Construction Project Management, COTM 6101

MSc program in Construction Technology and Management

Addis College

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Chapter 1

Introduction to project and Construction Project body of knowledge

- A project is a series of activities(Group of tasks) aimed at bringing about clearly specified objectives within a defined
  - Time-period
  - Project budget.
- It has specific set of objectives and characteristics.
  - It is likely to be a one-time program.
  - It has a life cycle, with a specific start and end.
  - It has a work scope that can be categorized into define tasks.
  - It has a start and end period with specific budget
- A routine work is different from a project.
- The same activity can be a project or a routine work

Project Management:

- Is the application of various knowledge, skills and techniques on projects to ensure both the pre determined objectives and the intended purpose of the larger business to met.
- Is accomplished through 5 major process groups: Initiating, Planning, Executing, Monitoring & Evaluation, and Closing.
  - Includes:
    - Identifying, Recognizing and Articulating Needs/requirements
    - Considering Stakeholders concerns, expectations, etc
    - Dealing with the following six competing constraints: Scope, Quality, Schedule, Budget, Resources and Risk.

Construction Projects: Main features

1. **Predetermined Objectives**
   - Components of a certain business
   - Often the first phase
2. **Constrained Schemes**
   - Schedule, Budget, Resources and Results / Scope Constraints
3. **Too Fragmented**
   - In processes,
   - In financial sources when co financed, and
   - In responsible bodies
4. **Investment**
   - Accelerates economic growth of a nation
   - Cost Extensive, and
   - Slow & Low business return on investment

5. **Human Resources**
   - Involves large number
6. **Construction Equipment**
   - Short life time, and
   - Highly cost extensive both to own and increase their life time
7. **Reports and Monitoring disparity**
   - Exhibits Financial & Engineering Reports disparity during implementations unless committed and compensation events are not clearly considered

Objectives of Construction Management

- The main objectives of the construction management team should include:
  - Project completion within the allocated budget and duration,
  - Ensure that the production of construction works satisfy the client's functional requirements,
  - Construction to specified standards,
  - Provision of safe and satisfactory working condition.
- Accordingly, construction project management may be defined as the overall control of the total management process to optimize the three attributes of the process: ***Quality***, ***Schedule*** and ***Cost***.

Functions of Construction Management

- The functions of construction management are: Planning, Organizing, Staffing, Motivating, Communication, Measuring (Correcting), and Coordinating.

i. Planning

- Planning is a function of devising the cause for the future with a vision, formulated for the future state of the organization or the project.
- Planning also involves preparation of alternatives for achieving specified objectives.

- In preparation of plans the following questions should be addressed:
  - What to do?
  - How to do?
  - Where to do?
  - How much does it cost?
- The detailing of the plan depends on:
  - Size of the project
  - Degree of difficulty
  - Knowledge and experience
  - Degree and extent of indeterminate operations
  - Extent of internal and external constraints

Scheduling:

- Scheduling is timing of the work activities.
- During scheduling questions like when to do it and how long it takes should be addressed.

ii. Organizing

- Organizing is required to achieve effective utilization of the people, facilities, equipment and money available to the Organization.
- Organizing also involves establishing a workable organizational structure

iii. Staffing:

- Staffing involves assigning (employing) people to fill the posts created within the organizational structure.
- Staffing also involves matching the organization's needs with each employee's goals and desires, and it requires adherence to equal opportunity regulations.

iv. Motivating:

- Motivation can be defines as follows:
  - Motivation is the set of processes that moves a person towards a goal.
  - Motivation is the internal or external forces that act on a person to pursue a certain course of action.

v. Communication:

- Communication is a multifaceted management responsibility.
- Communication can be formal and informal; it is both written and oral.
- It utilizes paper, telephone, face-to-face, and electronic means.

vi. Measuring and Correcting:

- Measuring and Correcting involves:
  - Measuring the actual performance
  - Identify plan and schedule
  - Compare plan against performance
  - If there is discrepancy, identify the reasons
  - Analyze the costs incurred
  - Take remedial measures
  - Observe quality of work
- ***NB: - "People work for what you inspect, not for what you expect."***

vii. Coordinating:

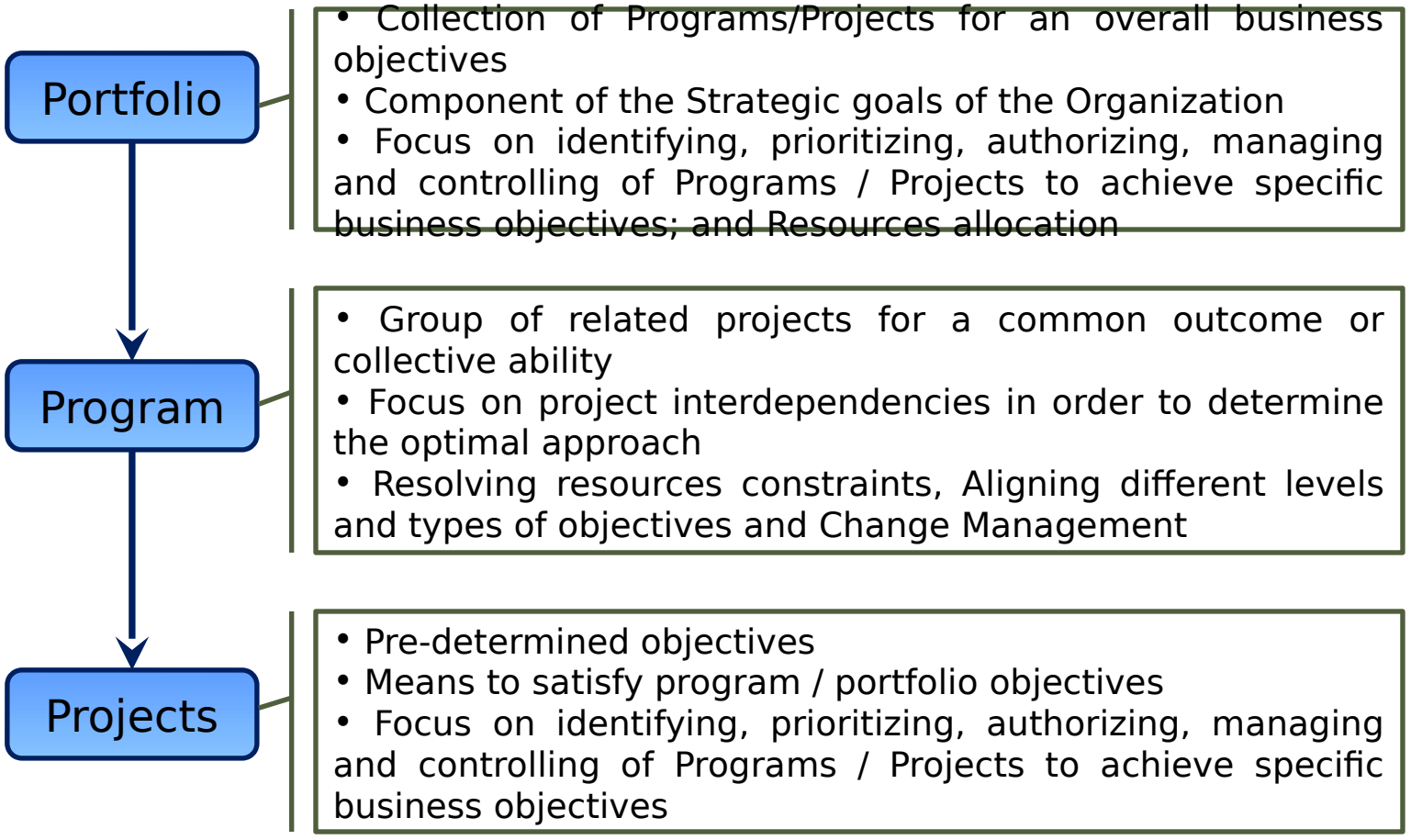
- Coordinating – conduct regular departmental and section heads meeting for discussion.

2. Essential elements of Construction Project Management

- The **Essential Elements** of Project Management include:
  1. Project, Program & Portfolio Management relationships
  2. Projects and Strategic Planning
  3. Project Life Cycle / Phases; PM Process Groups
  4. Project Stakeholders and Organization
  5. Project Management Office & The Project Manager Role
  6. Project Management Skills, Tools and Techniques

CPM: Essential Elements

Project, Program & Portfolio Management



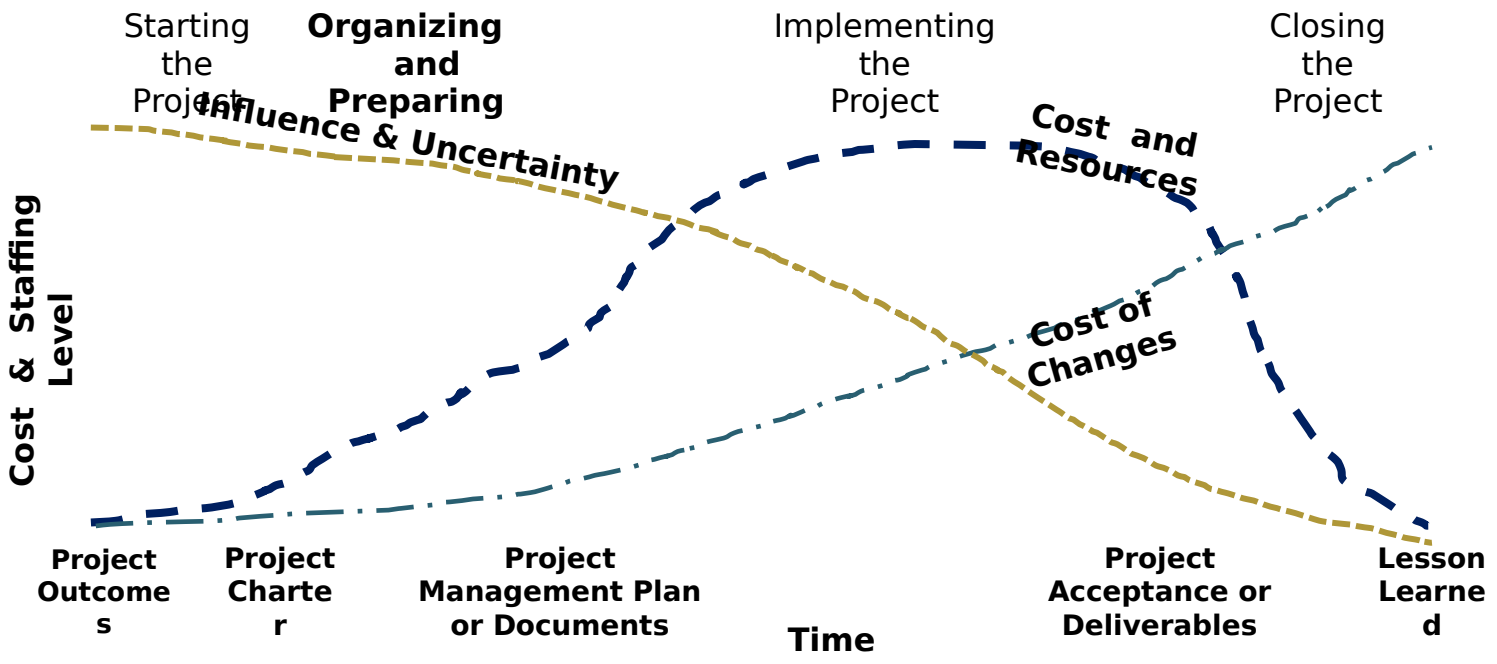
CPM: Essential Elements

Projects and Strategic Planning

- Projects are often utilized as a means of achieving an organization's strategic plan.
- Projects are typically authorized as a result of one or more of the following strategic considerations:
  - Market demand,
  - Strategic Opportunity,
  - Customer requirement,
  - Technological advancement, and
  - Regulatory or Legal Requirements.
- Projects, within programs or portfolios, are a means of achieving organizational goals and objectives as part of its Strategic Plan

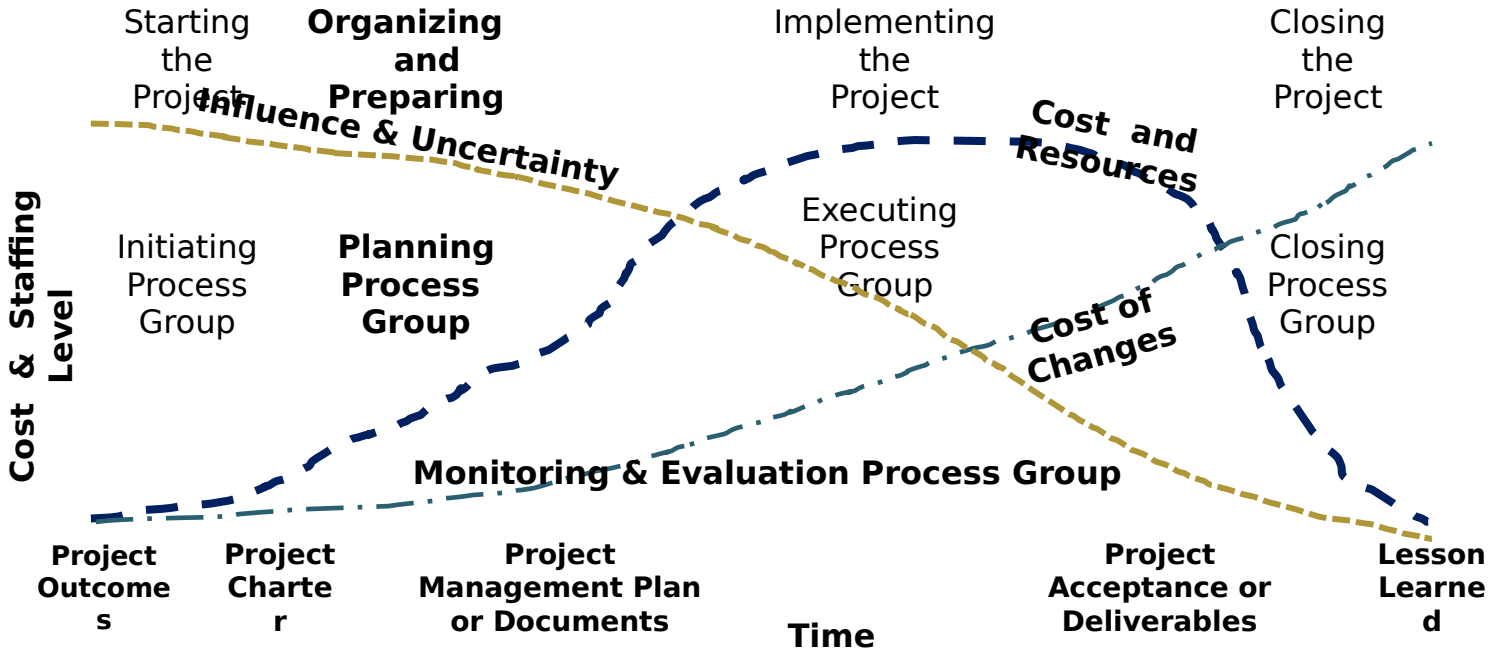
CPM: Essential Elements

- **Project Life Cycle / Phases**
  - The Four Structure of Project Life Cycle / Phases
    - Starting the Project,
    - Organizing and Preparing,
    - Implementing the Project, and
    - Closing the Project.



CPM: Essential Elements

- **Project Management Process Group**
  - The Five Project Management Process Group
    - Initiating Process Group,
    - Planning Process Group,
    - Executing Process Group,
    - Monitoring & Evaluation Process Group; and
    - Closing Process Group.



CPM: Essential Elements

- **Project Management Process Groups**

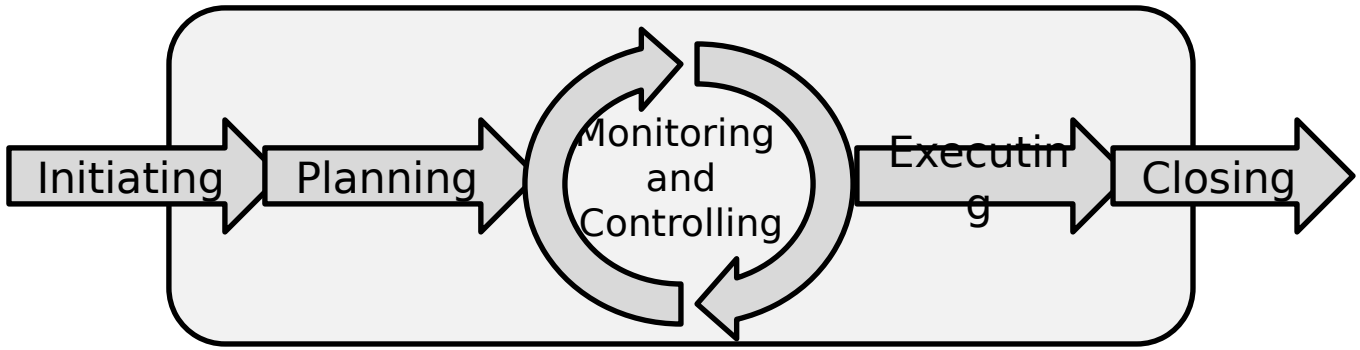
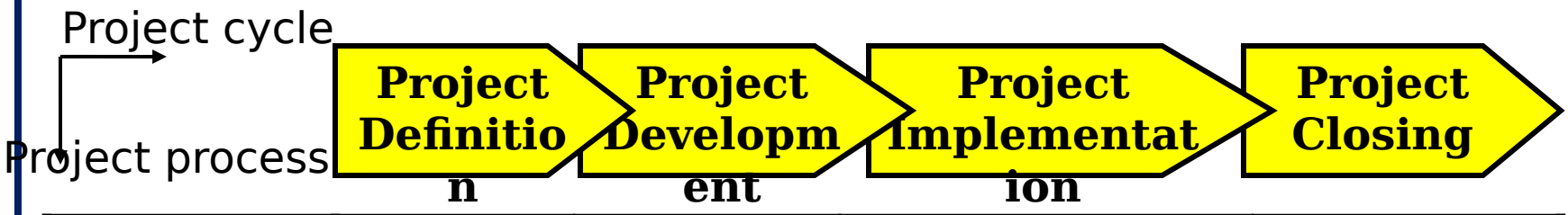


Fig. Single phase project life cycle

CPM: Essential Elements

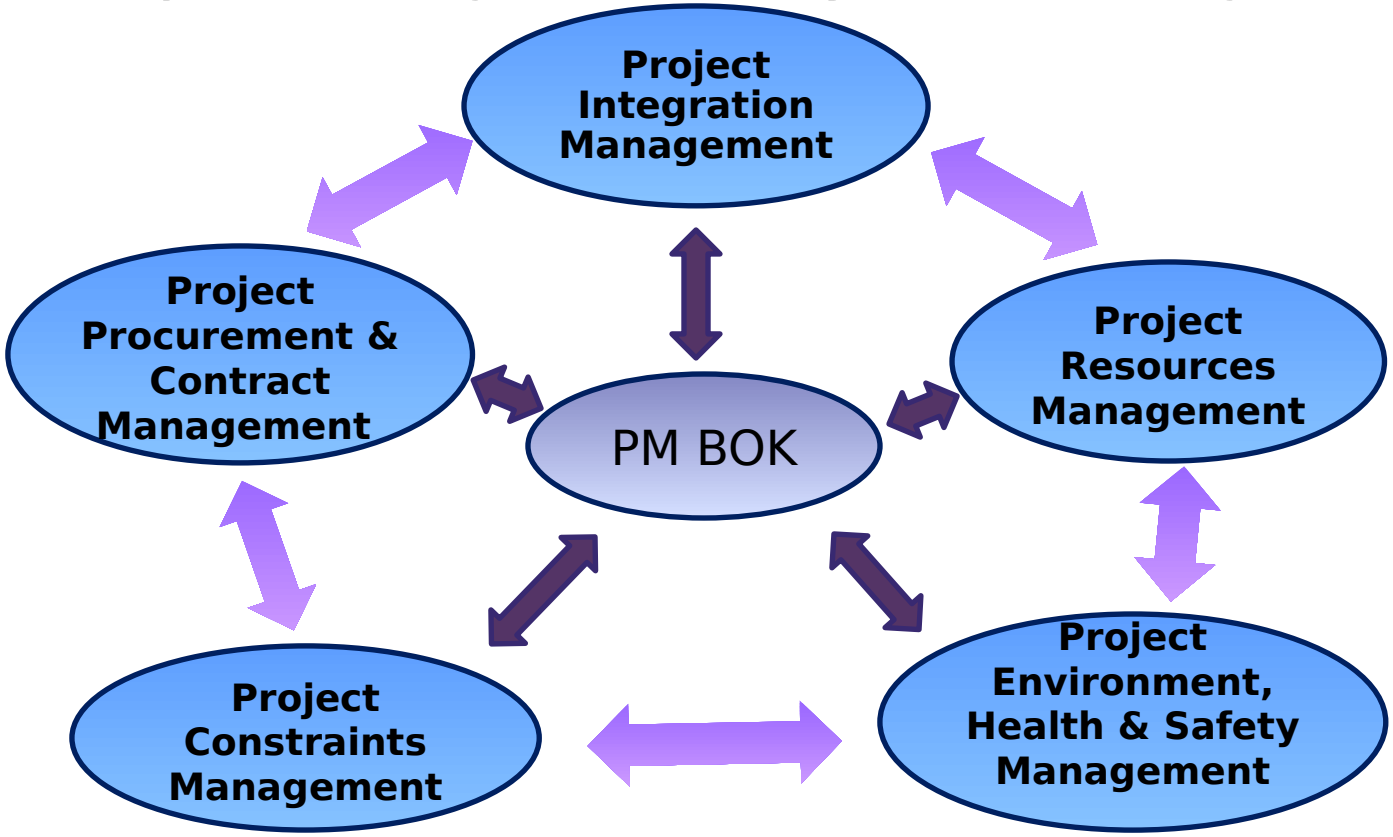
- **Project Management Process Vs Life Cycle**



Core Processes	Concept Definition	Concept Development	Design of buildings, Roads, etc & Physical construction works	Maintenance Period and Defect Remedies
Administrative Processes	Concept Evaluation Project Approval Budget Allocation		Monitoring, Procurement and Other Processes	Acceptance / Hand Over
Public Regulatory Processes	Right-of-way (if necessary) and Regulatory Permits		Tender award and Changes and Variation	Final Approval and User Permit

3. CPM: Body of Knowledge

- The **Project Management Body of Knowledge**



Project Management Body of Knowledge:

1. Introduction
2. Organizational influences & Project life cycle
3. Project Management processes
4. Project integration management
5. Project scope management
6. Project time management
7. Project Cost Management
8. Project Quality Management
9. Project human resource management
10. Project Communications Management
11. Project Risk Management
12. Project Procurement Management
13. Project Stakeholder Management

3. CPM: Body of Knowledge

1. **Project Procurement & Contract Management** involves:
   - Procurement & Contract Governance System (ServicesVs Works)
     - Construction Law
     - Delivery System
     - Contracting Method
     - Procurement Method
     - Contract Type
   - Procurement and Contract Management Planning
     - Establishing Procurement Team
     - Deciding Proc & Cont Governance Structure

3. CPM: Body of Knowledge

2. Project Constraints Management

- **Project Time Management** involves
  - the management of Activities and Resources Dependencies
  - PTM processes:
    - Define Activities
    - Sequence Activities
    - Estimate Activities Resources
    - Estimate Activities Durations
    - Develop Schedule
    - Monitor and Evaluate Schedule
  - Refer PM BoK / DCE's CW+RPs
  - Critical Path Method Vs PERT Vs Critical Chain Method
  - MS Project / Primavera

3. CPM: Body of Knowledge

- **Project Cost Management** involves
  - Cost Estimating, Budgeting and Controlling Costs
  - Budget and Cash Flow Management
  - PCM processes
    - Activities Definition
    - Define Measuring Units and Cost Coverage
    - Estimate Activities Resources
    - Define Crews and CBS
    - Determine Resources Basic Prices
    - Estimate Activity Costs
    - Develop Cash Flows and Budget
    - Monitor and Evaluate Costs
  - Cost Estimate Vs Project Cycle / Phases
  - Refer Cost Estimating Slides and Cases

3. CPM: Body of Knowledge

- **Project Quality Management** involves
  - Define & Plan Quality Requirements,
  - Perform Quality Assurance & Control Services
  - Project (as temporary organization) Management
  - Product Quality Management
  - Refer PMBoK

3. CPM: Body of Knowledge

3. Project Resources Management

- **Project Financial Management**
  - Involves the management of Project finance
  - Project Finance involves Project cash flow & liquidity management
  - Determine Organization and Project healthiness using Balance sheet, Income Statement and Financial ratios
- **Project Human Resources Management** involves
  - the management of Project personnel and Labor workmanship and productivities
  - Develop HR plan and Acquire, Manage and Develop Project team
  - Develop LBS, Define and Control Productivities and Workmanship requirements

3. CPM: Body of Knowledge

- **Project Materials Management** involves
  - the management of Materials Quality, Procurement & Handling
  - Develop MBS, Define and Control material quality
- **Project Machineries and Plants Management** involves
  - the management of Machineries and Plants access, installations, calibrations, productivities, costs and maintenance

3. CPM: Body of Knowledges

4. **Project Environment, Health and Safety Management**
   - **Project Environment** involves
     - Environment Impact Assessment, Resettlement Action Plan and Fire Protection; and their Implementation and Control
   - **Project Health** involves
     - Identifying health hazard work methods, chemicals, working environments; Develop, Implement and Control preventive methods
   - **Project Safety** involves
     - Identifying accident prone activities; Develop, Implement and Control preventive methods

3. CPM: Body of Knowledges

5. Project Integration Management

- **Project Portfolio Management / Project - Parent Relationships Management**
  - the management of Organizational relationships and authorities; and Resources Allocations among Programs and Projects
  - Develop Organizational Breakdown Structures (OBS), Implement and Control OBS
- **Project Communication Management**
  - the management of Project Management Information System (PMIS)
  - Plan communication requirements, Develop communication mechanisms, Implement and Control Communications

3. CPM: Body of Knowledge

- **Project Uncertainty and Change Management**
  - **Project Risk Management**
    - Plan Risk Management, Identify Risks, Perform Risk Analysis (Qualitative and / or Quantitative), Develop and Plan Risk Responses (Scenario Management), Monitor and Control Risks
  - **Project Configuration / Changes / Alterations Management**
    - Develop and Plan Changes Management, Monitor and Control Changes and Consequential Impacts
    - Includes Requirement Changes Management, Project Completion Time and Project Cost Variations Adjustment System
  - **Project Claim and Dispute Management**
    - Develop and Plan Claim and Dispute Management, Monitor and Control Claims and Disputes including their Consequential Impacts