

 CS413

SOFTWARE ENGINEERING PROJECT MANAGEMENT

**TEAM PROJECT**

**PROJECT MANAGEMENT PLAN (PMP)**

**<PROJECT NAME>**

**<GROUP/TEAM NAME>**

**Members**

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The contents of this PMP explain how the project is to fulfil the purpose and outcomes. This plan can be updated as needed and authorized. This document is intended to aid project managers in managing to successful conclusion those projects concerned with software systems.

This plan is based on ISO/IEC/IEEE 16326:2019.

This project management plan is prepared for <PROJECT NAME>, by <GROUP/TEAM NAME>.

## EXECUTIVE SUMMARY

In 10-13 sentences, please, do summarize the content of this document. This part should be enough for top management to comprehend the whole document. Do draft, craft and enhance this part of the document accordingly. You might attempt to answer who, what, where, when, why, and how questions.

## FRONT MATTER

This part of the plan shall contain:

* Identifying information, which shall contain the project name, the date of issue, a unique identifier (draft number, baseline version number) and identification of the issuing organization
* Approval record, which shall contain the record of approvals by the authority(ies) responsible for reviewing and approving the PMP
* A change history, which shall include or reference the changes, change rationale and previous revisions of the PMP
* An introduction, which shall describe the scope and context of the PMP and identify the intended audience for the PMP
* A table of contents, or list of bookmarks or hyperlinks to main sections and subsections
* A list of figures that appear in the PMP
* A list of tables that appear in the PMP

## PROJECT OVERVIEW

## Project Summary

### **Purpose, Scope and Objectives**

This section of the PMP shall state the purpose, scope and objectives of the project, and the products to be delivered or activities to be performed. The statement of scope shall be consistent with similar statements in the project agreement and other relevant system-level or business-level information items.

This section of the PMP shall also provide a brief statement of the business or system needs to be satisfied by the project, with a concise summary of the project objectives, the products to be delivered or activities to be performed to satisfy those objectives, and the methods by which satisfaction will be determined.

A reference to the official statement of product requirements shall be provided in this section of the PMP.

### **Assumptions and Constraints**

This section of the PMP shall describe the assumptions on which the project is based and imposed constraints on project factors such as the scope, schedule, budget, resources, software to be reused, acquirer software to be incorporated, technology to be employed, project enabling facilities, product interfaces to other products, expected product user's environment and required integrity level.

This section should also describe any considerations of scope or objectives to be excluded from the project or the resulting product.

### **Project Deliverables**

This section of the PMP shall list the work products that will be delivered to the acquirer, delivery locations and quantities required to satisfy the terms of the project agreement. In addition, this section shall specify the delivery media and any special instructions for packaging and handling.

The list of project deliverables may be incorporated into the PMP directly or by reference to an external item such as a contract data requirements list (CDRL) or a product parts list (PPL). This section shall also include any work products that are deliverables internal to the project team, such as results from one project phase that are used by a subsequent phase, or organizational process metric data.

For projects which will output intangible deliverables and projects which are focused on decommissioning or disposal that will not result in any "deliverables," this section of the PMP shall list activity completion dates, methods of delivery, dissemination or disposal (where appropriate), locations (physical or logical) where dissemination, decommissioning or disposal will take place, and the means to demonstrate that the project is complete as required to satisfy the terms of the project agreement.

### **Schedule and Budget Summary**

This section of the PMP shall provide a summary of the schedule, including delivery dates, and budget for the project. The level of detail should be restricted to an itemization of the major work activities and supporting processes as, for example, those depicted by the top level of the work breakdown structure. This section shall also include payment details and schedules.

### **Evolution of the Plan**

This section of the PMP shall specify the plans for producing both scheduled and unscheduled updates to the PMP. Methods of disseminating the updates shall be specified. This section shall also specify the mechanisms used to place the initial version of the PMP under configuration management and to control subsequent changes to the PMP.

## REFERENCES

This section of the PMP shall provide a complete list of all project information items and other sources of information referenced in the PMP. Each listed item should be identified by title, version number, date, author, path/name for electronic access and publishing organization. Any deviations from referenced standards or policies shall be identified and justifications shall be provided.

## DEFINITIONS

This section of the PMP shall define, or provide references to sources containing the definition of, all terms and acronyms required to properly understand the PMP.

## PROJECT CONTEXT

## Process Model

This section of the PMP shall either reference the life cycle model management process or specify the relationships among major project work activities and supporting processes by specifying the flow of information and work products among activities and functions, the timing of work products to be generated, reviews to be conducted, major milestones to be achieved, baselines to be established, project deliverables to be completed, and required approvals that span the duration of the project. In addition, the technical standards, policies and procedures governing the development and/or modification of the work products shall be specified. The process model for the project shall include project initiation and project termination activities. To describe the process model, a combination of graphical and textual notations may be used. Any tailoring of an organization’s standard process model for a project shall be indicated in this section.

## Process Improvement

This section of the PMP shall either reference the life cycle model management process or include plans for periodically assessing the project, determining areas for improvement and implementing improvement plans. Process improvement planning should be closely related to problem resolution planning; for example, a root cause analysis of recurring problems can lead to simple process improvements that can significantly reduce rework during the remainder of the project. Implementation of improvement plans should be examined to identify those processes that can be improved without serious disruptions to an ongoing project and to identify those processes that can best be improved by process improvement initiatives at the organizational level.

## Infrastructure and Enabling Systems

This section of the PMP shall specify the plan for establishing and maintaining the project infrastructure and enabling systems (production systems, SEE, maintenance systems, project support systems including hardware, operating system, network and software), and the policies, procedures, standards and facilities required to conduct the project. These resources can include workstations, local area networks, software tools for analysis, design, implementation, testing, and project management, desks, office space and provisions for physical security, administrative personnel and janitorial services.

## Methods, Tools and Techniques

This section of the PMP shall either reference the life cycle model management process or specify the development methodologies, programming languages and other notations, and the tools and techniques to be used to specify, design, build, test, integrate, document, deliver, modify and maintain the project deliverable and non-deliverable work products.

## Product Acceptance

This section of the PMP shall specify the plan for acquirer acceptance of the deliverable work products generated by the project. Objective criteria for determining acceptability of the deliverable work products shall be specified in this plan if the project is fulfilling an agreement or contract. Any technical processes, methods or tools required for product acceptance shall be specified in the product acceptance plan. Methods such as testing, demonstration, analysis and inspection should be specified in this plan.

## Project Organization

### **General**

This section of the PMP shall identify interfaces to organizational entities external to the project, describe the project’s internal organizational structure and specify roles and responsibilities for the project.

### **External Interfaces**

This section of the PMP shall describe the organizational boundaries between the project and external entities. This should include, but is not limited to, the following: the parent organization, the acquiring organization, subcontracted organizations and other organizational entities that interact with the project. Representations such as organizational charts and diagrams may be used to depict the project’s external interfaces.

### **Internal Interfaces**

This section of the PMP shall describe the internal structure of the project organization, including the interfaces between the development teams. In addition, the organizational interfaces between the project and organizational entities that provide supporting processes, such as configuration management, quality assurance and verification and validation, shall be specified in this section. Graphical devices such as organizational charts or diagrams should be used to depict the lines of authority, responsibility and communication within the project.

### **Authorities and Responsibilities**

This section of the PMP shall identify and state the nature of each major work activity and supporting process and identify the organizational units that are responsible for those processes and activities. A matrix of work activities and supporting processes vs. organizational units may be used to depict project authorities and responsibilities.

## PROJECT PLANNING

## General

This section of the PMP shall specify the project management processes for the project. This section shall be consistent with the statement of project scope and shall include the project initiation plans, project work plans, project acquisition and supply plans, project assessment and control plans, and project closeout plan.

## Project Initiation

### **General**

This section of the PMP shall specify the details for estimating project scope, the required staffing, the plan for acquiring the resources to support the project staff and the plan for project staff training. Depending on the size and scope of the project, these plans may be incorporated directly or by reference to other plans.

### **Estimation**

This section of the PMP shall specify the cost and schedule for conducting the project as well as methods, tools and techniques used to estimate project cost, schedule, resource requirements and associated confidence levels. In addition, the basis of estimation shall be specified.

This section shall also specify the methods, tools, and techniques that will be used to periodically re-estimate the cost, schedule and resources needed to complete the project.

### **Staffing**

This section of the PMP shall specify the number of staff required by skill level, the project phases in which the numbers of personnel and types of skills are needed and the duration of need.

This section shall also specify the sources of staff personnel; for example, by internal transfer, new hire or contracted. If personnel from other companies or from the customer are to be hosted along with the project team, this section shall also address the details of how the hosting will be accomplished. Resource Gantt charts, resource histograms, spreadsheets and tables may be used to depict the staffing plan by skill level, by project phase and by aggregations of skill levels and project phases.

### **Resource Acquisition**

This section of the PMP shall specify the plan for acquiring and releasing the resources in addition to personnel needed to successfully complete the project. The resource acquisition plan should include a description of the resource acquisition and release process, including assignment of responsibility for all aspects of resource acquisition. The plan should include, but not be limited to, acquisition and release plans for equipment, computer hardware and software, training, service contracts, transportation, facilities and administrative and janitorial services. The plan should specify the points in the project schedule when the various acquisition and release activities will be required. Constraints on acquiring the necessary resources shall be specified. This section may be expanded into additional sections as required to accommodate acquisition plans for various types of resources to be acquired.

### **Project Staff Training**

This section of the PMP shall specify the training needed to help ensure that necessary skill levels in sufficient numbers are available to successfully conduct the project. The training schedule shall include the types of training to be provided, numbers of personnel to be trained, entry and exit criteria for training and the training method; for example, lectures, consultations, mentoring or computer-assisted training. The training plan should include training as needed in both technical and managerial skills. If personnel from other companies or from the customer are to be hosted as part of the project team, this section shall specify the training to be provided for them.

## Project Work Plans

### **General**

This section of the PMP shall specify the work activities, schedule, resources, budget and procurement details for the project.

### **Work Activities**

This section of the PMP shall specify the various work activities to be performed in the project. A work breakdown structure should be used to depict the work activities and the relationships among work activities. Work activities shall be decomposed to a level that exposes all project risk factors and allows accurate estimate of resource requirements and schedule duration for each work activity. Work packages should be used to specify, for each work activity, factors such as the necessary resources, estimated duration, work products to be produced, acceptance criteria for the work products and predecessor and successor work activities. The level of decomposition for different work activities in the work breakdown structure can be different depending on factors such as the quality of the requirements, familiarity with the work and novelty of the technology to be used.

### **Schedule Allocation**

This section of the PMP shall provide scheduling relationships among work activities in a manner that depicts the time-sequencing constraints and illustrates opportunities for concurrent work activities. Any constraints on scheduling of particular work activities caused by factors external to the project shall be indicated in the work activity schedule. The schedule should include frequent milestones that can be assessed for achievement using objective indicators to assess the scope and quality of work products completed at those milestones. Techniques for depicting schedule relationships can include milestone charts, activity lists, activity Gantt charts, activity networks, critical path networks and PERT.

### **Resource Allocation**

This section of the PMP shall provide a detailed itemization of the resources allocated to each major work activity in the project work breakdown structure. Resources shall include the numbers and required skill levels of personnel for each work activity. Resource allocation can include, as appropriate, personnel by skill level and factors such as computing resources, software tools, integration, special testing and simulation facilities and administrative support.

A separate line item should be provided for each type of resource for each work activity. A summary of resource requirements for the various work activities should be collected from the work packages of the work breakdown structure and presented in tabular form.

### **Budget Allocation**

This section of the PMP shall provide a detailed breakdown of necessary resource budgets for each of the major work activities in the work breakdown structure. The activity budget shall include the estimated cost for activity personnel and can include, as appropriate, costs for factors such as travel, meetings, computing resources, software tools, special testing and simulation facilities and administrative support.

A separate line item shall be provided for each type of resource in each activity budget. The work activity budget may be developed using a spreadsheet and presented in tabular form.

### **Procurement**

This section of the PMP shall list the goods and services that will be purchased for the project and how they will be obtained. It shall specify the types of contracts to be used, who will conduct the procurement, sources of standard procurement requests, the deadline for obtaining each good and service and the lead times needed to conduct the procurement process.

### **Disposal**

This section of the PMP shall describe the Systems Engineering work products required prior to any decommissioning, demolition or disposal of software and/or systems, and shall provide a detailed breakdown of the decommissioning and/or disposal activities (as appropriate), which shall include roles, responsibilities and requirements for de-integrating the system/s from the operational environment, demolition or disposal work and removal of any waste. This shall include activities, responsibilities and Decommissioning Readiness Review (DRR) requirements. If any of the demolition or disposal is subcontracted, this section shall state the responsibilities and the criteria for determining successful completion.

## PROJECT ASSESSMENT AND CONTROL

## General

This section of the PMP shall specify the procedures necessary to assess and control the product requirements, the project scope, schedule, budget, resources, the quality and timeliness of acquired products from subcontractors and the quality of work processes and work products.

All elements of the control plan should be consistent with the organization’s standards, policies and procedures for project control as well as with any contractual agreements for project control.

## Requirements Management

This section of the PMP shall specify the control mechanisms for measuring, reporting and controlling changes to the project and product requirements. This section shall also specify the mechanisms to be used in assessing the impact of requirements changes on product scope and quality and the impacts of requirements changes on project schedule, budget, resources, risk and performance throughout the project’s life cycle. Techniques that can be used for requirements control include traceability, prototyping and modelling, impact analysis and reviews.

## Scope Change Control

This section of the PMP shall describe how to detect activities out of the project's scope and the actions that are to be taken if such activities are found or requested.

## Schedule Control

This section of the PMP shall specify the control mechanisms to be used to measure the progress of work completed at the major and minor project milestones, to compare actual progress to planned progress and to implement corrective action when actual progress does not conform to planned progress.

The project manager should employ earned value techniques for these measures. The schedule control plan shall specify the methods and tools that will be used to measure and control schedule progress. Achievement of schedule milestones should be assessed using objective criteria to measure the scope and quality of work products completed at each milestone.

## Budget Control

This section of the PMP shall specify the control mechanisms to be used to measure the cost of work completed, to compare planned cost to budgeted cost and to implement corrective action when actual cost does not conform to budgeted cost. The budget control plan shall specify the intervals at which cost reporting will be done and the methods and tools that will be used to manage the budget. The budget plan should include frequent milestones that can be assessed for achievement using objective indicators to assess the scope and quality of work products completed at those milestones. A technique such as earned value should be used to report the budget and schedule plan, schedule progress and the cost of work completed.

## Quality Assurance

This section of the PMP shall specify the quality goals and the resources and mechanisms to be used to measure and control the quality of the work processes and the resulting work products. The quality assurance plan shall include provisions for vendor evaluation and control. Quality control mechanisms can include quality assurance of work processes, verification and validation, joint reviews, audits and process assessment.

## Subcontractor Management

This section of the PMP shall contain plans for selecting and managing any subcontractors that can contribute work products to the project. The criteria for selecting subcontractors shall be specified and the management plan for each subcontract shall be generated using a tailored version of this document. Tailored plans should include the items necessary to help ensure successful completion of each subcontract.

In particular, requirements management, monitoring of technical progress, schedule and budget control, product acceptance criteria, quality assurance and measurement and risk management processes shall be included in each subcontractor plan. Additional topics should be added as needed to help ensure successful completion of the subcontract. A reference to the official subcontract and prime contractor/subcontractor points of contact shall be specified.

## Project Closeout

This section of the PMP shall contain the plans necessary to help ensure orderly closeout of the project. Items in the closeout plan should include a staff reassignment plan, a plan for archiving project materials, a plan for post-mortem debriefings of project personnel and preparation of a final report to include lessons learned and analysis of project objectives achieved.

## PRODUCT DELIVERY

This section of the PMP shall contain plans for delivery of the project's product(s) and shall specify the product delivery approach, the required information flow both internal to the project and to all external organizations required to support the delivery, the packaging and physical delivery plans and all associated customer documentation such as operation manuals, maintenance manuals and training materials.

For a project which results in intangible deliverable(s), this section of the PMP shall detail how project completion is to be determined and how completion of the intangible deliverables will be demonstrated.

For projects focused on decommissioning and/or disposal, this section of the PMP shall detail how activity completion shall be satisfactorily demonstrated and any completion or disposal certificate(s) which can be provided.

## SUPPORTING PROCESSES

## General

This section of the PMP shall contain plans for the supporting processes that span the duration of the project. These plans shall include, but are not limited to, project supervision and work environment, decision management, risk management, configuration management, information management, quality assurance and measurement.

Plans for supporting processes shall be developed to a level of detail consistent with the other sections and sections of the PMP. In particular, the roles, responsibilities, authorities, schedule, budgets, resource requirements, risk factors and work products for each supporting process shall be specified.

The nature and types of supporting processes required can vary from project to project; however, the absence of any of the plans listed above shall be explicitly justified in any PMP that does not include them. Plans for supporting processes may be incorporated directly into the PMP or incorporated by reference to other plans.

## Project Supervision and Work Environment

This section of the PMP shall state how the project manager provides day-to-day instructions, guidance and discipline to help project members fulfil their assigned duties. The project manager shall provide a work environment in which project personnel can work together toward common project goals which ensures a free flow of correct information among project members and allows project personnel to make decisions and expend resources within the limitations and constraints of their roles. The project manager shall also set performance goals for teams as well as for individuals, encourage constructive differences of opinion and help resolve the resulting conflicts.

## Decision Management

This section of the PMP shall specify decision categories based on circumstances and the need for decisions and shall specify a scheme for their categorization. It shall specify a decision strategy for each decision category and shall identify the method of involving all relevant parties in each decision strategy. This section shall also identify the desired outcomes of the strategies and shall specify measurable success criteria with which to assess the outcomes. This section shall also identify method(s) for tracking and evaluating the outcomes and for supplying the required information for documenting and reporting in accordance with the information management section. The need for decisions can arise as a result of an effectiveness assessment, a technical trade-off, a reported software or hardware problem needing resolution, action needed in response to risk exceeding the acceptable threshold, a new opportunity or approval for project progression to the next life cycle stage.

## Risk Management

This section of the PMP shall specify the risk management plan for identifying, analyzing and prioritizing project risk factors. This section shall also describe the procedures for contingency planning and the methods to be used in tracking the various risk factors and evaluating changes in the levels of risk factors and the responses to those changes. The risk management plan shall also specify plans for analyzing initial risk factors and the ongoing identification, analysis and treatment of risk factors throughout the life cycle of the project.

This plan should describe risk management work activities, procedures and schedules for performing those activities, documentation and reporting requirements, organizations and personnel responsible for performing specific activities and procedures for communicating risks and risk status among the various acquirer, supplier and subcontractor organizations. Risk factors that should be considered include risks in the acquirer-supplier relationship, contractual risks, technological risks, risks caused by the size and complexity of the product, risks in the development and target environments, risks in personnel acquisition, skill levels and retention, risks to schedule and budget and risks in achieving acquirer acceptance of the product.

## Configuration Management

This section of the PMP shall contain the configuration management plan for the project, to include the methods that will be used to provide configuration identification, control, status accounting, evaluation and release management.

In addition, this section shall specify the processes of configuration management to include procedures for initial baselining of work products, logging and analysis of change requests, change control board procedures, tracking of changes in progress and procedures for notifying concerned parties when baselines are first established or later changed.

The configuration management plan and procedures shall support the management and control of the software and/or system requirements. The configuration management process should be supported by one or more automated configuration management tools.

## Information Management

### **General**

This section of the PMP shall contain the plans for identifying what project information is to be managed, the forms in which the information is to be represented, who is responsible for the various categories of project information and how project information is to be recorded, stored, made available to designated parties and disposed of as required. This section shall include the plans for protection of both customer and vendor information.

### **Project Information Management**

This section of the PMP shall contain the information management plan for the project to include plans for generating non-deliverable and deliverable work products. Organizational entities responsible for providing input information, generating and reviewing the various information items shall be specified in the documentation plan.

Non-deliverable work products can include items such as requirements specifications, design documentation, traceability matrices, test plans, meeting minutes and review reports.

Deliverable work products can include source code, object code, a user’s manual, an on-line help system, a regression test suite, a configuration library and configuration management tool, principles of operation, a maintenance guide or other items as specified in the information management plan should include a list of the information items to be prepared, the controlling template or standard for each item, who will prepare it, who will review it, due dates for review copy and initial baseline version and a distribution list for review copies and baseline versions.

### **Communication and Publicity**

This section of the PMP shall list the stakeholders that need to receive information about the project, the information to be communicated and the format, content and level of detail. Communication tools can include numerous types of publicity and marketing. The plan shall specify who is responsible for each element of communication, who will receive the communication, the methods and technologies that will be used, the frequency of communication and how issues will be raised to higher levels of management if they are not resolved within specified timeframes. If the communication is to be by document distribution, this section shall list the documents and recipients both for distribution within the project team and external to the team. It shall also describe how the plan will be updated. If some aspects of communication, such as marketing, are outside the scope of the project, this should be stated, and the plan should state how those aspects will be addressed.

## Quality Assurance

This section of the PMP shall provide the plans for assuring that the project fulfils its commitments to the system and software process and the system and/or software products as specified in the requirements specification, the PMP, supporting plans and any standards, procedures or guidelines to which the process or the product must adhere. Quality assurance procedures can include analysis, inspections, reviews, audits and assessments. The quality assurance plan should indicate the relationships among the quality assurance, verification and validation, review, audit, configuration management, systems engineering and assessment processes.

The quality assurance plan should indicate the relationships among the quality assurance, verification and validation, review, audit, configuration management, systems engineering, assessment and acceptance processes.

## Measurement

This section of the PMP shall specify the methods, tools and techniques to be used in collecting and retaining project measures. The measurement plan shall specify the identified information needs, the measures to be collected, the definitions of each measure and the methods to be used in validating, analyzing and reporting the measures.

## Reviews and Audits

This section of the PMP shall specify the schedule, resources, methods and procedures to be used in conducting project reviews and audits. The plan should specify plans for joint acquirer-supplier reviews, management progress reviews, developer peer reviews, quality assurance audits and acquirer conducted reviews and audits. The plan should list the external agencies that approve or regulate any product of the project.

## Verification and Validation

This section of the PMP shall contain the verification and validation plan for the project to include scope, tools, techniques and responsibilities for the verification and validation work activities. The organizational relationships and degrees of independence between development activities and verification and validation activities shall be specified. Verification planning should result in specification of techniques such as traceability, milestone reviews, progress reviews, peer reviews, prototyping, simulation and modelling. Validation planning should result in specification of techniques such as testing, demonstration, analysis and inspection. Automated tools to be used in verification and validation should be specified.

## ADDITIONAL PLANS

This section of the PMP shall contain additional plans required to satisfy product requirements and contractual terms. Additional plans for a particular project can include plans for assuring that safety, privacy and security requirements for the product are met, special facilities or equipment, product installation plans, user training plans, integration plans, data conversion plans, system transition plans, product maintenance plans or product support plans.

## END MATTER

The PMP may also include annexes, an index and a glossary if applicable to aid in the use of the PMP.

* Annexes: Annexes may be included, either directly or by reference to other information items, to provide supporting details that could detract from the PMP if included in the body of the PMP.
* Index: An index to the key terms and acronyms used throughout the PMP is optional, but is recommended to improve the usability of the PMP.
* Glossary: A list of terms and acronyms that are used on the project is optional, but is recommended to reduce ambiguity in terminology.

## CONTRIBUTIONS

In this section of the document, the individual contributions of each team member are clearly explained.

Please provide the full name of each member, and list and detail their specific contributions.

This is not part of the project management plan; however, this information is required for assessment and evaluation. You should document which parts were completed by each team member.

It is possible that some sections were completed collaboratively by all or some members.

The instructor wants to understand the work each member contributed in preparing this plan.