**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.**

1. Waterfall Model:

This model is mostly not used because of it’s properties. In this type of model Customer is required to give the information about the requirement at once at the beginning of the project.

In this model all the phases of SDLC is executed step by step ,one after another. Only After completing the one phase next phase will begin.

No overlapping is done.

This model is also known as Linear sequential development model.

* **Requirement->Defining->Designing->Developing->Deployment->Maintenance**

**ADVANTAGE:-**

* It is very easy to implement
* Very cost effective
* Simplicity and clarity

**DISADVANTAGE:-**

* It is very rigid **, Not good for Dynamic project**
* Lack of customer interaction
* Demo is shown only after the full development
* If any change is required then have to start from the very beginning
* Very time taking
* Not good for Large scale project

**APPLICABILITY:-**

* This type of model is useful for Small scale project
* It should be used when the requirement is defined and have clear idea.

1. Agile Model:-

This Model is iterative incremental built model ,which give customer satisfaction by delivering the project rapidly.

In this type of model, the software application is divided into sprints and incremental built. Where each sprints vary from 2 to 4 weeks.

After completion of each sprint new feature is added means incremental built is done.

Incremental built is done in repetitive way.

**ADVANTAGE**:-

* Customer satisfaction is provided
* It is more flexible than waterfall model
* Demo is shown to the customer after every sprint.
* Improve the quality of the project
* Risk management

**DISADVANTAGE**:-

* It is complex
* It is more costly
* It is not easy to manage

**APPLICABILITY:**

* It is mainly used in mid level to large scale project
* Mostly used in project where there is continuous change of requirement.
* Used in dynamic project

1. Spiral Model:-

Spiral model in Software Development used the Iterative approach it is somewhat combination of waterfall and Agile model.

ADVANTAGE:-

* It is used where there is risk is involved for the risk management.
* It is used when the customer requirement is not clearly understand by customer
* Customer satisfaction
* It is flexible
* Iterative incremental approach
* Improve the quality

DISADVANTAGE:-

* It is expensive
* It is complex
* Time-consuming
* Difficult to maintain

APPLICABILITY:-

* It is mainly used for the development of the critical project.
* It is used where risk management is required.

1. V Shape Model:-

This model is an advance version of waterfall model. In this model Testing is required at every stage of development like:

Requirement -> Acceptance Testing

High level Design->System Testing

Low level Design-> Functional Testing

Coding-> Unit Testing

ADVANTAGE:-

* Development of the high quality product due to testing at every stage.

DISADVANTAGE:-

* Time Consuming
* More Documentation is required
* If the requirement is changed then have to change both the document SRS and Test Document.
* Initial cost is high

APPLICABILITY:-

* It is best to use for the small scale project.
* It is best to use when the requirement is certain or fixed