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CSCC- 43 [SPM]	Theory Assignments MCA IV SEM 2020

Instructions

- *Copying assignments is strictly prohibited. Do it sincerely and honestly in your own language (writing style) strictly as per **FORMAT.***
- *Prepare well before writing your assignments. Have a critical look on the handouts (Lecture Notes) and thoroughly study with Ref. material(s).*
- ***Submit your assignments on/before 10th May 2020.***

Points to Ponder (Introduction - SPM Percepts) : At least 15 ... to 20	Unit No-1

1. Software project management is an art and science of planning and leading software projects.
2. A Project can be broken down into project phases. In Simple terms its a proper way of planning and leading software projects.
3. Software is said to be an intangible product, most software products are tailor made to fit client's requirements.
4. Software underlying technology changes and advances so frequently and rapidly that experience of one product may not be applied to the other one.
5. Today's major problem with software development are not technical problems, but management problems.
6. Principal nature of the challenges in software project management has not changed dramatically in the last 25 years. As Compared to technology, which have changed drastically.
7. Traditional plan-driven software development has been replaced and by adaptive and dynamic approaches.
8. Initial planning and estimation of software projects.
9. Exhaustive testing of software is impractical because of several constraints.
10. Software Project Management Is Difficult to manage because of several complexities.
11. Software project management processes are grouped into initiating, planning, executing, monitoring and controlling, and closing.
12. The creation of software requires innovative problem solving to create unique solutions.
13. We needs software project manager who undertakes the responsibility of executing the software project.
14. Software project manager is thoroughly aware of all the phases of SDLC that the software would go through.
15. Software Project Management is dedicated to the planning, scheduling, resource allocation, execution, tracking and delivery of software.

Learning points/ Learning outcome : At least 5 …up to 10

1. Gives brief overview regarding Software Project Management.
2. This chapter gives idea about several responsibilities of Software Project Manager.
3. Come to know several phases of SDLC.
4. Come to know various characteristics of SPM.
5. It gives the idea about how we can develop the successful project/product.
6. It give the idea regarding several complexities involved with Software Projects.

Points to Ponder (Project Organization and Scheduling Elements) : At least 15 ... to 20 | **Unit No-2**

1. The project organization is the structure of the project.
2. Project organization is a process it provides arrangement for decisions on how to realize a project.
3. WBS(Work Breakdown Structure) is a hierarchical and incremental decomposition of the project into phases, deliverables and work packages.
4. WBS design principles is called the 100% Rule.
5. WBS is a like a tree structure, which shows a subdivision of effort required to achieve an objective.
6. Each WBC branch should be well defined Otherwise it may represents a scope definition risk.
7. WBS can also be color coded to represent sub-deliverable status as well.
8. Verb-oriented WBS, Noun-oriented WBS, Time-phased WBS are few types of WBS.
9. Scheduling is laying out of the actual jobs of the project in the time order in which they have to be performed.
10. Scheduling can be considered an operational research problem where research efforts are focused on providing solutions using mathematical modelling and computational intelligence methods.
11. Bar chart, CPM, PERT, Milestone chart, Gantt chart are commonly used tools for project scheduling.
12. Bar charts are useful and used to detect the amount of resources needed for one particular project.
13. Milestone Chart is an improved version of a bar chart.
14. Unlike bar chart, CPM uses arrows to represent activities and length of arrows has no relation with activity duration.
15. Unlike CPM, PERT is used for novel projects like research and development where it is difficult to estimate activity duration accurately.

Learning points/ Learning outcome : At least 5 …up to 10
1. How to breakdown whole project in sub-task efficiently using WBS. 2. Various Phases of Product/Project Life Cycle. 3. Come to know difference between Product Life Cycle & Project Life Cycle. 4. Project Scheduling produce an optimal project schedule in terms of cost, time, or risk. 5. The project life cycle is usually a subset of the product life cycle. 6. How to use several Project Management tools such as Bar Chart, CPM, PERT. 7. Come to know how by using management tools helps us to look efficiently, organize & schedule several project activities which leads to successful of project. 8. How to draw/design Bar Chart, Milestone, CPM, PERT using several software or from online web tools
Points to Ponder (Project Monitoring and Control) : At least 15 ... to 20. **Unit No-3**
1. Project Monitoring refers to the process of keeping track of all project-related metrics including team performance and task duration, identifying potential problems and taking corrective actions necessary to ensure that the project is within scope. 2. PMP (Project Monitoring Professional) certification will help you grow and become a successful, object-oriented Project Manager. 3. Control systems are needed for cost, risk, quality, communication, time, change, procurement, and human resources 4. Project monitoring helps in accessing the project results, improve process planning, promote learning, understand stakeholder's perspectives, ensure accountability etc. 5. Staff Meetings, Partners Meetings, Participatory Reviews, Statistics Report, Progress Reports are some commons activities which helps in efficient project monitoring. 6. It consists of processes performed to observe project execution so that potential problems can be identified in a timely manner. 7. Monitoring helps to take timely corrective action can be taken, when necessary, to control the execution of the project. 8. Earned Value Analysis (EVA) allows the project manager to measure the am **cost performance index** (CPI) is a measure of the financial effectiveness and **efficiency** of a project amount of work actually performed on a project beyond the basic review of cost and schedule reports. 9. Budget Cost for Work Schedule (BCWS) is the sum of the budgets for all work scheduled to be accomplished with a given time period. 10. Cost Variance (CV) is a process of evaluating the financial performance of your project. 11. Cost variance compares your budget set before the project started and what was actually spent.

12. Schedule Variance (SV) is an indicator of whether a project schedule is ahead or behind.
13. SV = BCWP – BCWS
14. Cost Performance Index (CPI) is a measure of the financial effectiveness and efficiency of a project.
15. CPI represents the amount of completed work for every unit of cost spent.
16. Error tracking helps in tracking errors in work products such as in SRS, Design Document, Source Code etc to access the status of a project.
17. Error Tracking can also be used to estimate the progress of the project.
18. Software Review is systematic inspection of a software to find and resolve errors and defects in the software during the early stages of SDLC.

Learning points/ Learning outcome : At least 5 …up to 10

1. Project performance is observed and measured regularly to identify variances from the project management plan.
2. Earned Value focuses on two variables time and cost.
3. This chapter gives idea of how we can have feedback system for multi-phase projects, to bring project into compliance with the project management plan.
4. Come to know about various Analysis & indicators for better monitoring and controlling such EVA, BCWS, CV, SV, CPI, SPI.
5. This chapter also gives idea about software Reviews and why its important to do it & what are various types of software reviews such as Code Review, Pair Programming, Walkthrough, Technical Reviews, Inspection etc.

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Points to Ponder (Software Quality Assurance) : At least 15 ... to 20	Unit No-4

1. Quality software is reasonably bug or defect free, delivered on time and within budget, meets requirements and/or expectations, and is maintainable.
2. Software Quality Assurance (SQA) is a set of activities for ensuring quality in software engineering processes.
3. SQA is an ongoing process within the SDLC that routinely checks the developed software to ensure it meets the desired quality measures.
4. SQA activities involves Process definition and implementation, Auditing, Training.
5. SQA Process could be Software Development Methodology, Project Management, Configuration Management, Requirements Development/Management, Estimation, Software Design, Testing.
6. Software testing is a process of executing a program with the aim of finding the error.
7. If testing is done successfully it will remove all the errors from the software.
8. Testing shows presence of defects, Exhaustive testing is not possible, Early testing, Defect clustering, Pesticide paradox, Testing is context dependent, Absence of errors fallacy are seven principles in software testing
9. Software Testing levels can be Functional Testing, Non-Functional Testing, Automation Testing, Agile Testing etc.
10. Unit Testing, Integration Testing, System Testing, Sanity Testing, Smoke Testing, Interface Testing, Regression Testing, Beta/Acceptance Testing are some popular Functional Testing.
11. Performance Testing, Load Testing, Stress Testing, Volume Testing, Security Testing, Compatibility Testing, Install Testing, Recovery Testing, Reliability Testing, Usability Testing, Compliance Testing, Localization Testing are some popular Non-Functional Testing.
12. Correctness, Reliability, Adequacy, Learnability, Robustness, Maintainability, Readability, Extensibility, Testability, Efficiency, Portability, are some attributes of Software Quality.
13. Software metrics can be classified into three categories−
    - **Product metrics** − Describes the characteristics of the product such as size, complexity, design features, performance, and quality level.
    - **Process metrics** − These characteristics can be used to improve the development and maintenance activities of the software.
    - **Project metrics** − This metrics describe the project characteristics and execution.
14. Software quality metrics are a subset of software metrics that focus on the quality aspects of the product, process, and project.
15. Capability Maturity Model (CMM) specifies an increasing series of levels of a software development organization. The higher the level, the better the software development process

16. Reaching each CMM level is an expensive and time-consuming process.
    - Level One - Initial.
    - Level Two - Repeatable.
    - Level Three – Defined.
    - Level Four - Managed.
    - Level Five - Optimizing.

Learning points/ Learning outcome : At least 5 …up to 10

1. The SQA team should ensure the metrics are reached by constantly monitoring the development process.
2. The SQA team should select a proper methodology. Selecting the proper methodology is quite a challenge.
3. This chapter gives idea why Software Testing is necessary simply because we all make mistakes.
4. Come to know difference between Software Verification and Software Validation.
5. Software Verification is the process of evaluating products of a development phase to find out whether they meet the specified requirements where as Software Validation is the process of evaluating software at the end of the development process to determine whether software meets the customer expectations and requirements.
6. This chapter gives idea why Software metrics are important simply because its including measuring software performance, planning work items, measuring productivity, and many other uses.

Points to Ponder (Project Management and Project Management Tools) : At least 15 ... to 20 | **Unit No-5**

1. Project management is the practice of initiating, planning, executing, controlling, and closing the work of a team to achieve specific goals and meet specific success criteria at the specified time.
2. Software Configuration Management (SCM) is the task of tracking and controlling changes in the software, part of the larger cross-disciplinary field of configuration management.
3. SCM primary goals are Configuration Identification, Configuration Control, Configuration Auditing, Defect Tracking etc.
4. **Configuration Items -** A component of a system that is treated as a self contained unit for the purposes of identification and change control
5. Software Configuration items must be subjected to a final examination to ensure that the software data packages are complete.
6. Software Configuration Management task includes :
    - Configuration Identification
    - Change Control
    - Version Control
    - Configuration Auditing

- Reporting

7. Baseline in project management is a clearly defined starting point for your project plan.
8. Baseline is a fixed reference point to measure and compare your project's progress against.
9. A project baseline typically has three components:
   - Schedule
   - Cost
   - Scope
10. The change control process in project management ensures that each change proposed during a project is adequately defined, reviewed and approved before implementation
11. With the pace of change today, it is almost certain that projects will face the demand for change during their life
12. Change control contains five stages:
    - Proposing a Change
    - Summary of Impact
    - Decision
    - Implementing a Change
    - Closing a Change
13. Risk is inevitable in a business organization when undertaking projects.
14. Managers can plan their strategy based on four steps of risk management which prevails in an organization.
    - Risk Identification
    - Risk Quantification
    - Risk Response
    - Risk Monitoring and Control
15. Risks could be resolved through structured or unstructured brainstorming or strategies.
16. Risks can be avoided, Pass on the risk, Take corrective measures to reduce the impact of risks, Acknowledge the risk are some risk response strategies.
17. Risk breakdown structure (RBS) is a hierarchical framework of potential sources of risk to a project.
18. RBS is a hierarchical representation of risks, starting from higher levels and going down to finer levels of risks.

Learning points/ Learning outcome : At least 5 …up to 10

1. This chapter gives idea that primary challenge of project management is to achieve all of the project goals within the given constraints.
2. Come to know the objective of project management is to produce a complete project which complies with the client's objectives.

3. Project Management primary focus on three important goals: time, quality and budget.
4. Come to know about several project management tools such as Scoro, proofhub, basecamp, asana, Podio, JIRA etc.
5. This chapter gives idea that a good project manager should be able to manage the risks effectively and get the project on track
6. This chapter gives idea that Successful projects are completed on schedule, within budget, and according to previously agreed quality standards.
7. This chapter gives idea regarding the configuration identification task of the SCM process.
8. Come to know PMB provides the ability to efficiently monitor and manage how a change in one component affects the others.
9. Risks can be mainly divided between two types, negative impact risk and positive impact risk.

SPM Summary (1500-2000 Words/Sigle Space)

Software Project Management

- Software project management refers to the branch of project management dedicated to the planning, scheduling, resource allocation, execution, tracking and delivery of software and web projects.
- A project is well-defined task, which is a collection of several operations done in order to achieve a goal.
- Software project management is an art and science of planning and leading software projects.

Software Project Manager

- A software project manager is a person who undertakes the responsibility of executing the software project.
- Software project manager is thoroughly aware of all the phases of SDLC that the software would go through.
- Project manager may never directly involve in producing the end product but he controls and manages the activities involved in production.

Software Management Activities

- **Project Planning -** Software project planning is task, which is performed before the production of software actually starts.
- **Scope Management –** It includes all the activities, process need to be done in order to make a deliverable software product.

- **Project Estimation -** Effective software project estimation is one of the most challenging and important activities in software development.
- In involves Software size estimation, Effort estimation, Time estimation, Cost estimation etc.

Project Scheduling –

- Project Scheduling in a project refers to roadmap of all activities to be done with specified order and within time slot allotted to each activity.
- Project managers tend to define various tasks, and project milestones and arrange them keeping various factors in mind.

Resource management –

- The resources are available in limited quantity and stay in the organization as a pool of assets.
- Allocating extra resources increases development cost in the end.
- Determining resources required at a particular stage and their availability.

Project Management Tools –

Gantt Chart :

- Gantt charts was devised by Henry Gantt (1917).
- It represents project schedule with respect to time periods.
- It is a horizontal bar chart with bars representing activities and time scheduled for the project activities.

PERT Chart:

- PERT (Program Evaluation & Review Technique) chart is a tool that depicts project as network diagram.
- It is capable of graphically representing main events of project in both parallel and consecutive way.

Resource Histogram :

- This is a graphical tool that contains bar or chart representing number of resources (usually skilled staff) required over time for a project event (or phase).

Critical Path Analysis :

- This tools is useful in recognizing interdependent tasks in the project.

- It also helps to find out the shortest path or critical path to complete the project successfully.

Software Development Life Cycle (SDLC):

- SDLC is a process used by the software industry to design, develop and test high quality softwares.
- It aims to produce a high-quality software.
- It is also called as Software Development Process.
- It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific software.
- SDLC Process includes repetitive Planning, Defining, Designing, Building, Testing, Deployment phases.

SDLC Model

- It is a conceptual framework describing all activities in a software development project from planning to maintenance.
- There are several SDLC models such as waterfall model, Incremental model, spiral model, Iterative Model, Agile Model, V-Shaped Model etc.

Project Plan –

- A project plan stores the outcome of project planning. It provides information about the end date, milestones, activities, and deliverables of the project.
- It describes the responsibilities of the project management team and the resources required for the project.
- A project plan helps a project manager to understand, monitor, and control the development of software project.

Work Breakdown Structure –

- A work breakdown structure (WBS) is a key project deliverable that organizes the team's work into manageable sections.
- Its deliverable oriented hierarchical decomposition of the work to be executed by the project team.
- A project budget can be allocated to the top levels of the work breakdown structure
- With the help of WBS we can Divide complex projects to simpler and manageable tasks.

Software Project Monitoring –

- Project work breakdown structures can also be used to identify potential risks in a given project.

- The work breakdown structure can also be color coded.
- We can assigning colors RED for late, YELLOW for at risk, GREEN for on-target, and BLUE for completed deliverable.

Earned Value Analysis –

- It allows the project manager to measure the amount of work actually performed on a project beyond the basic review of cost and schedule reports.

Budget Cost for Work Schedule(BCWS) –

- It is the sum of the budgets for all work scheduled to be accomplished with a given time period.

Cost Variance (CV) –

- Cost variance compares your budget set before the project started and what was actually spent.

Schedule Variance (SV) –

- It is an indicator of whether a project schedule is ahead or behind.

Cost Performance Index (CPI) –

- It is a measure of the financial effectiveness and efficiency of a project. It represents the amount of completed work for every unit of cost spent

Schedule Performance Index (SPI) –

- It is a measure of how close the project is to being completed compared to the schedule.

Software Review –

- Software review or inspection is one of the techniques for improving software quality.
- Peer Review, Management Review, Audit Review are some types of Software Review.

Software Quality Assurance –

- It's a way to assure quality in the software.

- It include set of standard procedure and Activities.
- It focuses on improving the process of development of software.
- SQA produce high quality software.
- Improves the quality of the software.

Software Testing –

- It's a process of verifying and validating that a software or application is bug free.
- It involves major two steps, Verification & Validation.
- **Verification -** "Are we building the product right?"
- **Validation -** "Are we building the right product?"
- Unit, Integration, System, Acceptance, Black Box, White Box are some types of software Testing.

Software Quality Attributes –

- Correctness, Reliability, Adequacy, Learnability, Robustness, Maintainability, Readability, Extensibility, Testability, Efficiency, Portability are some common attributes of Software Quality.

Software Quality Metrics –

- It means measurement of attributes, pertaining to software quality along with its process of development.
- It can be Product, process, project metrics.
- It's a subset of software metric that focus on the quality aspects of the product, process & project.

Project Risk Management –

- Risk management involves all activities pertaining to identification, analyzing and making provision for predictable and non-predictable risks in the project.

Risk Management Process –

- It involves Identification, Categorize, Managing, Monitoring activities.

Types of Risk Associated –

- Schedule / Time Related / Delivery Related Planning Risk.
- Budget / Financial Risks.
- Operational / Procedural Risks.
- Technical / Functional / Performance Risks.

Risk Planning –

- It's the process of identifying, prioritizing, and managing risk.
- Risk is an Integral part of Project Management.

Risk Breakdown Structure –

- It is a hierarchical framework of potential sources of risk to a project.
- It is a hierarchical representation of risks, starting from higher levels and going down to finer levels of risks.

Risk Monitoring –

- It's the ongoing process of managing risk.
- It's the process of tracking risk management execution and continuing to identify and manage new risks.
- It's purpose of risk monitoring is to address how risk will be monitored.

Configuration Management –

- Configuration management is a process of tracking and controlling the changes in software in terms of the requirements, design, functions and development of the product.

Baseline –

- A phase of SDLC is assumed over if it baselined.
- Baseline is a measurement that defines completeness of a phase.
- A phase is baselined when all activities pertaining to it are finished and well documented.

Change Control –

- Change control is function of configuration management, which ensures that all changes made to software system are consistent and made as per organizational rules and regulations.

Cost Benefit Analysis –

Its a process by which organizations can analyze decisions, systems or projects, or determine a value for intangibles.

Organizations rely on cost benefit analysis to support decision making.

It may be used to compare completed or potential courses of actions.

CBA helps predict whether the benefits of a policy outweigh its costs, relative to other alternatives.

SPM : Current Trends AND Future Prospects

Current Trends-Practices (of SPM):

Agile Approach :

- Agile is one of the latest approaches in project management.
- It follows bi-directional Approach.
- It supports cloud-based service applications.
- It's an iterative approach.
- The design process in split into modules, and the designers work on modules.
- Any bug or error can be fixed in the middle of development.

Scrum :

- Its is a type of agile approach.
- Here changes are incorporated in between the implementation phase before developing the end product.
- It has become a common framework that is inevitable in project management software.

IoT (Internet of Things) :

- It is nothing, but all the technologies are connected through the internet.
- Here all the technologies are connected through the internet.
- It helps in monitoring and controlling the task assigned to an individual or team member.

Open-Source Project :

- An Open-Source Projects are those projects which are available to every one.
- Individuals can even modify the actual source code, and can later sell it to others.
- Project teams can use already written open source code instead of putting efforts again.

Emotional Intelligence:

- Emotional intelligence is one of the strongest predictors of performance irrespective of the nature of your job.
- Emotional intelligence is one of the strongest predictors of performance irrespective of the nature of your job.

- There are five core categories that are used to measure emotional intelligence – social skills, motivation, empathy, self-regulation, and self-awareness.
- Emotional intelligence will help project managers in a number of different ways such as being able to deliver results, provide leadership, manage change, build effective teams and operate in complex matrix environments etc.

Future Prospects/Predictions [of SPM]:

Artificial Intelligence:

- Artificial Intelligence is one of the most trending topics within project management teams.
- Artificial intelligence is nothing but machine learning. we try machines to think and act rationally like humans so that they can do tasks which requires human intelligence.
- AI is not the intelligence of a human rather machines exhibit it.
- With the use of AI we can automate several things, Perform several daily tasks that require human efforts.
- It helps to reduce budged for various activities and process as because of decrease in human resource.

Virtual Project Teams:

- A virtual team is a team where the primary method of interaction is done through electronic mediums.
- Team can communicate through several mediums, such as email, video conferencing, group chats, virtual team softwares such as MS Team Viewer, AnyDesk etc.
- Teams may not interact frequently face-to-face.
- Team members are not located in the same demography.
- Team members may work at different times as per their ease, also they do not require a physical office to work which reduces the cost factor while operating.

- There is no time wasted for commuting and clothing, also physical handicaps persons are not an issue as team members has to work from their homes.

Hybrid Project Management Approaches:

- Hybrid project management refers to methods combining approaches from the traditional PM environment and the agile methodology as well.
- In simple terms it's the combination of two different methodologies or system to create a new and better model.
- Hybrid methodologies accepts the fluidity of projects.
- Hybrid methodologies can be applied to the full job or specific aspects of the projects.

Summarization-Generic Guideline

Good summary has several characteristics including ***conciseness, accuracy, coherence, logical connectivity and objectivity.*** It restates someone else's ideas in your own/personal WORDS (original style of writing), categorically presents the main idea and supporting points of an original work, and shortens the original work to communicate the intent and content at large. While summarizing, one should not borrow/copy too much from the original work/text but write from own memory/understanding. Following steps may be adapted to accomplish the task:

1. For a while, take yourself off from the assignments - completely,
2. Organize your unit summary in paragraphs dealing with:
    a. Goals-Objectives
    b. Section-wise precise description/Summaries
    c. Conclusion
3. Identify 1-3 significant objectives for each unit.
    a. Write in your own words (sentences/statements).
4. Identify main points from each section.
    a. Write a (5-7 sentences) summary of each section.
5. Formulate few sentences that consolidate the whole unit.
    a. Write a paragraph to conclude everything of the unit.
6. Review (for conciseness, objectivity, coverage), Revise and Finalize.
    a. Rewrite the paragraph to make it clear and concise, to eliminate repetition.
    b. The final version should be a complete, unified, and coherent.