

Course: Software Project Management

Week 1: Project Management Fundamentals

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Course Description

- This course provides in-depth understanding of software project management principles, methodologies, and best practices.
- It discusses about the fundamental concepts, roles and purpose of project management within the context of software engineering.
- The course covers
 - software project management fundamentals
 - software project planning, execution
 - Monitoring & Controlling, and proper closure.

Course Goal

- The primary goal of this course is to equip students with the knowledge, skills, and competencies needed to successfully
 - Plan, Execute, Monitor & control software projects within scope, time, cost, and quality constraints.

Contents

- Introduction
- Basic concepts
- Project Management phases
- Project Management Principles
- Software Project Management Tasks
- The Role of Project Manager

Learning Outcomes

After completing this lesson, you will be able to:

- Define project, project management and related concepts.
- Describe the five phases of project management and their significance in project success.
- Apply project management principles in real world scenarios to ensure project success.
- Identify key tasks in software project management projects.
- Evaluate responsibilities, skills and challenges of project manager

Introduction

- Now a days, various projects are implemented for different purposes in different countries of the world.
- The projects are carried out by companies, governments or NGOs and has significant value.
- The projects can be:
 - Simple or complex
 - Short time or long term

Introduction

- Knowledge and skill of project management is the backbone for a successful implementation of these projects.
- Organizations rely on effective project management to achieve strategic goals and deliver value.
- Today, project management is a profession with excellent career opportunities.

Basic Concepts

- **What is Project?**
 - A project is defined as a **temporary** endeavor undertaken to create a unique product, service, or result (PMI, 2013)
 - The temporary nature of projects indicates that a project has a clear **beginning** and **end**.
 - A **project** is planned set of interrelated tasks to be executed over a fixed period and within certain cost and other limitations.
 - **Parameters:** scope, cost, time, resources, quality

Basic Concepts

- **Example of a Project: Online Learning System**
 - **Goal:** To develop a web-based platform that allows students to enroll in courses, access learning materials, take quizzes, and track their progress. **Scope:** User registration, course management, quizzes, progress tracking, **Budget:** \$2.5M
 - **Duration:** 6 months (start date: **March 17**, End Date: **Sep 16, 2025**)
 - **Resource:** will be developed by 5 developers, 1 UI/UX designer, 1 QA Tester and 1 PM, using React.js, Node.js, and MongoDB

Basic Concepts

- **Management in Project Management**
 - Management is the process of
 - Planning
 - Organizing, leading, and
 - controlling resources to **achieve specific objectives efficiently** and **effectively**.
 - Resources means
 - **people, time, money, and technology**

Basic Concepts

- Management is achieving goals in a way that makes the best use of all resources.
- This involves the following activities:
 - **Planning:** deciding what is to be done
 - **Organizing:** making arrangements
 - **Staffing:** selecting the right people for the job
 - **Directing:** giving instructions

Basic Concepts

- **Controlling:** Ensure that everything meets the standards
- **Monitoring:** checking on progress
- **Innovating:** solutions when problems emerge
- **Representing:** liaising with stakeholders

Example:

- Managing the development of an **online learning system**
 - involves balancing time, cost, and scope while ensuring quality and stakeholder satisfaction.

Basic Concepts

How **project** is different from **operation** in an organization?

- **Project** is temporary effort and has clear start and end.
- **Operation** is an ongoing and repetitive activity that sustain organization's daily function.

Therefore, **Project** is temporary and goal oriented, **operation** is permanent and process oriented. For example:

1. Development of an online learning system → **Project**
2. Maintaining and supporting an online learning system → **Operation**

Basic Concepts

- **Project Management**

- The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.
- It is a profession that requires a combination of skills, knowledge, tools and techniques to successfully complete a project.

- **Project Manager**

- A professional responsible for managing resources, leading teams, mitigating risks and ensuring projects are completed on time, within budget, and scope

Basic Concepts

Activity:

- When the project is begin and reached to an end?
- What is Software Project and Software Product?
- A project begins when it is formally initiated with defined objectives and ends when its deliverables are completed and accepted, followed by closure activities
- Software Project is the process of creating the Software product, while the software product is the tangible outcome delivered to users.

Basic Concepts

Program and Portfolio

- **Project** is a temporary effort carried out to achieve a specific goal.
- **Program** is a collection of two or more **related** projects to achieve strategic benefit. → Program Manager
- **Portfolio** is a collection of projects, programs and operations to Achieve strategic business goal. → Portfolio Manager
- In an organization, there is an office called **project management office (PMO)** that oversees and provides strategic directions.

Project Management Phases

- Project management is achieved by effectively applying and integrating a set of logically grouped processes or phases.
- The five phases or process groups in project management are:
 - **Initiating**
 - **Planning**
 - **Executing**
 - **Monitoring and Controlling**
 - **Closing**

Project Management Lifecycle

- The project management lifecycle is the **step by step sequencing** of the above five phases, from initiation to closure.
- It provides a structured framework that outline the organization and management of project's tasks, resources and timeline.
- These phases of the project lifecycle are based on industry standards that undertakes from inception to completion of a project.
- In the following slide, the phases and its sequencing are illustrated (*Brown, 2025:online*).

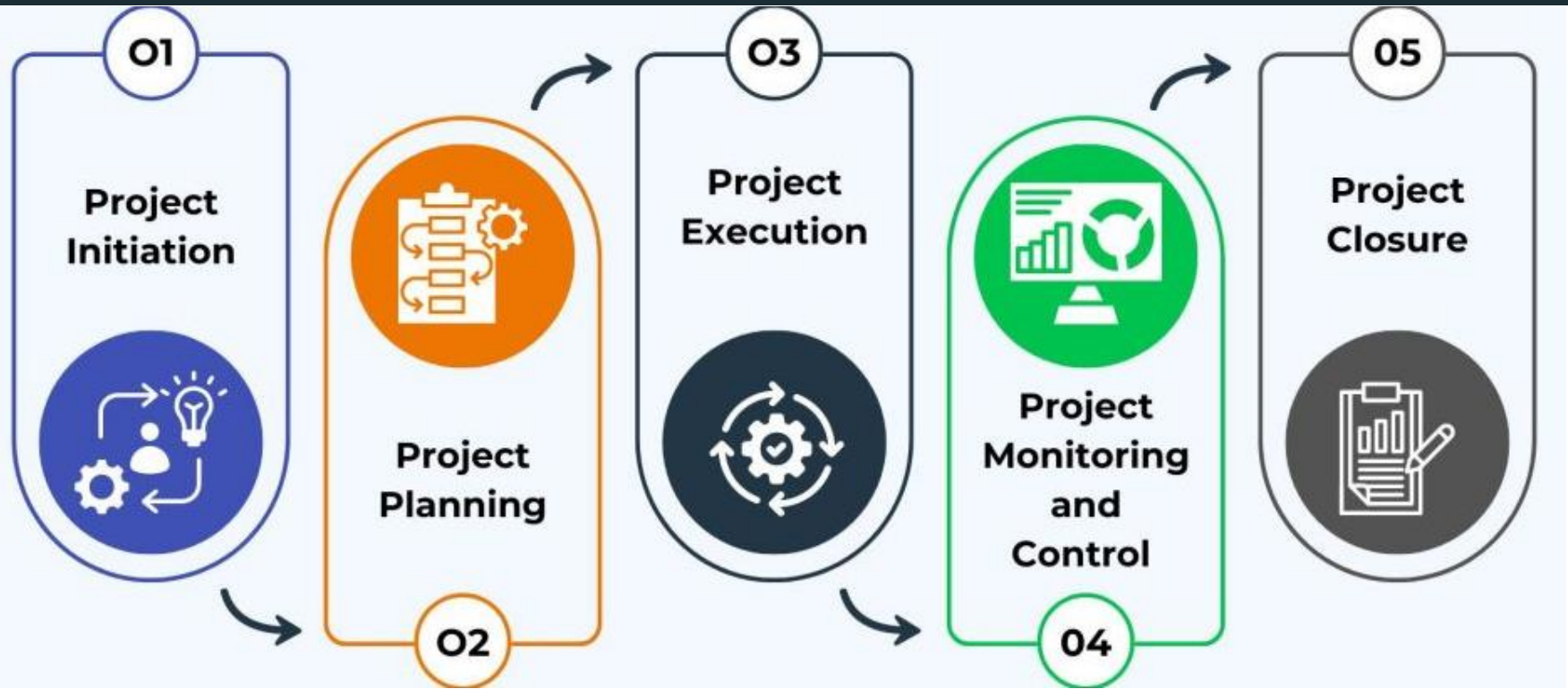


Figure 1: The five stages of a project lifecycle (Source: Brown, 2025:online)

Project Management Lifecycle

- Each project management phase has specific goals, deliverables, and processes that contribute to the overall success of the project.

Initiation

- **Activities**

- Identify the project's purpose, goals and objectives.
- Conduct feasibility study or business case analysis.
- Identify key stakeholders and their expectations.
- Develop a project charter (formal authorization to start the project).

Project Management Lifecycle

Initiation

- **Significance**
 - Ensures the project aligns with organizational goals.
 - Provides a clear understanding of the project's purpose and scope.
 - Sets the foundation for planning by defining high-level requirements.
- **Purpose:** Define the project at a high level & obtain approval to proceed

Project Management Lifecycle

Planning

- **Activities**

- Define the project scope and create a Work Breakdown Structure
- Develop a project schedule, budget, and resource plan.
- Identify risks and create a risk management plan.
- Establish communication, change management and quality plans
- Develop project management plan

Project Management Lifecycle

Planning

- **Significance**
 - Provides a clear plan to guide the project team.
 - Helps anticipate challenges and prepare for risks.
 - Ensures all stakeholders are aligned on the project's direction.
- **Purpose:** Develop a detailed roadmap for executing, monitoring, and controlling the project.

Project Management Lifecycle

Execution

- **Activities**

- Execute the project plan and manage deliverables
- Assign tasks and resources to team members.
- Communicate with stakeholders and manage their expectations.
- Implement quality assurance processes.

Project Management Lifecycle

Execution

- **Significance**
 - Turns the project plan into actionable results.
 - Ensures deliverables meet the required standards.
 - Keeps the project on track through effective team and stakeholder management.
- **Purpose:** Carry out the project plan and produce deliverables

Project Management Lifecycle

Monitoring and Controlling

- **Activities**

- Monitor project progress against the plan.
- Manage changes to scope, schedule, and budget.
- Identify and address risks and issues.
- Report on project performance to stakeholders.

Project Management Lifecycle

Monitoring and Controlling

- **Significance**
 - Ensures the project stays on track and within budget.
 - Allows for timely adjustments to address deviations.
 - Maintains transparency and accountability throughout the project.
- **Purpose:** Track, review, and regulate the project's progress and performance

Project Management Lifecycle

Closure

- **Activities**

- Obtain formal acceptance of deliverables from stakeholders.
- Develop lessons learned and project closure report
- Release project resources and close contracts.
- Archive project documentation for future reference.

Project Management Lifecycle

Closure

- **Significance**
 - Ensures all project objectives have been met.
 - Provides insights for improving future projects.
 - Officially closes the project and celebrates success.
- **Purpose:** Formalize the completion of the project and hand over deliverables

Project Management Lifecycle

Example:

Assume, the development of an **Online Learning System**. List at least three key activities that would occur in each phase of the project management.

The project management phases are:

1. Initiation
2. Planning
3. Executing
4. Monitoring and Controlling
5. Closing

Project Management Lifecycle

Phase	Key Activities
Initiation	Identify project goals and stakeholders, define project scope, conduct feasibility study and business case
Planning	Develop schedule, allocate resources, identify risks, define budget
Execution	Develop and test the platform, design UI/UX, integrate video conferencing tools.
Monitoring & Controlling	Track project progress, adjust plans as needed, conduct quality assurance tests.
Closing	Conduct final testing, document lessons learned, hand over the system to the university.

Project Management Principles

There are twelve principles of project management (PMI, 2021)

1. Be a diligent, respectful, and caring steward
2. Create a collaborative project team environment
3. Effectively engage with stakeholders
4. Focus on value
5. Recognize, evaluate, and respond to system interactions
6. Demonstrate leadership behaviors

Project Management Principles

There are twelve principles of project management (PMI, 2021)

7. Tailor based on context
8. Build quality into processes and deliverables
9. Navigate complexity
10. Optimize risk responses
11. Embrace adaptability and resiliency
12. Enable change to achieve the envisioned future state

Software Project Management Tasks

- **Software Project Management:**
 - A part of project management in which software projects are
 - planned, implemented, monitored, and controlled.
 - A systematic approach to planning and guiding software project processes from **start** to **finish**.
 - A proper way of planning and leading software projects

Software Project: a type of project that involves **SDLC** and **development methodologies** to create a software product.

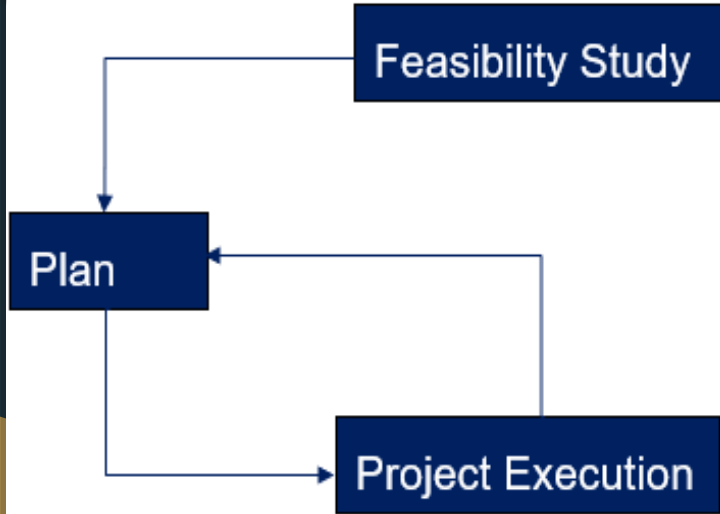


Figure 2: Elements or Knowledge areas of Project Management
(Source: Tommy, 2024: Online)

Software Project Management Tasks

- The following are the three sequential stages that drive the creation of a new system.
 - **Feasibility study**
 - Is project technically feasible and worthwhile from a business point of view? **May be a project by its own.**
 - **Planning:** How do we do it, done if project is feasible
 - **Execution:** Implement plan
 - Contains design and implementation subphases

Software Project Management Tasks



The phase of SDLC are:

1. Planning
2. Requirement gathering and Analysis
3. Design
4. Coding or development
5. Testing and Integration
6. Deployment and Maintenance

This process align with the SDLC

- **Feasibility** study includes **determining requirements**
- **Plan** includes **requirement Analysis**
- **Execution** includes **Design, coding, testing** and **deployment**.

Software Project Management Tasks

- Therefore, Software Project Management (SPM) tasks
 - Involve managing the software development lifecycle (SDLC) activities and methodologies.
- In the context of SPM, the responsibilities includes
 - Creating and overseeing the planning, execution and delivery of software projects, while ensuring the effective use of SDLC methodologies.

Software Project Management Tasks

- Key SPM tasks related to managing SDLC activities :
 - Defining the Project Scope and Requirements
 - Project Planning
 - Methodology Selection
 - Team Management
 - Monitoring and Controlling
 - Ensuring Adherence to SDLC Methodology
 - Stakeholder Communication and Reporting
 - Project Closure

Project Management Lifecycle

Activity:

- The five process groups form the foundation of project management, and allocating the appropriate time to each group is crucial for project success. **Estimate how much percentage of the project time is required to complete each phase.**
- **Alpha project managers** spent twice for planning when compared with **other project managers**, and lower execution time (Crowe, 2010).

Project Management Lifecycle

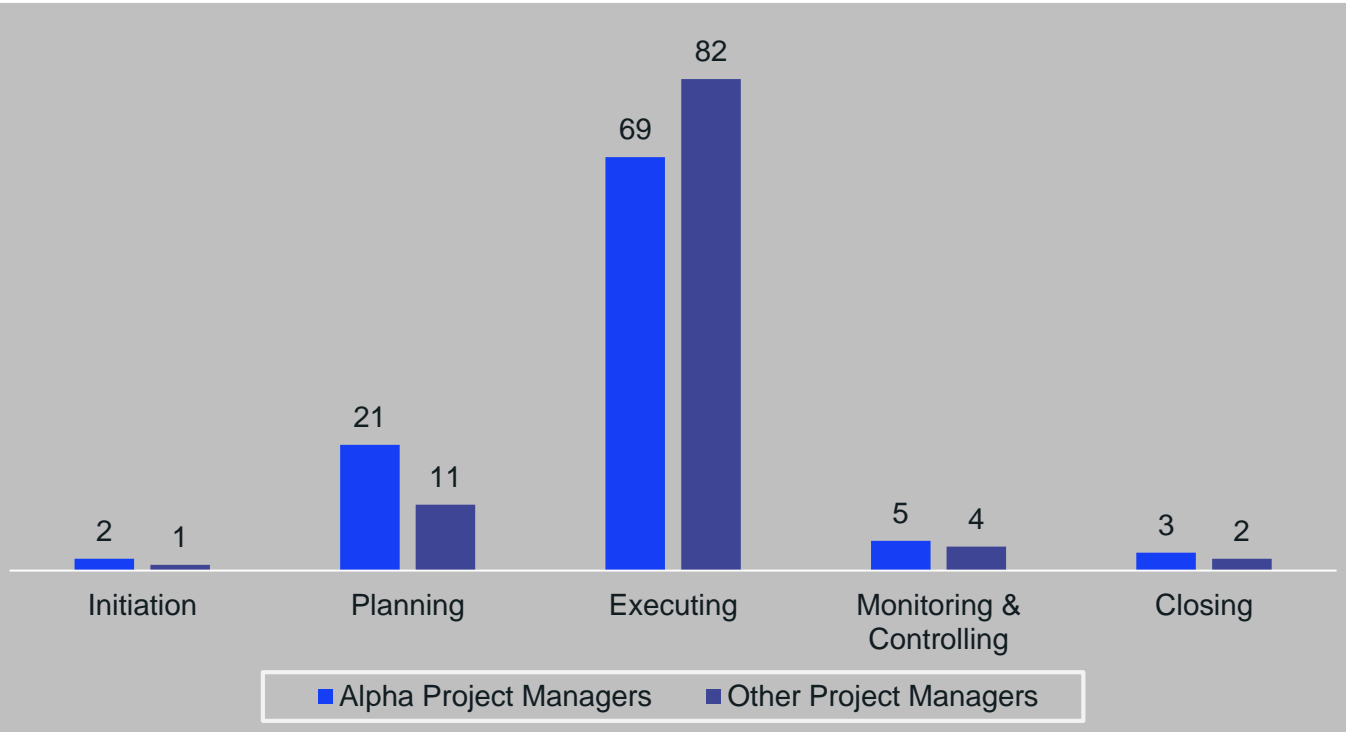


Figure 2: Percentage of time spent on each process group (Source: Crowe, 2010)

The Role of Project Manager (PM)

- The PM is the key in ensuring the successful planning, execution, and completion of a project by ensuring they meet objectives, stay within budget, and are completed on time.
- The roles include
 - Planning and organizing
 - Team leadership
 - Communication
 - Managing stakeholders, resources, changes and risks
 - Progress tracking and problem solving

The Role of Project Manager (PM)

- Project managers need a wide variety of skills.
 - Comfortable with change, understand the organizations they work in.
 - Able to lead teams to accomplish project goals.
 - Need both “hard” and “soft” skills.
 - **Hard skills:** domain knowledge, tools & techniques
 - **Soft skills:** being able to work with people

A **good project manager** combines leadership, communication, problem-solving, and organizational skills to ensure project success.

Summary

- A project is a temporary endeavor aimed at creating a unique product, service, or result, distinct from routine operations.
- The success of an organization often depends on the effective execution of such projects. Project management involves applying knowledge, skills, and experience to oversee project activities, ensuring goals are met efficiently.
- The five phases of project management form the foundation for successful project execution, enabling teams to achieve project goals.
- In software projects,
 - this management is closely tied to the SDLC.
 - A skilled project manager plays a critical role in driving a project to success.

References

1. PMI. (2013). *A Guide to the Project Management Body of Knowledge* (5th ed.). PMI, Inc.
2. PMI. (2021). *A Guide to the Project Management Body of Knowledge* (7th ed.). PMI, Inc.
3. Crowe, A. (2010). *Alpha Project Managers (What the Top 2% Know Every One Else Does Not)*.
4. Brown, L. (2025) *The five stages of a project lifecycle* [Online Image] [Accessed on 14th March, 2025]. <https://www.invensislearning.com/blog/5-phases-project-management-lifecycle/>
5. Tommy, B. (2024) *What is Project Management....and why do we need it?* [Online Image] [Accessed on 14th March, 2025]. <https://www.moserit.com/learning-blog/what-is-project-management>