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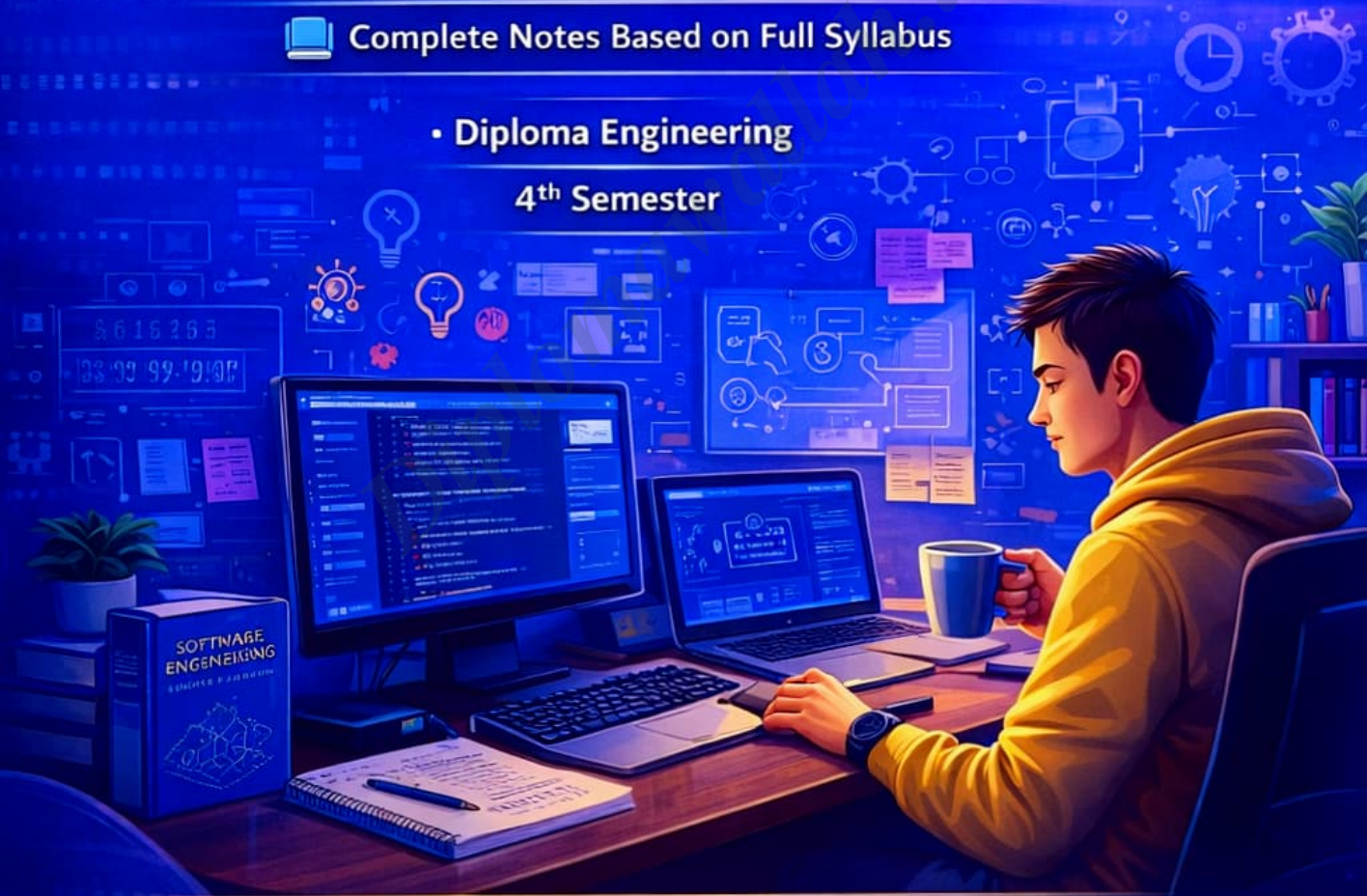
SOFTWARE ENGINEERING

PRINCIPLES AND PRACTICES

 Complete Notes Based on Full Syllabus

• Diploma Engineering

4th Semester



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Unit-04RISK

A risk is any potential problem or uncertain event that could negatively affect a software project success.

- It is not a problem yet, but it might become in future.
- Risk are about uncertainty - something that could happen.
- If the risk does occur, it called an issue or problem.

Example:-

Suppose we are developing a banking app:

- Risk: A key developer might leave during the project.
- Uncertain event: The developer may or may not leave.
- Impact if happens: Delay in project, extra cost to train a new developer.

Key points:-

1. uncertainty
2. loss or negative impact.
3. probability
4. impact.

Schedule Risk, Budget Risk, Operational Risk, Technical Risk

Program Risk

Types

1. Project Risks:

- Delays in Schedule
- Budget overruns
- Team problems (Staff leaving, lack of skills)

2. Technical Risks:

- Technology not working as expected.
- Integration issues.
- Performance problems

3. Business Risks:

- Product doesn't meet user needs.
- Customer changes requirement

4. Operational Risks:

- Hardware failure
- Supplier delays.

5. External Risks:

- Regulatory changes.
- Natural disaster.

* Characteristics of Risk

1. Uncertainty

Risk always involves uncertainty about what will happen in the future.

Ex - we don't know if a machine will break down or not.

2. Possibility of Loss

There is always a chance that you will face a loss.

Ex - If a raw material is delayed, production stops, causing financial loss.

3. Variability of outcome

Outcomes can vary each time the event happens.

Ex - One shipment may arrive safely, another may be damaged.

4. Can be Reduced But not Eliminated

Precaution and risk management can minimize risk, but not remove it completely.

Ex - Fire safety measure reduce fire risk but can't fully guarantee prevention.

(Every business must live with some level of risk)

5. Can be reduced but not eliminated

Precaution and risk management can minimize risk, but not remove it completely.

6. Related to time

Risk always concerns the future; past events are certain.

Ex - Forecasting next quarter's profit has risk because it's about the future.

* Categories of Risk

1. Project Risk

→ These affect the project plan, schedule and resources.

Ex - Poor project planning, unrealistic deadlines, inexperienced team members.

2. Technical Risks.

These are related to the technology or technical aspects of the S/W.

Ex

- New or untested technology
- Integration problem with third-party tools.
- Performance issue.

3. Business Risks.

These relate to the product market success or business impact.

- Ex - product may not meet customer expectations.
- market demand may change, product pricing issue.

4. Operational Risks

These are risks during the deployment and maintenance phase.

- Ex - lack of training for end-user
- System failure after release
 - Security vulnerabilities.
 - poor documentation.

* Risk Management

Risk management plays a crucial role in ensuring the success, quality and timely delivery of S/W projects.

It is important because:

1. prevents project failure without proper risk management, unexpected issue (like delays, cost overruns or technical problems) can cause the project to fail completely.

2. minimize financial loss

Software projects are expensive. Risks like Scope creep, hardware failure, or miscommunication can lead to budget overruns if not managed.

Ex -

A Client keeps changing req. during development increasing both time and cost. Risk management anticipates such risk and controls them early.

3. Improves planning and decision making
Risk management helps in identifying potential obstacles early.

Ex - If a tool we're using is unstable, we can plan for an alternative in advance.

4. Ensure timely delivery

Managing schedule-related risks keep the project on track.

5. Improves Software Quality

Risk related to testing, security and performance can impact product quality.

6. Increases Client Satisfaction.

7. Support Compliance and Legal Safety

8. Helps in Resource optimization.

9. Reduces Stress in Team.

* Framework

1. Risk Identification :- Find all possible risks that could affect the project.
2. Risk Analysis :- understand how likely the risk is to occur and what impact it may have.
3. Risk Evaluation or prioritization :- Rank risk based on their severity and impact.
4. Risk Treatment or mitigation :- decide what to do about each risk.
5. Risk monitoring & control :- continuously track risk and make adjustment.
6. Risk communication & documentation :- Ensure all team members and stakeholders are informed.

* Principles

1. Integration with project objective
• Risk should be identified and managed in the context of the project scope, timeline, quality and budget.
2. Structured and comprehensive
A systematic and logical approach well-defined framework that ensures no risk is overlooked.
Steps - Identification → Analysis → response → monitoring.

3. Customized to project needs.

• Every project is unique. A large banking SW project will have different risks than a mobile game.

4. Inclusive and Collaborate

project managers, developers, testers and client should all contribute to risk discussions.

5. Dynamic and Responsive to change

• As technology, requirements or the environment changes, new risks may appear, and existing ones may grow or shrink.

6. Risk ownership

Assign clear responsibility for each risk.

* Risk assessment

→ Risk assessment is the process of:

- Identifying potential risks.

- Analyzing the impact and likelihood of these risks.

Steps

1. Risk identification

• List all possible risks that might affect the project.

Ex - Req. changes, developers leaving, server failure, budget overrun.

2. Risk analysis

determine the likelihood (probability) and impact severity of each risk.

• you can rate both on a scale like low, medium, high.

- Risk evaluation / prioritization
- Combine likelihood and impact to calculate risk exposure.
- Risk exposure = probability \times Impact.

4. Risk mitigation planning

• decide how to handle high-priority risk.

• Plans may include:

- Avoidance (removing the cause)
- Reduction (minimizing impact)
- Transfer (outsourcing)
- Acceptance (doing nothing but monitoring)

5. Documentation and Communication

- Record all risk data in a Risk Register.
- Share with stakeholders and team.

6. Continuous monitoring: Track new risk and update mitigation plans.

* Risk Control

Risk control refers to the set of actions taken to minimize the probability and impact of risk that may affect the success of S/w project.

Goals:

1. Prevent the risk from occurring.
2. Reduce the impact if it does occur.
3. Prepare recovery plans in case the risk becomes a reality.

Two major phases of risk control:-

1. Risk mitigation

→ This involves planning and implementing steps to reduce the chances or effects of the risk.

Ex → If the risk developer unavailability, hire backup developer or cross-train the team.

- If the risk requirement changes, use agile methods to handle them iteratively.

2. Risk monitoring and management (Tracking & handling).

→ Regular tracking of risk status and applying control measures as needed.

Key steps:-

- Create a risk tracking report.
- Assign a risk owner responsible for monitoring.

1. Risk Control Planning

→ Risk Control planning involves deciding how to handle each identified risk.

This step is taken after risk assessment and focuses on developing strategies to avoid, reduce, transfer or accept risks.

2. Risk Resolution

Risk Resolution refers to the implementation of planned risk responses.

It includes carrying out the mitigation, avoidance or contingency actions when the risk actually occurs or prevents it.

3. Risk Monitoring

Risk monitoring is the ongoing process of keeping track of identified risks, detecting new risks, and evaluating the effectiveness of risk resolution efforts.

~~Ex:~~

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