**Assignment 3:** Research and compare SDLC models suitable for engineering projects. Present findings on Waterfall, Agile, Spiral, and V-Model approaches, emphasizing their advantages, disadvantages, and applicability in different engineering contexts.

**Introduction:**

Software Development Life Cycle (SDLC) models guide engineering projects from conception to delivery. This comparison analyzes four popular SDLC models: Waterfall, Agile, Spiral, and V-Model.

**SDLC Models:**

1. **Waterfall Model**

**Advantages:**

Linear and predictable approach

Clear documentation and milestones

Suitable for well-defined requirements

**Disadvantages:**

Inflexible to change requests

High risk of project failure if requirements change

Limited customer involvement

**Applicability:**

Construction and infrastructure projects

Embedded systems development

Regulatory-compliant projects

1. **Agile Model**

**Advantages**:

Flexible and adaptable to change

Customer-centric and iterative approach

Early and continuous delivery

**Disadvantages:**

Higher risk of project scope creep

Requires high team collaboration and communication

Limited documentation

**Applicability:**

Software development and IT projects

Research and development initiatives

Projects with rapidly changing requirements

1. **Spiral Model**

**Advantages**:

Combines Waterfall and Agile benefits

Risk assessment and mitigation

Suitable for complex projects

**Disadvantages:**

Higher cost and time-consuming

Requires expert risk assessment

Limited scalability

**Applicability:**

Complex system integration projects

High-risk and high-reward initiatives

Projects requiring iterative development

1. **V-Model**

**Advantages**:

Emphasizes testing and validation

Verification and validation at each stage

Suitable for safety-critical systems

**Disadvantages:**

Limited flexibility to changes

Higher testing costs

Requires detailed requirements

**Applicability:**

Safety-critical systems development

Medical device and aerospace projects

Regulatory-compliant projects

**Comparison Summary:**

**SDLC Model Waterfall Agile Spiral V-Model**

Flexibility Low High Medium Low

Risk Management Low Medium High High

Customer Involvement Low High Medium Medium

Documentation High Low Medium High

Applicability Well-defined requirements Changing requirements Complex projects Safety-critical systems

**Conclusion:**

Choosing the right SDLC model depends on project requirements, complexity, and stakeholder needs. Consider:

Project scope and stability

Risk management and mitigation

Customer involvement and feedback

Regulatory compliance and safety requirements

By selecting the most suitable SDLC model, engineering projects can ensure efficient development, effective risk management, and successful delivery.

**References:**

Pressman, R. S. (2022). Software Engineering: A Practitioner's Approach.

Sommerville, I. (2016). Software Engineering.

PMI. (2022). A Guide to the Project Management Body of Knowledge.