. of STDs
6. Section 1. Evaluation
   Performance &
   contract signing
7. Section 3. GCC
8. Section 4. PCC
9. Forms

W12/2

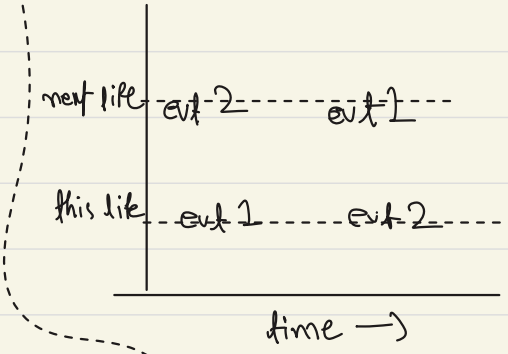
10/09

Technical Specification writing

CT — Lec 20, 21

1. what is tech specs in tendering processing
   a. Scope of work
   b. Material's quality
   c. Workmanship

2. Requirements to be described by PE
   a. Name on description of G/W/S
   b. Quality of "
   c. Performance standards & life span
   d. safety " & limits
   e. Symbol & terminology used in packaging
   f. Process & method used
   g Test for conformity



evt 1 → astroid wiping out dinosaur

evt 2 → astroid wiping out human

Considerations for preparation by PE

1. General principles
   a. Non-restrictive manner
   b. Consistent with drawing

2. PE's preparation when appropriate
   a. Expressed in terms of output / perf.

w13 14/09

Tenden Evaluation

1. Procedures
2. considerations
3. Not cont. to eval.
4. special cases

---

1. Procedures

. . .

2. considerations – by TEC

   a. Compliance w/ mandatory

   b. TEC also determines

3. TEC will not continue to evaluate

   a. Failed to demonstrate its qualification

4. Special cases – TEC to consider

   a. Quoted price is significantly below

      - Investigate reasons
      - Consider non-responsive
      - May be responsive if gave some favorable reasons

   b. Quoted price is higher but within acceptable limit of market price.

      ① Recommend to HOPE / AA to accept with availability of Budget

      ⑪ Advice PE – to reduce the scope

(iii) If there is tie for lowest price

- no lottery
- Superior past performers to PE
- " " " w/ other PE

Rough / CT-3 17/09

Preparation of procurement related docs & content:

1. Docs for pre-qualification, proposal — by PE by std doc
2. Docs for goods & related services, works & physical services:

   i) Instruction for submission
   ii) Deadline
   iii) Time, loc for tender opening
   iv) Sample
   v) Details of contract
   vi) Requirement specs
   vii) Num. of copies
   viii) Period of tender validity

3. Information & cond. to be clearly set out by PE:

   i) Desc. of works or physical services to be provided or goods & related services to be supplied.
   ii) Drawing and location on works or installation/ delivery of supplies.
   iii) Schedule of deliveries, milestone.
   iv) Currency and amount
   v) Mode of payment
   vi) Advance payments requirements
   vii) Payment for tender security, perf. sec., etc
   viii) warranty for defects
   ix) Min insurance

Docs forming the contract:

i) Signed contract agreement
ii) Notif. of Award (NOA)
iii) Tender & appendices to tender
iv) Particular cond. of contract
v) General cond. of contract
vi) Technical specs
vii) General specs
viii) Drawings
ix) Priced schedules
x) Other docs

Struct. of tender docs (STD):

i) Instructions to Tenderers
ii) Tender datasheet
iii) General cond.
iv) Particular cond.
v) Tender contract form
vi) Bill of quantities
vii) General specs
viii) Particular specs
ix) Drawings

Why STDs: i) Provide all info to tender
ii) Fair, transparent, acc. eval process
iii) Internationally acceptable model formats

Defn of STD: Model procurement template issued by CPTU under Schedule - I of PPR.

Tender eval committee to not continue to eval. a tender:

i) If a tender fails preliminary eval stage or is defn to be non-responsive.
ii) If an apparently non-responsive tenderer can't be made responsive through clarification.
iii) If a tender communicates w/ P.E during eval w/o being asked for clarification.
iv) Tender fails to accept arithmatic corr. made by TEC.
v) Fails post qualification stage.
vi) All tenders are rejected.

Meaning — Systematic confidential, obj. process carried out by TEC to examine, compare, defn lowest eval. responsive tender based on pre-disclosed qualification critics—

Procedures followed by TEC:

i) Four stage – Preliminary eval
Technical res
Financial comp.
Post qualification

ii) No min number of responsive tender — single tender can do

iii) TEC may req submission of necessary info

iv) Ask for clarification

v) Arithmatic errr. corrn.

vi) Financial comp.

vii) NO post-qualification negotiation

Technical specs:

Defn: Part of the contract doc that sets out:

i) Scope of work
ii) Detailed descrb. and nature of mats be used
iii) Worksmanship to be complied during exec
iv) When read in conj. w/ drawing & BOQ, the worker poseses all info needed for exec.

Considerations:

i) Non-restrictive & open
ii) Consistency
iii) Output perf. reqs
iv) Nat & internat stds
v) Avoid brand names
vi) Use 'similar or equiv'.
vii) Usen consultantim & standardization

Points PE must define clearly:

i) Name & description of works / service / mats
ii) Quality reqs
iii) Perf std & lifespan
iv) Safety std.
v) Packaging, labelling, marking (e.g. fragile, keep-dry)
vi) Specific method / procedures
vii) Testing procedures

W13

17/09

Job application

1 Identify — employer needs

2. Employers perspective/needs

. . .

Reason for rejection

W14

21/09

DPP Development Project Proposal

Rough / Final 26/10

Lec 1

Professional: A person who has a job that requires skills, education, and training

Professionalism: A set of chars that displays one to be hardworking, dependable, and respectful in informal settings.

Professional practices: Refers to the conduct standards, and practices a member of a profession follows to provide his services to employer or clients while keeping the integrity of his profession.

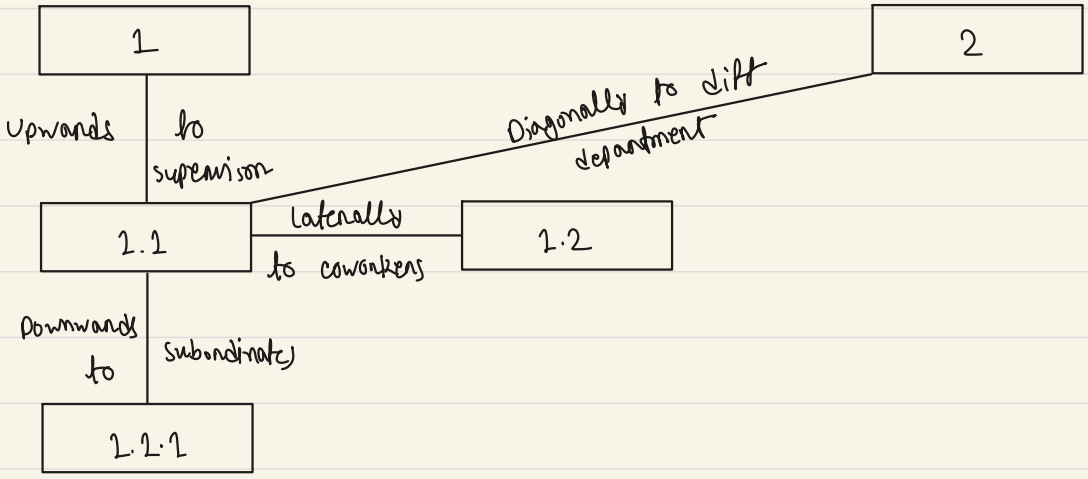
Maintain professionalism in workplace: EA EP O

1. Ethical
2. Attire
3. Etiquette
4. Punctual
5. Organized

Ethics: Guiddines for moral on socially accepted behaviors.
Moral: Principals of right on wrong that we live by.
Law: Created rules that are enforceable by an institute on government to regulate behavior.

Communication: transmission of information.

Mode of communication:



Importance for professional practices: BRAE-I

1. Ensure boundaries among professions & peers
2. Respect among each other
3. Accountability to superior
4. Minimize conflicts
5. Encourage improvements into one's field

Importance of professional communication: MALEE

1. Managerial efficiency
2. Ability to be vocal
3. Eff. leadership
4. Employees abilities, flourish
5. Ethical/moral development

Project:

Specific finite activity that produces an observable, measurable result under preset conditions.

Characteristics:

1. Temporary
2. Unique deliverables
3. Progressive elaboration
4. Structured
5. Logical
6. Limited by resources available
7. Purposeful

Stages of project: IPA PIMF

1. Identification
2. Preparation for appraisal
3. Appraisal of every aspect
4. Presentation for financing & approval
5. Implementation
6. Monitoring
7. Evaluation

Project proposal:

Initial document that transforms an idea or policy into details of an effective project.

It includes: enough information such that decision makers are enabled to make decisions.

1. Technical background
2. Feasibility report
3. survey result
4. Recommendations
5. output
6. Stakeholders
7. Risks etc

Categories of project proposal:

2. Internal P.P.
2. External P.P → written by external consultant for another company
3. solicited P.P → sent out RFP
4. Unsolicited P.P → Not requested

Lec 2

meeting: Gathering of group of members for a structured discussion guided by a designated chairperson

Why necessary in business/project:

1. Coordinate
2. collaborate
3. Collectively solve
4. Acquire support for idea
5. sell an idea
6. Consensus-based decisions.

Importance of face-to-face meeting:

1. Bonding
2. Inspire attendees
3. Bring out best of people
4. Build trust
5. Break through thinking
6. Non-verbal cues
7. Immediate feedback / clarification
8. Higher engagement / focus
9. Fasten consensus

Points to be considered for arranging meeting:

1. Reasons for scheduling
2. Discussion points
3. Attendees
4. Result/outcome

Reason for attending:

1. To give info
2. To get info
3. To sell an idea
4. Acquire support
5. Participate in decision making
6. Solve problem
7. Show/provide support
8. Networking
9. Answer ques

Considerations for eff business meeting:

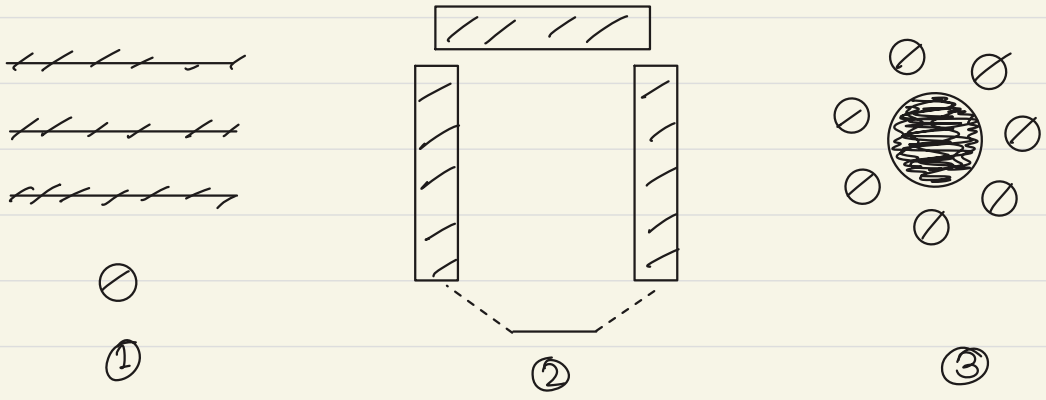
1. Objective – concise and clear
2. Ensure meeting necessity
3. Relevance with business
4. Location – incl. room and size
5. Invite list – only those necessary
6. contact details in invitation
7. Agenda
8. Post-meeting evaluation on effectiveness

Tasked to be performed when planning meeting:

1. Site selection
2. Overnight
3. Travel arrangement
4. Audio-visual equip.
5. Entertainment
6. Invitation
7. Decoration
8. Painting
9. Gifts & awards

Meeting room arrangement:

1. Theater style — leader → audience; less interruption from audience
2. U shape - great for visual aids
3. Circular — Democraphic, great visibility by participants, body language



Main steps:

1. Notice for meeting
2. Preparing agenda
3. Record minutes of meeting

Notice:

Official announcement sent to all eligible participants containing the date, time, location, and agenda of the meeting, through a formal channel (e.g., mail).

Contents: Address, date & reference, heading, main content, additional content, attendees, signatory

Agenda: Chronological list of items to be discussed on be actioned upon during the meeting.

Essential because → allows members to plan
an organizational tool
time management

Contents: Address, date & reference, headline, main content, list of agenda items, attendees, signature

Minutes of meeting: Formal recording of the meeting's activities, usually done by secretary.

Approved upon hearing on the next meeting

Contents: Address, date & reference, headline, main content, previous records discussed for approval, discussion items, signature

Lec 3

Professional communication:

Communication specifically related to professional activities.

Importance:

1. Fundamental medium for management to function
2. Enables coordination between employees and managers
3. Prevent costly mistakes by misunderstandings
4. Builds organizational reputation.

Categories;

1. Internal Operational Communication
2. External " "
3. Personal communication

Internal op. communication:

Formal communication that happens between the employees of an org, project or team to conduct their professional activities.

Categories: Upward
Downward
Horizontal

Methods: Memo
Reports
Records
Messaging
E-mail
Face-to-face, oral
Video-conferencing or tele-conf

External Op. Communication:

work related communications that a company does with people outside the company. Includes: Suppliers, service providers, contractors, clients, general public, regulatory bodies.

Means: Advertising
Brochures
Messages via radio & television
Customer call-back services
Follow-up services
Public speeches
Replies to comments & critics.

Improve PR: Organized and structured public speeches
Tactful replies to critics
Maintain transparency and clarity

Importance: Maintain strong relt'n to customer
Satisfy

Personal communication:

Exchange of information between human-beings when they engage together. Most of the non-operational or not related to work communications in a business is personal communication.

Effects: Affects employs behavior, moral, attitude
Have effects on business's sucess
Denial may lead to upsetness among employees
Excess may lead to less work completion.

Effective communication: 7 Cs

1. Completeness: Leave no questions unanswered.
   Include all facts, data, & content for reader to understand & act
2. Clarity: Use precise, unambiguous language and eliminate guessing.
3. Conciseness: Full message in the fewest possible words - avoid filler words and irrelevant sentences.
4. Correctness: Ensure accuracy to facts, tables, data
5. Consideration: Write each word w/ readers' viewpoint in mind
6. Courtesy: Be polite, tactful & respectfully
7. Concreteness: Be specific, definite, and vivid than vague or abstract.
   Support statement w/ exact figure, specs, and example.

   Instead of "concrete must be strong", say
   "Concrete must reach 35 MPa strength at 28th day"

Barriers of communication:

Errors and misunderstandings in professional communication preventing reliable and accurate transmission of information even if they are complete and accurate.

Factors (Human):

1. Jargon words
2. Unfamiliar words
3. Taboo words
4. Lack of attention
5. Inability to speak/listen properly
6. Cultural differences
7. Prejudice and/or stereotying
8. Accent
9. Emotional barriers – anger/mistrust that shadows rational interpretation

Aspects of ethical communication:

1. Integrity
2. Honesty
3. Fairness
4. Quality
5. Compassion
6. Dignity

Strategies to overcome comm. baniers:

1. Clarify to self before communicate
2. Communicate w/ receiver's lvl of understanding & env in mind
3. Consult w/ others before communicate
4. Ensure proper feedback
5. understand language, tone of the message
6. Convey things of value or help
7. Ensure consistency
8. Ensure followups
9. Be a good listener

Lec 4

Project proposal: An initial document that describes a proposed project, its outcomes and goals, and steps

Primary obj. is to convince decision makers for greenlight.

Not legally enforceable

During project initiation or bidding process

Project contract: Document that binds two parties for the completion of a project

Done after NOA and before proj. commencement

Legally enforceable in a court of law.

Defines the specifics, deliverables, dispute resolutions.

Key elements: Background

Obj.

Scope

Why important: Improved vendor comparison

Clear project understanding

Establish credibility

Set timeline and budget

Set expectations

Foundational basis for project execution plan

Types of project proposal:

1. Formally solicited P.P:
   Prepared in response to an official, structured solicitation document. E.g., RFP, Invitation for Tender, etc. It specifies exact eval. criteria, project scopes, submission formats.

2. Informally solicited P.P:
   Prepared when client informally (e.g, verbally) expresses interest for a project w/o issuing RFP.

3. Unsolicited P.P:
   Prepared by an independent engineer or firm w/o prior requests from the client. Main obj. is to convince the client of the projects need.

4. Continuation P.P:
   For an already approved project when it enters a new phase or fiscal year, simply to confirm continuation or release of approved funds w/o changing scope.

5. Renewal P.P:
   Prepared when a project is reaching its expiration date or for an already expired project to renew or extend the project.

6. Supplimental P.P:
   Prepared when a project requires change in scope, time, budget resources due to unforeseen circumstances

Things to consider before writing P.P.:

1. Audience — technical person → technical words
   non-technical person → easy to understand words.
2. Data & research.

Reasons why P.P gets rejected:

1. Poorly defined proposal
2. Client benefits are not clearly & credibly defined
3. Project not aligned w/ organizational goals
4. Ineffective presentation

Steps to write project proposal:

1. Define the problem — start strong, use facts over opinion.
2. State solution — why sound & superior to others
3. Specify deliverables & success criteria — SMART obj.
4. State methodology
5. Outline schedule & budget
6. Executive summary & concl.
7. Proofread the doc.

Lec 5

Research proposal:

A structured document that states a research topic, its justification and practical approach.

Purpose: Convince supervison, committee, or university that:

1. Research is suitable for the degree program
2. It is manageable

Contents of research proposal: what why how

1. Define research topic: Be explicit and exact.
   E.g., "Empirical Assessment of Top-Floor Ceiling Temperature Reduction by Residential Rooftop Gardens in Dhaka."

   It should answer — what's being investigated
   who it involves
   and in what content

2. Justify: show gap in current literature and why this investigation imp.

3. How: show practical, realistic approach and show it is manageable given your constraints.

   — How data be collected
   — How be analyzed

Structure : Title

Introduction & background

Scope

Literature review

Methodology

Technical proposal:

A formal document designed to introduce a technical product system, or service demonstrating how it'll solve the client's problem.

How to create technical proposal:

Introduction — define problem

what happens if left unresolved

Solution

cost & schedule

Executive summary

Types of technical proposal:

1. Technical business proposal — sales
2. " research " — grants
3. " design "
4. " implementation "

Key elements of technical proposal:

Introduction

Background

Benefits & feasibility

Task description

Cost

Schedule

Conclusion

write technical proposal:

1. Define the problem: specify specific problem, market gap, and client req that warrants for the product
2. state benefits
3. Process
4. vision! UX
5. own role/participation

Lec 6

Financial proposal: A written report that details the future economy of a project by addressing:

Financial needs — CapEx, OpEx

Budget

Importance:

New business: setting up budget, acquire money to start up

Existing business: Change monetary expenses, free up money for new project.

Project management: Allocate resources

Accountability

Demonstrate feasibility

Enable risk management

Key points:

1. Overview: About own company, overall changes, goals
2. Identify key players: Persons who'll be involved for the change
3. Aim to succeed: Goals & issues to be addressed

   e.g., decrease liabilities (loans), wages, incr. sales, ↓exp.
4. Timeframe for the changes to implement
5. Tidying up: Check & fix
6. Create own budget
7. Summary

why one page summary at the front:

1. Quickly refer to all facts & figures at a glance
2. Gateway to detailed data
3. Strong first impression and clarity

Civil & Env./ water Resources Engg.:

specialized persons entrusted by the society to create a sustainable world and enhance the quality of lives.

master planner, designer, construction protection of nat. env. res., innovator, integrator, leaders in decisions

key issues faced by by CE:

2. Escalated and increased risk to public health & safety consequence of engg. failure is much greater than before
2. vulnerability to natural & man-made hazards / disasters
3. Globalization
4. Sustainability
5. Emerging technology

Recap: Increased risk to public safety
vulnerability to man-made disasters
Globalization
Sustainability
Emerging tech

Chars of engineering as profession:

1. Continuous challenges
2. Continuous education
3. Engineering practices — innovative think tact-ful knowledge

Attributes of CE:

1. Systematic body of theory
2. Professional authority
3. Community sanction
4. Ethical codes
5. Professional culture

Lec 7-8

Professional ethics:

Philosophy that recommends the concept of right/wrong for professionals, practicing within a profession.

Contemporary ethical theories:

1. Metaethics — investigates the origin and sources of societal truths
   Concerns with reality; not practicality
   E.g., what's God's will
2. Normative ethics - Focuses on the practicing standards society has set to regulate right/wrong.
   E.g., appropriate marriage age.
3. Applied ethics - Involves analyzing and resolving controversial moral dilemmas.
   E.g., bioethics

Engineering ethics:

Study of moral issues, confronting individuals and organizations engaged in engineering practices.

Related to normative ethics. Because, in normative ethics, practicing professional sets the moral standards, rules, and codes to regulate right or wrong.

Objective of engg. ethics:

1. Confront moral issues responsibly
2. make sound ethical decisions in professional practice

How we view engg.:

1. Problem solver
2. Enjoyable
3. Professional freedom
4. Public benefactor
5. Honorable profession

How public views:

1. Utilitarianism
2. Positivism
3. Applied physical scientists
4. Alienation due to approach: rigorous, systematic problem-solving methods

Ethical triangle – Applied ethics:

1. Character based

   Articulated by Aristotle. It defines what make a good virtuous human being.

   If an engineer not experienced in a field, he should consult w/ more experienced one.

2. Principle based

   Actions are inherently good or bad based on universal moral principals, regardless of consequences.

   Ex., $0.25 per coffee, self served; not paying is not the end of world, but paying is the right thing.

3. Consequence based

   Actions are evaluated based on their consequences.

   Guided by the greatest happiness principle.

   Ex. Design choices and trade-offs for maximum societal benefits, minimal harm.

Moral spectrum:

Absolutism: only one moral theory is correct, and must apply in all cases w/o exception.

E.g., lying is bad even if life depends on it.

Relativism: No universal moral standards.

Right/wrong depends on culture, context, norms.

Bribing police

Pluralism: Moral questions can have more than one correct answers.

Allowing use of multiply theories for eval.

Doesn't mean others are wrong.

Favorite movie

Lec 9

Code of ethics:

A guiding set of principles intended to instruct professionals to act in a manner that is honest & beneficial to all stakeholders.

why support code of ethics:

2. Protect professionals from harms by others
2. Ensure a fair and suitable working env.
3. make profession a recognized practice
4. Obligate fairness among peers — promoting mutual benefits.

Functions of code of ethics:

1. Serve as collective recog by the members of a profession
2. Env. in which ethical behavior is the norm
3. Guide of conduct in specific situations
4. Development of code of ethics is valuable for a profession
5. Educational tool
6. Indicate to others that this profession is seriously concerned w/ responsible professional conduct.

Hierarchy of terms:

Principles: Fundamental & comprehensive doctrine regarding professional behavior

Canyon: Broad principles derived from fundamental principles

Standard: More specific moral goals towards which one professional should aspire to be

Rules of conduct: Mandatory directives

Violation → disciplinary actions.

Fundamental principles of ASCE: KHSS

1. Use knowledge & skills for the betterment of society
2. Honest & impartial
3. Strive for competence
4. Support societies of their discipline

7 canyons of ethics:

Safety – hold paramount public safety, health, sustainability

Competence – work in area of competence

Objectivity – issue public statement in objective, truthful manner

Faithful agent – faithful to employer, clients; no conflict of interest

Fair competition

Anti-corruption

Cont. development

Lec 10

IFCE / FIDIC – International Federation of consulting Engg.

Consulting engineer:

An expert in the planning, design, and construction of public/private infrastructures.

Responsibilities: Accept responsibility of the consulting industry to society
Seek solutions that is compatible w/ sustainability
Always uphold the dignity & reputation of his consulting industry

Consulting firm: A consultation service firm that provides the service for a fee through consultants.

BACE: Bangladesh Association of Consulting Engineers

- Founded in 1975 to encourage sound & institutional development of consulting firms in the country.
- Firms are admitted into membership only after they have satisfied the council with their criteria (professionally qualified, act independently of contractors)

Characteristics of consulting engineers:

1. Competence: Up-to date w/ technical skills, knowledge
2. Integrity: Act in the interest of clients
3. Impartial: Disclose full information incl. potential conf. of interest.
   Provide objective judgement
4. Fairness to others: Promote QBS
   Refrain from injuring others reputation
   Do not takeover others work w/o consulting them and getting written letter of termination
   Maintain appropriate conduct while reviewing others' works
5. Corruption-free: Neither offer nor accept payments that may benefit or produce injust.
   Co-op. w/ law enforcement agencies

Code of ethics of IEB:

1. Hold paramount the safety, health, welfare of public and comply w/ sustainable development.
2. Be honest and impartial to employers & client.
   Receive no remuneration.
3. Work only in areas of competence.
4. Faithfull agent to client
5. Give public statement only in objective manner
6. Build professional reputation on the merits of own work and no unfair competition.

Lec 11 Professional engagement

Defn:

Allows an engineer's career to grow by applying expertise and learnings through interaction with other professionals both formal & informal ways.

Needs / requirements of prof engagement:

1. To secure professional service
2. Establish scope, statement of work
3. Offer client cost-effective alternatives
4. Build trust through RFP, proposal process

RFP – Request for Proposal:

A document that contain details of a project and solicits bids from contractors willing to do the project.

Bid Formal document to provide good/ service while competing with others.

Bid solicitation: Process of notifying prospective bidders to receive bids on the specified prod or project.

Includes — Invitation for bid (IFB)
" for tender (IFT)
Request for proposal (RFP)
" for quotations (RFQ)
Expression of interest (EOI)

Tender — doc
Tenderer — person / org to submit tender

Invitation for bid: Call to contractors to submit proposals on a project for a specific prod / service.

Invitation for Tender: Used in large project where owner knows in details what they want.

Doc includes: detailed specs of performance
detailed qualification & criteria for bidders.

Tender for procurement process:

1. Procurement team → Dev. tender, evaluation criteria
Pre-qualification criteria
2. PE → Issue tender
Receive tender
3. TOC → Initial opening of tender
4. TEC → Evaluate → short list → prioritize → visit & negotiation
Evaluation report
5. HOPE → Approve or re tender
6. PE → Issue NOA

Request for quotation!

Like IFT but smaller in size.

Geared towards clients seeking pricing information for a define scope of work

Statment of work v. scope of work!

1. St: Document laying out the foundation on a work
   Sc: A section within the sow
2. St: Contains the goal and objective
   Sc: Contains delivenables and actions to be performed
3. St: Responsibilities the vendor will take
   Sc: How to acomplish, what mats to use

Process of professional engagement (pov- consultant)

Sorting → Tracking → Positioning → Proposal → Review → interview
go/no-go ↓
start ← Negotiation ← selection

QBS – Quality based selection

A procurement method where client releases a Request for Qualification and selects consultant firm based on qualification (competence based work) rather than cost.

Steps →
1. Public announcement of opportunity – criteria, loc, ...
2. Short list (>3)
3. Interview
4. Rank top (>3)
5. Negotiate → restart if negotiation fails

Fee-based selection (FBS)

The client – alone or with the engineer – establishes a scope of work and negotiates on a fee.
Flat lump sum or % of total cost.

Writing engg proposal:

1. Identify problem
2. Background knowledge
3. Understand client's needs & constraints
4. Clear communication
5. Technical alts
6. Alt eval
7. Design, plan, specs, cost
8. Construction assistance
9. Maintenance "
10. schedule

Contract

Budget

Lec 13

Project: Temporary endeavor that produces an observable, measurable result under preset cond.

Project criteria / triangle / diamond:

- must be completed on time
- within budget
- meet prescribed perf. req.
- maintain safety standards

Types of project:

1. Time-bound — preparation / opening of stadium for tournament
2. Cost-bound — Building const.
3. Performance-bound — Nuclear proj.
4. Safety-bound — all — " "

Life-cycle phases:

efforts
- 4% { 1. Conception — generate idea
  2. Definition — detailed into the idea
- 8% ← 3. Planning & organizing — bridges and overlaps btwn definition & imple
- 85% ← 4. Implementation — start of physical progress
- 3% ← 5. Clean-up — handover

Project cost estimate:

Why → assess fund req
economic viability
→ time bound proj → time is a commodity that can be bought w/ increased cost

Types of repeated cost est.

1. order of magnitude est.:
   During conception phase; go/no-go by entrepreneur
   ± 60%
2. study est:
   During definition phase
   financial eval. of proj, budget is allocated based on this est
   20% exceedence may trigger re-evaluation
   ± 30%
3. Preliminary est:
   Planning & org phase
   implementation plan is available, technological package is ready
   ± 20%
4. Definitive est:
   On zeroth day; day of construction start; based on concrete data
   ± 10%
5. Detailed est.:
   > 90% work is done
   ± 5%

Why not 100% acc.:

Detailed est. has 10% work remaining
Unforseen event, price fluctuations
100% achieved after construction

Basis of time est.:

work breakdown structure
time for each job
cumulative time (sequence + parallel)

Lec 14

Contract: Agreement between two parties to do or not do certain actions.

Types: Main contract → Between a client & contractor that outlines the scope of project, timeline, cost, etc

Sub contract → when the main contractor outsources specific works through third-parties.

Classification of contracts:

- Admeasurement contract
  - Bill of quatities, schedule of rates
- Cost-reimbursable contract
- Lump-sum contract
  - Cost plus (Fixed fee / Percent fee / Fluctuating fee)
- Turn-key contract
- Partial turn-key contract
- Design-Build contract
- Design-Build-operat contract
  - Free-standing, Levies on public sector, Joint-Venture

Admeasurement contract:

works are split into individual items with fixed unit rates; contractor is payed by the actual work done.

Two forms:

1. Bill of quantities: uses estimated quantities priced by contractor, which are remeasured during execution.
2. schedule of rates: uses agreed rates for labor, materials. suitable when uncertain quantities.

Adv. → can be adjusted (scope of work)
easy to evaluate

Cost-reimbursable contract:

Client reimburses the contractor for all the allowable cost incurred plus an agreed upon fee. Places financial risk to the buyer.

- Cost Plus fixed fee
- Cost Plus Percent fee
- Cost Plus fluctuating fee
  → dynamically adjust on a sliding scale
  e.g. more cost and time is saved, more the fee.

Lump-sum contract:

Contractor agrees to do all the specified works for a fixed cost. Takes on the risk of price fluctuation.

Turn-key contract:

Full project, including design, construct, and financing, is done by the contractor. Then when key is turned over to the buyer, cost + profit is paid.

Partial turn-key: Owner outsources smaller works from third-party usually of a cheaper rate.

Design-Build contract:

Contractor does both design and construction of the project.

Design-Build-operate contract:

Private-Public Partnership;
The private section finances, designs, and constructs the project. Then for an agreed upon during they operate to recoup the cost plus profit.

Why: relieves public section from the financial burden
transfers risk
leverages private section expertise.

Forms/Types: 1. Free-standing; cost is recouped during operation by tolls and fees. E.g., bridge toll fee

2. Levies on public section: charges the public section some fee for cost and profit E.g., prison.

3. Joint-venture; shared cost by private & public section. Service fee paid by public section based on a agreed benefit/revenue formula.

Lec 15

Procurement: Purchasing on renting of goods

Public procurement: Procurement using public funds.

PPA 2006 v. PPR 2008; Public Procurement Act/Rules

PPA 2006: First legislature that focused on the core principles of public procurement

PPR 2008: Second legislature that detailed the specific procedural steps for public procurement.

Circumstances to which PPR applies:

1. Procument by PE using public funds
2. Procurent by any govt., subgovt., statutory body under the law.
3. " by any companies under the Companies Act using public funds
4. Procurement under funds, credits, or loans entered into development partners or foreign state or org.

Short notes:

HOPE: Secretary of a ministry, head of a govt. dept. or directorate, chief executive who is the head of procuring.

PM: Primary person who's contact is given in contract or any other competent personnel appointed by PE.

Force Majure: An event / situation beyond the reasonable control of contractor and not occured due to his negligence.

Approving Authority (AA): Entity that approves contract for procurement.

Responsive Tenderer: Tenderer who is qualified and fully complies with all mandatory qualification criteria.

Tender opening Committee (TOC):

Formation: Appointed by HOPE or an officer authorized by HOPE or AA (if AA below HOPE).

Members: Chairperson, member, member secretary
2x from PE, 2x from TEC

Functions: Tender opening in presence of bidders
submission to TEC

Tender Evaluation Committee:

Appointed by AA or if AA is at board level, or recommending body is above HOPE, then appointed w/ the approval from Chairperson or secretary of the board.

Members: Min 5, normally ≤ 7
2 external

Officers from the ministry
or from other ministries as external

During sign, 5 must present w/ 1 external

Chairperson: Below AA and HOPE (one level), whichever is lower.

Skip

Functions: Eval
Prepare, recommend → Eval Report → submit to AA.

Removal of TEC member:

1. Undisclosed conflict of interest
2. Two consecutive absence on eval. meeting
3. Breach of section 64
4. Transfer, death absence from country

Technical sub-committee (TSC):

AA may appoint a TSC with max 3 members incl one expert if a tender requires technical assistance.

Lec 16

Open Tendering Method:

- Preferred & default method for goods & work of public procurement
- Non-discriminatory & equal rights.

Time for submission:

≤ 2 crore → ≥ 14 CD (Continuous Days)
2–5 crore → ≥ 21 CD
> 5 crore → ≥ 28 CD
Emergency → ≥ 10 CD

For re-tendering → ≤ 2 crore → ≥ 10 CD
Emergency → ≥ 7 CD
Else → ≥ 14 CD

Limited Tendering Method: LTM

A restricted procurement method where invitations are sent directly to suppliers or pre-listed contractors (than being open)

Requires approval from HOPE or Authorized officers.

Criteria of applicability:

W/o financial cap: specialized nature
urgent need
specialized equip
limited suppliers
standardization
impracticality

W/ financial cap: goods → ≤ 25 lacs
service → ≤ 2 crore

Time for submission: ≥ 14 CD
national disaster ↓ 7 CD
urgent ≥ 7 CD
re-tendering ≥ 7 CD

Enlishment procedure of suppliers:

2. PE invites for enlishment
2. List by type and categories of goods/services
3 HOPE approves
4. Annually update

Two stage tendering method:

Procurement method used for turnkey contracts on large complex project for which PE can't prepare technical specs in advance

criteria for two stage:

1. Specs can't be prepared in advance
2. Lack of internal capabilities
3. Alt tech exists
4. Turnkey project — or complex project.

Procedure / stage 1: Unpriced

1. Invitation: PE releases, based on conceptual specs
2. No tender security
3. submission: ≥ 42 CD; tenderer submits
4. Evaluation & discussion:
   i) Review proposal for responsiveness
   ii) confidential, separate discussions w/ each responsive tenderer
5. Issue minutes of Adjustment
6. Approval by HOPE/AO

stage 2: final priced tenders

1. Tender doc update: single, agreed, tech scope & eval criteria
2. Invitation for final bids: from bidders at stage 1; ≥ 21 CD
3. Eval. & award: OTM

One stage two envelope:

Used for turnkey or large complex project when PE can prepare technical specs, design, BoQ in advance.

Procedure:

2. Submission: tenderers submit two seperate sealed envelope:
   i) Technical proposal (w/ security money)
   ii) Financial proposal
2. Technical eval:
   i) TOC opens the env. (I)
   ii) TEC evaluates on a pass/fail basis
   iii) Eval report is submitted for approval
3 Financial eval:
   i) Responsive tenderers are invited for their public opening of financial proposal
   ii) Awarded to lowest, responsive tenderer
4. Return of unopened bids

Lec 17

Request for quotation :

simplified procurement method used to purchase readily available, off the shelf goods within financial limits.

	Dev. budget	Rev budget
Goods	2 lakh / 10 lakh	5 lakh / 20 lakh
Works	5 " / 20 lakh	10 lakh / 40 lakh
	↑ per case	↑ annual

Docs needed for RFQ procurement of goods:

1. Statement of PE's requirements
2. From supplier:
   i) Priced quotation
   ii) Trade License
   iii) TIN certificate
   iv) VAT reg. cert.
   v) Bank solvency report

Procedures: 1. Invitation

Direct

Deadline $\leq$ 10 CD

2. Submission

As Quotation

Handed over to TOC, unopened, by PE

Min 3

3. Eval & award

TEC eval

Awarded to lowest evaluated responsive tenderer

PE issues formal purchase order

Direct Procurement Method:

A non-competitive procurement method where PE purchases directly from a single source w/o opening tender.

Requires prior approval from HOPE

5 types:

1. Direct contracting

Proprietary items, exclusive dealer, critical components, govt. owned entities, ...

2. Repeated order

3. Extra-work order: change order

4. Direct cash purchase: small amounts; < 25K percase; ≤ 5bc (annual)

5. Force account: carry-out dept. constructions using agency's own tools (w/o hiring external) materials needed

Lec 19

Goods v. service:

1. G. Product based, physical deliverables
   S. knowledge " , intellectual "

2. G. Open competition
   S. " " followed by short-listing

3. G. Cost prime factor
   S. Quality of performance

4. G. Single or two envelope
   S. Two envelope

5. G. Detailed specs
   S. ToR

6. G. Negotiation none
   S. " needed

7. G. Security deposit
   S. No " " ; indemnification

8. G. Invitation for tender
   S. Request for proposal

methods of procurement of intellectual service:

Preferred: Quality and Cost Based Selection
Fixed Budged selection

Others: Least cost selection
Single Source selection
Community Service Organization Selection
Selection Based on Consultant Qualification
Design Contest selection

Quality & Cost Based selection:

considers both cost & quality with quality receiving greater weight.

Procedure: REOI
RFP issuance & receipt
Short-listing
Technical eval } combined eval → negotiation → Award
Financial opening }

Fixed budged eval.

used when project is relatively simple and defined, budget is fixed

Procedure: Same as QCBS except → i) mention of fixed budget in RFP
ii) ToR prep. w/ regard to this cost
iii) Consultants provide cost breakdown

Lec 20

Tender documents: The official document prepared by a PE and provided to prospective tenderers as the basis of preparing their tenders.

Information to be set out by PE in TD:

1. Description of works to be carried out
2. Drawing & location of works
3. Description of goods / services to be supplied
4. Location of delivery / installation
5. Schedule of completion
6. warranty, defects, maintenance requirements
7. Currency the tenderer would quote in
8. Amount & currency of Tender security, Perf. security
9. Advance payment of not
10. Min insurance coverage
11. Others.

Document forming the contract (in following order):

1. Signed contract aggn.
2. MoA
3. Tender & its appendices
4. Particular conditions of contract
5. General " " "
6. Technical specs
7. General specs
8. Drawings
9. Priced schedule of requirements & bill of quantities
10. others.

Standard Tender Doc (STD):

Based on internationally acceptable model format, it provides all the information a tenderer would need to prepare and submit tender.

8 sections; 1 & 3 must not be altered.

Struct: Instructions to tenderers
Tender datasheet
General cond.
Particular cond.
Tender & contract form
Bill of quantities
General specs
Particular "
Drawings

Stages of tender evaluation:

1. Preliminary
2. Technical responsiveness
3. Financial evaluation
4. Post qualification

Lec 21

specification :

Part of tender document that sets out:

2. Scope of work
2. what mats to be used
3. workmanship to be complied w/ exec. of work
4. when read in conjuction to drawings & BoQ, contractor would've all the info for execution.

PE to describe when writing technical specs of goods:

i) Name & description
ii) Quality standards
iii) Performance standards & life span
iv) safety standard & limits
v) Packaging & labellings
vi) Processes & methods (if any)
vii) Test procedured

Considerations for preparation of technical specs:

1. Non-restrictive manner to allow open & fair competition
2. Consistency with drawings & BOQ
3. Output based criteria instead of models
   For generator, max noise, KW consumption, fuel/KW-h
4. Standardization – recognized nat & int. nat standards
5. No trademarks / brands
6. User consultation

In case PE lacks the capability to write generic specs, he may reference specific brands but must append, " similar or equiv. ".

Lec 22

Tender Evaluation

Refers to the systematic, confidential process carried out by TEC to determine least evaluated responsive tenderer based on pre-disclosed criteria.

Procedures followed:

1. Based solely on pre-disclosed criteria
2. Preliminary examination — completeness of tender
3. Technical eval
4. Financial comp.
5. Post qualification
6. Clarification & minor corrections
7. Arithmatic corrections
8. Sort in ascending order based on evaluated cost
9. No post-qualification negotiations
10. Note of dissents - to be independently verified by AA if necessary.

Circumstances under which TEC shall no longer eval:

1 Tenderer has failed to show qualification:
document on capacity
2. Failed to accept correction of an arithmatic error
3. Non-responsiveness
Not qualified

when tender offers a price significantly below official est.:

i) Investigate actual reason
ii) consider non-responsive if,

a) Tenderer is deemed inexperienced and priced wrong
b) Tenderer failed to provide justification

iii) If pricing is accurate, then continue.

when lowest eval. responsive tender price higher:

i) TEC shall recommend AA to approve or
ii) Reduce scope or reallocate risk

If tie: i) Prefer tenderer w/ past exp. w/ the PE
ii) " " w/ greater exp. w/ other P.E
iii) Superior quality of goods

Lec 23

Job application: A formal process to sell one's services & skills to a prospective employer.

what to do before responding to job applications:

a. Identify what they're looking for
b. " what skills I have matching their requirements.
c. Research the company
c. Investigate myself to filter out past experiences that may be suitable for the role
d. Answer the question: what concrete evidence I've to prove my competence to their role

Most important factors for recruitement:

1. Enthusiasm
2. Personality
3. Transferable skills

Employer's perspective: Find out about them
what they can contribute
why are they interested
Do they understand the job's role
Do they have the qualifications
Do they have the right mix of skills
Is it worth my time to interview them

what employeeen looks for:

1. Potential for advancement
2. Good academic record
3. Relevant past experience
4. specialist subject knowledge
5. Personal interest
6. Any other work exp.

CV: A detailed documents that provide a written summary of a person's education, qualification, and career history.

main parts of CV:

Name
Education : reverse chronological
Work exp. : " "
Competencies : w/ concrete evidence
Skill profile
Interests
Refenees : normally, 2

Likely reasons for rejection:

1. Too little or too much info
2. Irrelevant info
3. Grammatical or typographical error
4. Wrinkled paper
5. Failure to follow application guideline
6. Not tailored for the role
7. Use of negative words like fired
8. No signature
9. Unrealistic salary info
10. Lack of enthusiasm
11. Poor presentation
12. Incomplete or blank section

Lec 24

Development project proposal (DPP):

A detailed project document based on a workplan with time an cost of development project.

Types → 1. Investment project: Involves large investment from local on both local & foreign resources.
E.g., power plant
Formulated using standard DPP formula

2. Technical assisted project: No cap-ex
Usually foreign aided
Formulated using TAPP format

Approval process:

Idea generation
Formulation
Ministry scrutinization
Planning commission appraisal
Appraisal → recommendation – approval:
Recommend by PEC
Approved by ministry or ECNEC
Inclusion in ADP