

Lecture 1: Introduction

1. What is a Project?

- * A project is a **temporary endeavor** undertaken to create a **unique product, service, or result**.
- * Projects fulfill objectives by producing **deliverables** (unique, verifiable products, results, or capabilities).
- * **Objectives** are outcomes, strategic positions, purposes, results, products, or services to be achieved.
- * Deliverables can be tangible or intangible.

2. Types of Deliverables:

- * A unique product (component, enhancement, correction, new item).
- * A unique service or capability (e.g., business function).
- * A unique result (e.g., outcome, document like research).
- * A unique combination of products, services, or results (e.g., software with documentation and help desk).

3. Temporary Endeavor:

- * Projects have a **definite beginning and end**.
- * "Temporary" doesn't necessarily mean short duration.
- * A project ends when: objectives are achieved, objectives cannot/will not be met, funding is exhausted/unavailable, the need no longer exists, resources are unavailable, or it's terminated for legal/convenience reasons.

4. Managing a Project:

- * Involves: identifying requirements, addressing stakeholder needs, communication, and balancing competing constraints (Scope, Quality, Schedule, Budget, Resources, Risks).

5. Projects Enable Business Value Creation:

- * **Tangible Value:** Monetary assets, stockholder equity, utility, fixtures, tools, market share.
- * **Intangible Value:** Goodwill, brand recognition, public benefit, trademarks, strategic alignment, reputation.

6. Project Initiation Context (Reasons for Starting Projects):

- * Meet regulatory, legal, or social requirements.
- * Satisfy stakeholder requests or needs.

- * Create, improve, or fix products, processes, or services.
- * Implement or change business or technological strategies.

7. Benefits of Effective Project Management:

- * Meet business objectives, satisfy stakeholders, be more predictable, increase chances of success, deliver right products at the right time, resolve issues, respond to risks, optimize resources, manage constraints, balance influences, and manage change better.

8. Consequences of Poorly Managed Projects:

- * Missed deadlines, cost overruns, poor quality, rework, uncontrolled expansion (scope creep), loss of reputation, unsatisfied stakeholders, and failure to achieve objectives.

9. Project Management as a Strategic Competency:

- * Enables organizations to: tie project results to business goals, compete effectively, sustain the organization, and respond to business environment changes by adjusting plans.

10. Relationship of Project, Program, Portfolio, and Operations Management:

- * **Portfolio Management:** Aligns with organizational strategy by selecting the right programs or projects, prioritizing work, and providing resources.
- * Focus: Strategic objectives, investment decisions, optimal mix, transparency, resource prioritization, ROI, aggregate risk.
- * **Program Management:** Harmonizes program components (projects, sub-programs) and controls interdependencies to realize specified benefits not available from managing them individually.
- * Focus: Alignment, scope allocation, interdependencies, program risks, resolving constraints/conflicts, change requests, budgets, benefits realization.
- * **Project Management:** Enables the achievement of organizational goals and objectives through the creation of unique deliverables.
- * **Operations Management:** Concerned with the ongoing production of goods/services, ensuring efficient operations by using optimal resources to meet customer demands. (Largely outside the scope of formal PM).
- * **Organizational Project Management (OPM):** A strategy execution framework utilizing portfolio, program, and project management to consistently and predictably deliver organizational strategy.

11. Project Life Cycles & Development Life Cycles:

- * **Predictive (Waterfall):** Scope, time, and cost determined early. Changes carefully managed.

- * **Iterative:** Scope determined early, time/cost estimates refined as understanding increases through repeated cycles.
- * **Incremental:** Deliverable produced through successive iterations adding functionality within a predetermined time frame.
- * **Adaptive (Agile/Change-driven):** Intended to respond to high levels of change and ongoing stakeholder involvement. Scope defined and approved before each iteration.
- * **Hybrid:** Combination of predictive and adaptive approaches.

12. Project Phase:

- * A collection of logically related project activities that culminates in the completion of one or more deliverables.
- * Attributes: Name, number, duration, resource requirements, entrance/exit criteria.
- * Examples: Concept development, feasibility, design, build, test, transition.

13. Phase Gate (Stage Gate, Kill Point):

- * Held at the end of a phase to compare performance/progress against business documents (business case, charter, PM plan).
- * A go/no-go decision is made: continue, continue with modification, end project, remain in phase, or repeat phase.

14. Project Management Processes:

- * Can be used once/predefined points (e.g., Develop Charter), periodically (e.g., Acquire Resources), or continuously (e.g., Define Activities).

15. Project Management Process Groups (IPECC):

- * **Initiating:** Define and authorize the project or phase.
- * **Planning:** Establish scope, refine objectives, define the course of action.
- * **Executing:** Complete the work defined in the project management plan.
- * **Monitoring & Controlling:** Track, review, regulate progress and performance; identify and initiate changes.
- * **Closing:** Formally complete or close the project, phase, or contract.

16. Project Management Knowledge Areas (10 of them):

- * Integration, Scope, Schedule, Cost, Quality, Resource, Communications, Risk, Procurement, Stakeholder Management. (These are mapped against the Process Groups).

17. Project Management Data and Information:

- * **Work Performance Data:** Raw observations and measurements from activities.
- * **Work Performance Information:** Performance data analyzed in context and integrated.

* **Work Performance Reports:** Physical/electronic representation of work performance information compiled in project documents.

18. Tailoring:

* Determining the appropriate combination of processes, inputs, tools, techniques, outputs, and life cycle phases to manage a project. Methodologies can be developed internally or acquired externally.

19. Project Management Business Documents:

* **Project Business Case:** Documents the justification for the project, including business needs, analysis of the situation (objectives, root cause, gap analysis, risks, success factors), recommendation (option, constraints, success measures), implementation approach, and evaluation (how benefits will be measured).

* **Project Benefits Management Plan:** Describes how and when the benefits of the project will be delivered and measured. Includes target benefits, strategic alignment, timeframe, owner, metrics, assumptions, and risks.

20. Project Charter and Project Management Plan:

* **Project Charter:** Formally authorizes the project's existence and provides the PM with authority to apply resources.

* **Project Management Plan:** Describes how the project will be executed, monitored, and controlled. It integrates and consolidates subsidiary plans.

21. Project Success Measures:

* Define what success looks like, how it's measured, and factors impacting success.

* Examples: Completing benefits plan, achieving financial measures (NPV, ROI, IRR, PBP, BCR), nonfinancial objectives, stakeholder satisfaction, quality, etc.

22. The Environment in Which Projects Operate:

* **Enterprise Environmental Factors (EEFs):** Conditions not under the immediate control of the project team that influence, constrain, or direct the project.

* **Internal EEFs:** Org. culture/structure/governance, geographic distribution, infrastructure, IT software, resource availability, employee capability.

* **External EEFs:** Marketplace conditions, social/cultural influences, legal restrictions, commercial databases, academic research, government/industry standards, financial considerations.

* **Organizational Process Assets (OPAs):** Plans, processes, policies, procedures, and knowledge bases specific to and used by the performing organization.

- * **Processes, Policies, Procedures:** Initiating/planning guidelines, templates, change control, financial controls, issue/defect management, communication requirements, work authorization, closure guidelines.

- * **Organizational Knowledge Repositories:** Configuration management, financial data, historical information/lessons learned, issue/defect data, metrics data, previous project files.

23. Organizational Systems:

- * Consist of management elements, governance frameworks, and organizational structure types. They are dynamic, can be optimized, and are often nonlinear in responsiveness.

24. Organizational Governance Frameworks:

- * Provide direction and oversight through people, roles, structures, and policies. Include rules, policies, procedures, norms, relationships, systems, and processes.

25. Management Elements (Factors in Governance):

- * Division of work, authority, responsibility, discipline, unity of command/direction, subordination of individual interest, fair pay, optimal resource use, clear communication, etc.

26. Factors in Organization Structure Selection:

- * Alignment with objectives, specialization, span of control, clear escalation path/authority, delegation, accountability, adaptability, cost, communication, etc.

- * Common structures: Functional, Matrix (Weak, Balanced, Strong), Project-Oriented.

27. Project Management Office (PMO):

- * An organizational structure that standardizes project-related governance processes and facilitates sharing resources, methodologies, tools, and techniques.

*** Types:**

- * **Supportive:** Consultative role, low control (templates, best practices).

- * **Controlling:** Provides support and requires compliance, moderate control (frameworks, specific tools).

- * **Directive:** Takes control by directly managing projects, high control.

- * PMOs can manage shared resources, develop methodologies, coach/mentor, monitor compliance, and coordinate communications.

28. Role of the Project Manager:

- * Responsible for achieving project objectives.

- * Acts as a conductor, possessing knowledge and understanding across various domains but not necessarily an expert in all.

- * Communicates extensively (90% of time) within various spheres of influence (team,

sponsors, stakeholders, other PMs).

- * Stays informed about industry trends.

29. PMI Talent Triangle®:

- * **Technical Project Management:** Knowledge, skills, and behaviors related to specific domains of project, program, and portfolio management.

- * **Leadership:** Knowledge, skills, and behaviors specific to leadership-oriented, cross-cutting skills that help an organization achieve its business goals.

- * **Strategic and Business Management:** Knowledge of and expertise in the industry/organization that enhances performance and better delivers business outcomes.

30. Key Skills for Project Managers:

- * **Technical PM Skills:** Focus on critical elements (success factors, schedule, financials, issue log), tailor tools, plan/prioritize, manage project elements (schedule, cost, resources, risks).

- * **Strategic & Business Management Skills:** Understand/explain business aspects, develop delivery strategy, maximize business value.

- * **Leadership Skills:** Visionary, optimistic, collaborative, manages relationships/conflict, communicates effectively, respectful, integrity, gives credit, lifelong learner, focuses on priorities, holistic view, critical thinking, team building. Includes understanding politics, power (positional, informational, referent, etc.), and influence tactics.

31. Leadership vs. Management:

- * **Management:** Maintains, administers, focuses on systems/control, near-term goals, "how and when," bottom line, accepts status quo, "does things right."

- * **Leadership:** Develops, innovates, focuses on relationships/trust, long-range vision, "what and why," horizon, challenges status quo, "does the right things," focuses on vision/alignment/motivation.

32. Leadership Styles:

- * Laissez-faire, Transactional, Servant leader, Transformational, Charismatic, Interactional.

33. Personality Traits for PMs:

- * Authentic, courteous, creative, culturally sensitive, emotionally intelligent, intellectual, managerial, political, service-oriented, social, systemic thinker.

34. Performing Integration (Project Manager's Role):

- * Work with sponsor on strategic objectives.

- * Ensure alignment of project with portfolio, program, and business areas.

- * Contribute to strategy execution.
- * Guide the team to focus on essentials.
- * Achieved by integrating processes, knowledge, and people.

35. Project Integration Management (Knowledge Area):

* Includes processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities.

*** Processes:**

1. Develop Project Charter
2. Develop Project Management Plan
3. Direct and Manage Project Work
4. Manage Project Knowledge
5. Monitor and Control Project Work
6. Perform Integrated Change Control
7. Close Project or Phase

36. Project Scope Management (Knowledge Area):

* Includes processes required to ensure the project includes all the work required, and only the work required, to complete the project successfully.

*** Processes:**

1. Plan Scope Management
2. Collect Requirements
3. Define Scope
4. Create WBS (Work Breakdown Structure)
5. Validate Scope
6. Control Scope

Lecture 2: Agile PM

1. PMBOK® Guide - 6th vs. 7th Edition Context:

- * The presentation starts by showing the evolution from PMBOK® Guide 6th Edition (process-group and knowledge-area focused) to the 7th Edition.
- * **PMBOK® Guide 7th Edition** emphasizes:
 - * A system for **Value Delivery**.
 - * **12 Principles** (e.g., Stewardship, Team, Stakeholders, Value, Systems Thinking, Leadership, Tailoring, Quality, Complexity, Risk, Adaptability & Resiliency, Change).
 - * **8 Performance Domains** (e.g., Stakeholders, Team, Development Approach & Life Cycle, Planning, Project Work, Delivery, Measurement, Uncertainty).
- * This shift aligns with more adaptive and Agile approaches.

2. The Agile Development Rhythms (Cadences):

- * **Strategy:** Project and product vision, business need, and overall direction.
- * **Release:** A set of product features delivered as a package (typically 1-6 month cycles). Involves prioritizing features.
- * **Iteration (Sprint):** Short, time-boxed periods (usually 1-4 weeks) where the team produces a potentially shippable increment of working software. Includes Iteration Planning, Daily Stand-ups, Iteration Review, and Retrospective.
- * **Daily:** Short team meetings (e.g., Daily Scrum) to synchronize, discuss progress on high-priority features, and identify impediments.
- * **Continuous:** Agile teams aim for ongoing improvement in planning, collaboration, development, testing, and integration to consistently deliver valuable working software.

3. The Agile Manifesto - Values:

- * Agile values are contrasted with traditional approaches. The manifesto prioritizes:
 - * **Individuals and Interactions** over Processes and Tools
 - * **Working Software** over Comprehensive Documentation
 - * **Customer Collaboration** over Contract Negotiation
 - * **Responding to Change** over Following a Plan
- * Agile mythology emphasizes frequent delivery of high-quality, working software and alignment between technology and business.

4. The Agile Manifesto - 12 Principles:

1. Highest priority: Satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development.

3. Deliver working software frequently (weeks or months).
4. Business people and developers must work together daily.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them.
6. Face-to-face conversation is the most efficient and effective method of conveying information.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. Maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity—the art of maximizing the amount of work not done—is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior.

5. The Agile Process / Methodology:

- * Starts with initial planning: Product Vision, Project Definition, Initial Release Plan, Contractual Agreement (if applicable).
- * Key Roles: Stakeholders, Product Owner (manages product backlog), Development Team.
- * **Product Backlog Management:** A prioritized list of features/requirements.
- * **Release Planning:** Deciding which backlog items go into which release.
- * **Iterative Development:** Work proceeds in cycles (iterations/sprints).
- * Each iteration involves: Design -> Build -> Test & Show Client (Demo).
- * Feedback from the demo informs the next iteration.
- * **Agile Lifecycle (example):** Start (Define Project, Define Requirements, High-Level Req.) -> Development Iterations -> Accept -> Release to Market.
- * Emphasis on continuous visibility for stakeholders.

6. Agile Methodology - Extreme Programming (XP):

- * An agile software development framework aiming for high-quality software and higher quality of life for the development team.
- * Key Practices: Whole Team, Collective Ownership, Test-Driven Development, Coding Standard, Customer Test, Pair Programming, Refactoring, Continuous Integration, Simple Design, Sustainable Pace, Small Releases, Planning Game.

7. Waterfall VS. Agile:

- * **Waterfall:**
- * Sequential phases (Requirements, Design, Construction, Testing, Deployment).
- * Scope is typically fixed upfront.

- * Plan-driven; changes are difficult and costly.
- * Budget and schedule are often estimated based on the full scope.
- * **Agile:**
- * Iterative and incremental approach.
- * Value-driven; scope can be flexible and evolve.
- * Embraces change; frequent feedback loops.
- * Features planned and developed in short cycles (e.g., Sprints).
- * Delivers working software in increments.

8. Agile Success Rates & Benefits:

- * Agile methodologies often show higher success rates (e.g., 72% for Agile vs. 63% for Traditional in one chart).
- * Benefits include: Transparency, Frequent Delivery, Predictability, Allows Change, Business Focus, Customer Focus, High Quality.

9. Agile Momentum & Reasons for Implementation:

- * High adoption rates (70-80% of organizations using some form of Agile).
- * Key drivers for adopting Agile:
- * Accelerate product delivery.
- * Enhance ability to manage changing priorities.
- * Increase productivity.
- * Improve software quality.
- * Enhance delivery predictability.
- * Improve business/IT alignment.

10. Agile Methodologies Used:

- * **Common Methodologies:** SCRUM (most popular), SCRUMBAN, KANBAN, LEAN, XP.
- * **Scrum:** Iterative framework with Sprints (1 week to 1 month).
- * **Kanban:** Pull-based system emphasizing flow and visualizing work.
- * **XP:** Focuses on software development quality and responsiveness.
- * **Scaling Agile Methodologies:** For larger enterprises.
- * SAFe (Scaled Agile Framework) - most common for scaling.
- * SCRUM OF SCRUMS / SCRUM@SCALE, ENTERPRISE SCRUM, Disciplined Agile Delivery (DAD), LEAN.

11. Measuring Agile Success & Results:

- * **Metrics:** On-Time Delivery, Product Quality, Customer Satisfaction, Business Value, Product Scope.

* **Results from Implementation:** Improved management of changing priorities, greater productivity, increased project visibility, better delivery predictability, improved team morale and motivation.

12. Keys to Success & Barriers Against Agile:

* **Keys to Success:** Common tools, Agile consultants/trainers, executive sponsorship, consistent practices, internal Agile support team.

* **Barriers:** Company culture, lack of experience, insufficient management support, inconsistent practices, resistance to change.

13. Top Agile Management Tools:

* Examples: Microsoft Excel, Microsoft Project, Atlassian/JIRA, VersionOne, Microsoft Team Foundation Server (Azure DevOps), Google Docs, HP Quality Center (Micro Focus ALM).

14. Agile Templates & Visual Tools:

* Agile utilizes various templates and visual tools for planning, tracking, and communication.

* Examples shown:

* Agile Roadmap Template

* Agile Release Planner

* Agile Project Plan Template

* Agile Sprint Backlog Template

* Agile Product Backlog Template

* Agile Test Plan Template

* Agile User Story Template

* Agile Project Charter Template

* Editable Gantt Chart (often adapted for Agile visualization)

* Kanban Board (visualizing Backlog, To Do, In Progress, Testing, Done)

Lecture 3: Planning WBS

1. Overview of Lecture:

- * **Project Planning:** Building a Project Plan, relation to the overall unit plan, first steps.
- * **Work Breakdown Structure (WBS):** Definition, types, and application in project planning.
- * **Assignment 1:** Finalizing section choices, working on goals and WBS.

2. Discussion Points (Prompt for Students):

- * Why is Project Planning important?
- * What is involved in Project Planning? What would be the outputs?

3. How Projects are Managed (General Management Functions):

- * Planning
- * Organizing
- * Leading
- * Controlling

4. Project Planning - Deciding in Advance:

- * **What** the project aims to achieve and **why** (Purpose and Goals)
- * **What to do** to achieve goals (Work Breakdown)
- * **With what** to do it (Resources Required)
- * **How much effort** is required (Effort Estimation)
- * **When** to do it (Schedule)

5. Project Planning Steps:

- * **Define the project:** Includes defining scope/limitations. Often starts in a Project Charter and is expanded/refined in planning.
- * **Do a work breakdown.**
- * **Estimate effort, prepare budgets, allocate resources.**
- * **Schedule activities and resource use.**
- * **Document the project plan:** Includes project definition, course of action, policies, WBS, budget, schedule, monitoring plans, communication plans, contingency plans.

6. Importance of Documentation (Recap):

- * Provides a clear, unambiguous reference point.
- * Avoids reliance on human memory/perceptions (prevents "he said, she said").
- * Ensures consistency even with personnel changes.
- * Gets all stakeholders on the same page (requires sign-off).

- * Provides traceability (what, who, when).
- * Avoids conflict and misunderstanding.

7. Building a Project Plan (Key Activities):

- * Validate project definition.
- * Determine what needs to be done (Deliverables, WBS).
- * Determine acceptance criteria (for each deliverable).
- * Determine resource needs (people, facilities, tools).
- * Acquire resources.
- * Estimate the work.
- * Develop the schedule.
- * Determine project costs and budget.
- * Determine the project control system (how performance will be measured, reported).
- * Update roles and responsibilities (responsibility chart/matrix).
- * Plan for change, project information, issues, risks, quality, communications, team management, and procurements.

8. Key Project Planning Principles:

- * **Purpose:** Develop a plan to execute and control the project.
- * **Iterative Process:** Multiple passes are required; not a straight-line process.
- * **Many Elements:** More than just a timeline or WBS file.
- * **Proactive Approach:** Effective planning enables proactive management.
- * **Time for Interaction:** Involves questions, facilitation, interaction, and feedback; not a top-down, isolated activity.

9. Defining the Project (More Detail):

- * **Requirements/Scope of Work/Goals:** Include how to measure and performance targets.
- * **Boundaries and Limitations:** Define results, time frames, and resources (personnel, money, equipment, space).

10. Defining Goals / Acceptance Criteria:

- * Be clear and specific. Avoid vague statements.
- * Example: "The project needs to be completed by 5pm on 30th June 2018" (Specific) vs. "The project needs to be finished as soon as possible" (Vague).

11. Setting Goals – SMART Goals (Recap):

- * **Specific:** State exactly what you want to accomplish.
- * **Measurable:** How will you demonstrate and evaluate when the goal has been met?

- * **Achievable:** Stretch and challenging goals within ability to achieve the outcome.
- * **Relevant:** How does the goal tie into key responsibilities/objectives?
- * **Time-bound:** Set target dates/deadlines to guide successful and timely completion.

12. Determining Resource Needs:

- * Determine type and quantity of resources (people/roles, facilities, tools/equipment).
- * Based on tasks and activities.
- * Timing (when needed) is crucial.
- * For people: Role description, prerequisite skills, skill levels, experience.

13. Responsibility Chart & Responsibility Matrix (RASIC/RACI):

- * **Responsibility Chart:** Defines roles and their responsibilities for different project aspects.
- * **Responsibility Matrix (RASIC/RACI):** Maps responsibility levels for each significant work package in the WBS.
- * **R** = Responsible (does the work)
- * **A** = Approve (accountable, signs off)
- * **S** = Support (provides resources/assistance)
- * **C** = Consulted (provides input/expertise)
- * **I** = Informed (kept up-to-date)

14. Iterative Process in Planning:

- * Planning is not a linear, one-time activity.
- * Involves multiple iterations and interdependencies.
- * Each pass refines and improves clarity and detail.

15. Assignment Selection (Context for Students):

- * Students need to choose a sub-project (e.g., Site & Décor for a wedding).
- * Choices to be recorded; changes need sponsor (lecturer) approval.

16. What is a Work Breakdown Structure (WBS)?

- * "A deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. It organizes and defines the total scope of the project." (PMBOK® Guide definition).
- * Key terms: Deliverables, Hierarchical, Decomposition, Scope.

17. Why do you need a WBS?

- * Avoids trying to plan a major project all at once (which is daunting and difficult).
- * Breaks down the project into more manageable parts.

18. Work Breakdown (WBS Characteristics):

- * A key project deliverable organizing team's work into manageable sections.
- * Ensures various project aspects are considered from the start.

*** Representation Methods:**

- * Tree-structured graph
- * Outline / Indented list

19. Types of WBS:

- * **Process WBS:** Pictures activities for the project.
- * **Product WBS:** Pictures components and interfaces of the product.
- * **Hybrid WBS:** Includes both process and product elements.

20. Purpose of WBS:

- * Identify project elements.
- * Help determine cost.
- * Estimate staff requirements.
- * Assign work elements, etc.

21. Guidelines for Effective WBS:

- * All project work included.
- * Deliverable-focused.
- * All deliverables explicit.
- * Developed with the team.
- * Refined as the project progresses.
- * Lowest level is the work package/activity level (where effort/cost can be reliably estimated).
- * Each element has only one parent.
- * **100% Rule:** Child elements completely cover the parent.
- * Unique identifiers for reporting.
- * Should include project management tasks.

22. When to Keep Breaking Down (Decomposition):

- * More than one individual/group responsible.
- * More than one deliverable included.
- * More than one work process included.
- * Time gap involved.
- * Resource requirements for the work element are inconsistent.
- * Specific risks associated with a smaller portion of the work element.

23. Example WBS Visualizations:

- * Showing hierarchical structure, addition of IDs and time, and incorporation of effort and budget.

24. WBS – Rolling Wave Method:

- * A form of progressive elaboration where work to be accomplished in the near term is planned in detail, while work far in the future is planned at a higher level of the WBS.
- * Allows for detailed planning of current phases and more general planning of future phases until more information is available.

Lecture 4: Project Risk Quality

1. Managing Issues:

- * **Identify** the issue.
- * **Document** the issues (e.g., in an Issue Log).
- * **Assign responsibility** for the issue.
- * **Track** until closure (issue resolved or an acceptable outcome achieved).
- * **Communicate** the issue to the team, stakeholders, and vendors.

2. Overview of the Session:

- * **Risk Management:** Defining risk, risk vs. issue, risk management process, common sources, application.
- * **Quality Management:** Defining quality, principles, tools, and techniques.

3. Risk Definition & Difference between Risk and Issue:

- * **Question:** What is the difference between a risk and an issue?
- * **Correct Answer:** A risk is a problem that *may occur*, an issue is a problem that *has occurred*.
- * **Risk Definition (various sources):**
 - * "A *potential problem* that will be detrimental to project success, should it materialize" (Wiegers, 2007).
 - * "An *uncertain event or condition* that, if it occurs, has a *positive or negative effect* on one or more project objectives (scope, schedule, cost, quality)" (PMI, 2017).
 - * "*Uncertain event impacting negatively or positively* on a project's objectives" (Larson & Gray, 2018).

4. Two Major Aspects of a Risk:

- * Its **probability** of occurrence (chance of the event happening).
- * Its **impact** (the effect of the event occurring).

5. Risk Management - General Principles:

- * An important part of project management; specifically addressed in the PM plan.
- * It is **proactive** (anticipating problems) rather than reactive (addressing issues as they arise).

6. Project Risk Characteristics:

- * **Uncertainty:** Probability is between 0 and 1 ($0 < P < 1$).
- * **Loss associated with it:** Can be money, time, reputation, product functionality, etc.
- * **Manageable:** Human actions can be applied to change its form and degree.

7. Overview of Risk Management Process (Cyclical):

1. **Establish Context** (Implicitly covered first in the lecture detailed steps)
2. **Identify Risks**
3. **Analyse and Evaluate Risks**
4. **Risk Response / Control**
5. **Monitor & Review**

8. Establish Context (Risk Management Step 1):

- * What are you evaluating risk for? (Define scope).
- * What factors may affect it? (Technical, economic, environmental, social, legal, etc.).
- * Identify stakeholders (users, employees, clients, legal bodies, etc.).
- * Identify risk criteria (death/injury, financial loss, legal liability, negative publicity, etc.).

9. Risk Identification (Risk Management Step 2):

- * Identify what could go wrong (risks).
- * Must be stated explicitly (as a *risk statement*).
- * Used to work out possible courses of action.
- * Can categorize by project "legs": Scope risks, Cost risks, Schedule risks.
- * **Risk Event Graph**: Shows chance of risk occurring is higher in early project phases, but cost to fix the risk is lower. Conversely, later in the project, the chance of new risks occurring decreases, but the cost to fix them increases.
- * **Risk Categories (PMI)**: Technical, External, Organizational, Project Management.

10. Risk Analysis (Part of "Analyse and Evaluate Risks" - Step 3):

- * Examine potential risks to determine:
 - * **Likelihood** (Probability)
 - * **Consequences** (Impacts)
- * Also look at:
 - * **Indicators** (that a potential problem is becoming real).
 - * **Trigger events** (to watch out for).
- * Related areas of impact.

11. Evaluate Risk (Part of "Analyse and Evaluate Risks" - Step 3):

- * Prioritize each risk based on assessed likelihood and consequences (impact).
- * Use a **Risk Matrix** (Likelihood vs. Consequences).
- * Address risks from high to low priority.
- * Decide if the risk is acceptable or not.

* Evaluate: Degree of control over risk, potential/actual losses, benefits/opportunities presented by the risk.

12. Risk Response / Control (Risk Management Step 4):

* **Risk Mitigation:** Act to reduce risk (reduce likelihood, reduce consequences, or both).

Ideally, eliminate risk altogether, but this may not always be possible.

* **Risk Avoidance:** Consciously avoid risky options or seek low-risk options. (May increase other risks, e.g., avoiding overspending leading to decreased quality).

* **Risk Transfer:** Transfer risks from one area to another (e.g., insurance, outsourcing to subcontractors). (May bring new risks, e.g., losing control).

* **Risk Acceptance:** Consciously accept low likelihood/low consequence risks and handle impacts if they occur. (Example: Accepting hard disk failure but mitigating through regular backups).

13. Risk Monitoring (Risk Management Step 5):

* Constant monitoring of:

* Risks that eventuate.

* Frequency of occurrence.

* Impacts.

* Also evaluate:

* Indicators and trends.

* Trigger events.

14. Review and Reiterate (Risk Management Continuous Aspect):

* The nature of risks evolves over time (new risks emerge, old ones disappear, likelihood/consequences change).

* Need to review what happened (risks that occurred, effectiveness of strategies).

* Repeat the whole process.

* Risk Management is a **continuous task**.

15. Common Risk Sources:

* **Project-related:** Size/complexity, requirements, change impact, organization, stakeholder involvement, schedule, funding, facilities, technology, vendors/suppliers.

* **Team-related:** External factors, business factors, project management, assumptions/constraints, project planning defects.

16. What is Quality? (Definitions):

* "The degree to which a set of inherent characteristics *fulfils requirements*." (PMI, 2017)

- * "*Fitness for use.*" (Juran, 2010)
- * "Quality should be aimed at the *needs of the consumer.*" (Deming, 1982)
- * "The total composite product and service characteristics of the organization to meet the *expectation by the customer.*" (Feigenbaum, 1991)

17. Aspects of Managing Project Quality:

- * Focus on **quality-based requirements** (identify standards, consider customer & stakeholders).
- * Focus on **value-added requirements** (understand non-functional requirements impacting satisfaction).
- * Focus on **product and process** (what is delivered, how it's created/delivered).
- * Focus on **verification** (validate project is on target, prove work is complete/correct).

18. Seven Key Principles to Managing Project Quality:

1. **Identify targets** (customer/stakeholder quality expectations).
2. **Plan it.**
3. **Right-size it.**
4. **Set expectations** (align with project needs, balance with schedule/budget).
5. **Stay customer-focused.**
6. **Trust, but verify** (inspect/test that results meet acceptance criteria).
7. **It is up to you!** (Project Manager has ultimate responsibility for quality).

19. Tools and Techniques for Project Quality:

- * **Requirements Traceability Matrix:** Links requirements to deliverables.
- * **Checklists:** Capture/communicate standards, flexible, capture lessons learned, document verification.
- * **Templates:** Enable use of standards, standardize outputs/processes.
- * **Reviews:** Plan for review-feedback-correction (peer reviews, inspections, walkthroughs, testing, milestone reviews).
- * **Completion Criteria:** Starts with acceptance criteria, defined for each deliverable/work assignment.
- * **Small Work Packages:** Finer level of quality control.
- * **Independent Audits:** External party review.
- * **Standards:** Defined beforehand and communicated.
- * **Quality Management Plan:** Describes and communicates the project's quality system to stakeholders.

20. Quality Management Process (PDCA Cycle - Deming):

- * **Plan:** What to do? How to do it?
- * **Do:** Do what was planned.
- * **Check:** Did things happen according to plan?
- * **Act:** How to improve next time?
- * Linked to inputs (e.g., contract review, purchasing requirements) and outputs (e.g., management review, corrective actions).

21. Overall Objective of Quality Management:

- * Understand needs and expectations of customers and other key stakeholders.
- * Ensure that those needs and expectations are managed and met.

Lecture 5: Project Scheduling

1. Project Schedule Management - Definition:

- * Includes the processes required to manage the timely completion of the project.

2. Processes in Project Schedule Management (PMBOK 6th Ed. numbering):

- * **6.1 Plan Schedule Management:** Establishing policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.
- * **6.2 Define Activities:** Identifying and documenting specific actions to produce project deliverables.
- * **6.3 Sequence Activities:** Identifying and documenting relationships among project activities.
- * **6.4 Estimate Activity Durations:** Estimating work periods needed to complete activities with estimated resources.
- * **6.5 Develop Schedule:** Analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model.
- * **6.6 Control Schedule:** Monitoring project status to update the schedule and manage changes to the schedule baseline.

3. Key Concepts for Project Schedule Management:

- * Project scheduling provides a detailed plan for **how and when** the project will deliver products, services, and results.
- * Serves as a tool for communication, managing stakeholder expectations, and performance reporting.
- * The project team selects a scheduling method (e.g., critical path, agile approach).
- * The detailed schedule should remain **flexible** to adjust for new knowledge, risk understanding, and value-added activities.
- * **Scheduling Method + Scheduling Tool + Project Specific Data** (activities, resources, durations, constraints, calendars, milestones) -> **Schedule Model** (generates) -> **Project Schedule** (output).
- * **Examples of Project Schedule Presentations:** Activity List, Bar Chart (Gantt Chart), Network Diagram.

4. Trends and Emerging Practices in Project Schedule Management:

- * **Iterative Scheduling with a Backlog:**
- * A form of rolling wave planning based on adaptive life cycles (e.g., agile).
- * Work is planned in iterations, with a backlog of features/stories to be pulled into upcoming iterations.

* **On-demand Scheduling:**

- * Typically used in Kanban systems.
- * Based on theory-of-constraints and pull-based concepts (lean manufacturing).
- * Limits Work In Progress (WIP) to balance demand against team throughput.
- * Visualized often with Kanban boards (e.g., To Do, Doing, Done or To Do, Plan, Develop, Test, Deploy, Done).
- * Agile planning often involves Release Plans broken into Iteration Plans, with features (User Stories) broken into tasks.

5. Tailoring Considerations for Schedule Management:

- * **Life cycle approach:** (e.g., predictive, iterative, agile) influences how scheduling is done.
- * **Resource availability:** Impacts activity durations and sequencing.
- * **Project dimensions:** (e.g., complexity, size) affect the level of detail and formality.
- * **Technology support:** Availability and choice of scheduling software/tools.

6. Considerations for Agile/Adaptive Environments:

- * Use **short cycles** (iterations/sprints) to undertake work, review results, and adapt.
- * Cycles provide **rapid feedback** on approaches and deliverables.
- * Manifests as iterative scheduling and on-demand, pull-based scheduling.

7. Plan Schedule Management (Process 6.1):

- * **Inputs:** Project Charter, Project Management Plan (Scope Management Plan, Development Approach), EEFs (culture, resource availability, software, tailoring guidelines, commercial databases), OPAs (historical info, policies, templates, reporting tools).
- * **Tools & Techniques:** Expert Judgment (development, management, control, methodologies, software, industry specifics), Data Analysis, Meetings.
- * **Outputs: Schedule Management Plan** (includes project schedule model development, release/iteration length, accuracy level, units of measure, organizational procedure links, model maintenance, control thresholds, rules of performance measurement, reporting formats).

8. Define Activities (Process 6.2):

- * **Inputs:** Project Management Plan (Schedule Management Plan, Scope Baseline), EEFs, OPAs.
- * **Tools & Techniques:** Expert Judgment, Decomposition, Rolling Wave Planning, Meetings.
- * **Outputs: Activity List, Activity Attributes, Milestone List**, Change Requests, Project Management Plan Updates (Schedule Baseline, Cost Baseline).

9. Sequence Activities (Process 6.3):

* **Inputs:** Project Management Plan (Schedule Management Plan, Scope Baseline), Project Documents (Activity Attributes, Activity List, Assumption Log, Milestone List), EEFs, OPAs.

* **Tools & Techniques:**

* **Precedence Diagramming Method (PDM):** (Activity-on-Arrow) Shows logical relationships. Types:

* Finish-to-Start (FS) - Most common

* Finish-to-Finish (FF)

* Start-to-Start (SS)

* Start-to-Finish (SF) - Least common

* **Dependency Determination and Integration:**

* Mandatory (hard logic): e.g., build foundation before erecting structure.

* Discretionary (soft/preferred logic): e.g., fast tracking.

* External: e.g., delivery from a third party.

* Internal: Within project team's control.

* **Leads and Lags:**

* Lead: Successor activity can start *before* predecessor finishes.

* Lag: A delay between predecessor and successor.

* Project Management Information System (PMIS).

* **Outputs:** Project Schedule Network Diagrams, Project Documents Updates (Activity Attributes, Activity List, Assumption Log, Milestone List).

10. Estimate Activity Durations (Process 6.4):

* **Inputs:** Project Management Plan (Schedule Management Plan, Scope Baseline), Project Documents (Activity Attributes, Activity List, Assumption Log, Lessons Learned Register, Milestone List, Project Team Assignments, Resource Breakdown Structure, Resource Calendars, Resource Requirements, Risk Register), EEFs, OPAs.

* **Considerations:**

* Law of diminishing returns.

* Number of resources (adding more doesn't always proportionally decrease time).

* Advances in technology.

* Motivation of staff (Student Syndrome, Parkinson's Law).

* **Tools & Techniques:**

* Expert Judgment

* Analogous Estimating (top-down, uses historical data from similar projects).

* Parametric Estimating (uses statistical relationship, e.g., cost per square foot).

* **Three-Point Estimating:** (Optimistic (tO), Most Likely (tM), Pessimistic (tP)). Formula: $tE =$

$(tO + tM + tP) / 3$ (Triangular distribution shown, PERT uses $(tO + 4tM + tP) / 6$).

- * Bottom-Up Estimating (aggregating estimates of lower-level components).
- * Data Analysis (Alternatives analysis, Reserve analysis).
- * Decision Making.
- * Meetings.
- * **Outputs: Duration Estimates, Basis of Estimates**, Project Documents Updates.

11. Develop Schedule (Process 6.5):

- * **Inputs:** Project Management Plan, Project Documents, Agreements, EEFs, OPAs.
- * **Tools & Techniques:**
 - * Schedule Network Analysis.
 - * **Critical Path Method (CPM):** Determines the longest path through the network, which is the shortest time the project can be completed. Activities on the critical path have zero float/slack.
 - * Resource Optimization (e.g., Resource Leveling, Resource Smoothing).
 - * Data Analysis (What-if scenario analysis, Simulation e.g., Monte Carlo).
 - * Leads and Lags.
 - * Schedule Compression (Crashing, Fast Tracking).
 - * PMIS.
 - * Agile Release Planning.
- * **Outputs: Schedule Baseline, Project Schedule, Schedule Data**, Project Calendars, Change Requests, Project Management Plan Updates, Project Documents Updates.
- * Visualizations include Gantt charts, milestone schedules, summary schedules, and detailed schedules.

12. Control Schedule (Process 6.6):

- * **Inputs:** Project Management Plan (Schedule Management Plan, Schedule Baseline, Scope Baseline, Performance Measurement Baseline), Project Documents (Lessons Learned Register, Project Calendars, Project Schedule, Resource Calendars, Schedule Data), Work Performance Data, OPAs.
- * **Tools & Techniques:**
 - * Data Analysis (Earned Value Analysis, Iteration Burndown Chart, Performance Reviews, Trend Analysis, Variance Analysis, What-if Scenario Analysis).
 - * Critical Path Method.
 - * PMIS.
 - * Resource Optimization.
 - * Leads and Lags.

- * Schedule Compression.

- * **Outputs:** Work Performance Information, Schedule Forecasts, Change Requests, Project Management Plan Updates, Project Documents Updates, OPA Updates.

- * Agile visual tools like iteration burndown charts are used to track progress.