INSTITUTE OF AERONAUTICAL ENGINEERING
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COMPUTER SCIENCE AND ENGINEERING(AI&ML)
DEFINITION AND TERMINOLGY

Department	**COMPUTER SCIENCE AND ENGINEERING(AI&ML)**				
Course Title	**OBJECT ORIENTED SOFTWARE ENGINEERING**				
Course Code	ACSC19				
Program	B.Tech				
Semester	VI	CSE(AI&ML)			
Course Type	Core				
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Course Structure	Theory			Practical	
	Lecture	Tutorials	Credits	Laboratory	Credits
	3	1	4	-	-
Course Coordinator	Mr.R A V Krishna Rao, Assistant Professor				

COURSE OBJECTIVES:
The students will try to learn:

I	The object-oriented concepts along with their applicability contexts.
II	The different phases in software development life cycle.
III	The modeling techniques to model different perspectives of object oriented software design.
IV	The software architecture and design patterns.
V	The knowledge of testing methods and comparison of various testing techniques.

1   COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Identity** software process software development process models and application to manage a software project.	Understand
CO 2	**Outline** the software requirements prototyping scheduling estimation models to prepare the software requirement specifications document.	Understand
CO 3	**Make use of** discrete modelling techniques to conduct structured object-oriented and domain analysis.	Apply
CO 4	**Utilize** the object -oriented analysis process and explore different design models with UML.	Understand
CO 5	**Explain** the design concept principles and various design approaches.	Understand
CO 6	**Summarize** the approaches used for object-oriented implementation testing and maintenance of a software product.	Understand

DEFINITION AND TERMINOLOGY:

S.No	DEFINITION	CO's
	MODULE I	
	INTRODUCTION TO SOFTWARE ENGINEERING	
1	**Define software?**	CO 1
	Software is: (1) Instructions (computer programs) that when executed provide desired features, function, and performance; (2) Data structures that enable the programs to adequately manipulate information and (3) Documentation that describes the operation and use of the programs.	
2	**Explainthe application of software engineering?**	CO 1
	The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.	
3	**Elaborate software development process?**	CO 2
	In software engineering, a software development process is the process of dividing software development work into smaller, parallel or sequential steps or subprocesses to improve design, product management, and project management. It is also known as a software development life cycle (SDLC). The methodology may include the pre-definition of specific deliverables and artifacts that are created and completed by a project team to develop or maintain an application.	

4	**Define Agile development?**	CO 1
	Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds. These builds are provided in iterations..	
5	**How project is explained in Software Engineering?**	CO 1
	A project manager and conducted by a project team, a project is a collection of tasks that have to be accomplished in order to achieve a goal. It includes a scope, fixed timeline, project plan, and resources. It's something that generally hasn't been done before within an institution and is often implemented to administer change	
6	**What is process?**	CO 1
	A process is an established, repeatable procedure used for internal business purposes. It involves a series of tasks that are related to one another which are required to be carried out in order to achieve a result.l.	
7	**Explain project management?**	CO 1
	Project management is the process of leading the work of a team to achieve all project goals within the given constraints: (1) This information is usually described in project documentation, created at the beginning of the development process. The primary constraints are scope, time, and budget (2) The secondary challenge is to optimize the allocation of necessary inputs and apply them to meet pre-defined objectives.	
8	**Define project metrics.**	CO 1
	Project metrics are the metrics used by the project manager to check the project's progress. Data from the past projects are used to collect various metrics, like time and cost; these estimates are used as a base of new software. Note that as the project proceeds, the project manager will check its progress from time-to-time and will compare the effort, cost, and time with the original effort, cost and time. Also understand that these metrics are used to decrease the development costs, time efforts and risks.	
9	**Define the Object-Oriented Concept, principles and methodologies?**	CO 1
	Object-oriented programming has four basic concepts: encapsulation, abstraction, inheritance, and polymorphism. Even if these concepts seem incredibly complex, understanding the general framework of how they work will help you understand the basics of an OOP computer program. Below, we outline these four basic principles and what they entail: 1. Encapsulation 2. Abstraction 3. Inheritance 4. Polymorphism.	

10	**What is software?**	CO 1
	Software is: (1) Instructions (computer programs) that when executed provide desired features, function, and performance (2) Data structures that enable the programs to adequately manipulate information and (3) Documentation that describes the operation and use of the programs	
11	**Define the meaning for LOC?**	CO 1
	Source lines of code (SLOC), also known as lines of code (LOC), is a software metric used to measure the size of a computer program by counting the number of lines in the text of the program's source code..	
12	**Define COCOMO model?**	CO 1
	The Constructive Cost Model (COCOMO) is a procedural cost estimate model for software projects. It has been commonly used to project costs for a variety of projects and business processes.	
13	**Elaborate Agile model?**	CO 1
	Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds. These builds are provided in iterations	
14	**Explain the purpose of process assessment?**	CO 1
	The aim of process assessment is to identify the areas for improvement and suggest a plan for making that improvement..	
15	**Define software process?**	CO 1
	The software process framework is a collection of task sets.	
16	**What is spiral lifecycle model?**	CO 1
	The spiral model, also known as the spiral lifecycle model. This model of development combines the features of the prototyping model and the strategies that models methodologies used in agile software developmentl..	
17	**Define Software Engineering A Layered Technology?**	CO 1
	Any engineering approach must rest on organizational commitment to quality which fosters a continuous process improvement culture.	
18	**Define the process of framework?**	CO 1
	The process of framework defines a small set of activities that are applicable to all types of projects.	
19	**Define waterfall model?**	CO 1
	In Waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases. Waterfall model is the earliest SDLC approach that was used for software development.	

20	**What is spiral lifecycle model?**	CO 1
	The spiral model, also known as the spiral lifecycle model. This model of development combines the features of the prototyping model and the strategies that models methodologies used in agile software development	

MODULE II
PLANNING AND SCHEDULING

1	**Define Software Requirements Specification?**	CO 3
	The production of the requirements stage of the software development process is Software Requirements Specifications (SRS) (also called a requirements document). This report lays a foundation for software engineering activities and is constructing when entire requirements are elicited and analyzed. SRS is a formal report, which acts as a representation of software that enables the customers to review whether it (SRS) is according to their requirements. Also, it comprises user requirements for a system as well as detailed specifications of the system requirements.	
2	**Describe Project Planning?**	CO 3
	Project planning is an organized and integrated management process, which focuses on activities required for successful completion of the project. It prevents obstacles that arise in the project such as changes in projects or organization's objectives, non-availability of resources, and so on. Project planning also helps in better utilization of resources and optimal usage of the allotted time for a project. The other objectives of project planning are listed below. With the help of user requirements, the project management team determines the scope of the project before the project begins. This scope provides a detailed description of functions, features, constraints, and interfaces of the software that are to be considered.	
3	**Describe the software scope?**	CO 5
	Software scope is a well-defined boundary, which encompasses all the activities that are done to develop and deliver the software product.	
4	**Describe the resources?**	CO 2
	A software resource is a logical concept that is obtained by viewing the base hardware resource notion as something that is more purpose oriented at the application level. In MARTE, software resources are represented by the SwResource stereotype, which is a refinement of the general Resource stereotype .	
5	**Define empirical estimation models?**	CO 2
	In software development, effort estimation is the process of predicting the most realistic amount of effort (expressed in terms of person-hours or money) required to develop or maintain software based on incomplete, uncertain and noisy input.	

6	**List the importance of planning?**	CO 2
	Project planning is an organized and integrated management process which focuses on the activities required for successful completion of the project. It prevents obstacles that may arise in the project such as changes in projects or organization's objectives, non-availability of resources, and so on.	
7	**define risk management?**	CO 3
	Risk management is the process of identifying, assessing and controlling threats to an organization's capital and earnings. These risks stem from a variety of sources including financial uncertainties, legal liabilities, technology issues, strategic management errors, accidents and natural disasters.	
8	**Define project scheduling?**	CO 3
	Software project scheduling is an activity that distributes estimated effort across the planed project duration by allocating the effort to specific software engineering tasks.	
9	**Define object oriented estimation and scheduling?**	CO 4
	Object-Oriented (OO) software projects are becoming more popular than structured (functional) technology based projects. Object Technology (OT) offers support to deliver products to market more quickly and to provide high quality with lower maintenance costs	
10	**Explain about functional requirements?**	CO 4
	A functional requirement defines a function of a system or its component, where a function is described as a specification of behavior between outputs and inputs. As defined in requirements engineering, functional requirements specify particular results of a system.	
11	**Explain about non functional requirements?**	CO 4
	A non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. They are contrasted with functional requirements that define specific behavior or functions.	
12	**Define user requirements?**	CO 3
	The user requirement(s) document (URD) or user requirement(s) specification (URS) is a document usually used in software engineering that specifies what the user expects the software to be able to do	
13	**Define system requirements?**	CO 1
	System requirements are the configuration that a system must have in order for a hardware or software application to run smoothly and efficiently. Failure to meet these requirements can result in installation problems or performance problems. System requirements are also known as minimum system requirement.	

14	**Define Basic Concept of Project Scheduling?**	CO 2
	An unrealistic deadline established by someone outside the software development group and forced on managers and practitioner's within the group. Changing customer requirements that are not reflected in schedule changes.	
15	**Define Effort Distribution?**	CO 4
	A recommended distribution of effort across the software process is often referred to as the 40–20–40 rule. Forty percent of all effort is allocated to frontend analysis and design. A similar percentage is applied to back-end testing. You can correctly infer that coding (20 percent of effort) is deemphasized.	
16	**DefineProject risks?**	CO 2
	Threaten the project plan. That is, if project risks become real, it is likely that the project schedule will slip and that costs will increase.	
17	**The Software Requirements Specifications(SRS) Document?**	CO 6
	The Software Requirements Specifications(SRS) Document? CO 4 The requirements document is the official statement of what is required of the system developers. Should include both a definition of user requirements and a specification of the system requirements..	
18	**Explain Feasibility studies?**	CO 5
	The purpose of feasibility study is not to solve the problem, but to determine whether the problem is worth solving. A feasibility study decides whether or not the proposed system is worthwhile.	
19	**Define requirements analysis?**	CO 2
	Requirements analysis, also called requirements engineering, is the process of determining user expectations for a new or modified product. These features, called requirements, must be quantifiable, relevant and detailed. In software engineering, such requirements are often called functional specifications.	
20	**Define the term project stakeholder?**	CO 3
	According to the Project Management Institute (PMI), the term project stakeholder refers to, "an individual, group, or organization,who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project".	
MODULE III		
ANALYSIS		
1	**Describe Analysis modeling?**	CO 4
	1. Analysis model operates as a link between the 'system description' and the 'design model' 2. In the analysis model, information, functions and the behaviour of the system is defined and these are translated into the architecture, interface and component level design in the 'design modeling'	

2	**Define data modeling, functional modeling?**	CO 5
	1. Functional Data Models are a form of Semantic Data Model which appeared early in database history. They use the mathematical formalism of function application to represent and follow associations between data items. Functions are usually applied to variables whose values may be object identifiers or record instances.	
3	**Define information flow?**	CO 5
	an information flow is a particular view that focuses on the path followed by information entities. For instance, this view specifies of which processes a document is an input and an output.	
4	**Define behavioral modeling?**	CO 5
	Behavioral models describe the internal dynamic aspects of an information system that supports the business processes in an organization. During analysis, behavioral models describe what the internal logic of the processes is without specifying how the processes are to be implemented.	
5	**Describe Structured analysis?**	CO 5
	Structured analysis is a software engineering technique that uses graphical diagrams to develop and portray system specifications that are easily understood by users	
6	**Define Object-Oriented analysis**	CO 5
	object-oriented analysis phase of software development, the system requirements are determined, the classes are identified and the relationships among classes are identified	
7	**Describe domain analysis?**	CO 5
	Domain analysis, or product line analysis, is the process of analyzing related software systems in a domain to find their common and variable parts. It is a model of wider business context for the system	
8	**Define object relationship model?**	CO 5
	An Object relational model is a combination of a Object oriented database model and a Relational database model. So, it supports objects, classes, inheritance etc. just like Object Oriented models and has support for data types, tabular structures etc. like Relational data model.	
9	**Describe object behaviour model?**	CO 5
	The behavior modeling of objects is a critical task in the object oriented approach to database design. The behavior that describes dynamic characteristics of objects is analyzed based on the aggregation concept.	

10	**Define design modeling with UML?**	CO 4
	Modeling with the Unified Modeling Language (UML)—a visual design language for object-oriented programming—is a critical skill for all team members in a software development project. These models are a cost-effective way for collaborators to analyze, communicate.	
11	**Define structured system analysis?**	CO 3
	Structured systems analysis is a set of standards for systems analysis and application design. It uses a formal methodical approach to the analysis and design of information systems	
12	**Define object modeling?**	CO 5
	Object modelling develops the static structure of the software system in terms of objects. It identifies the objects, the classes into which the objects can be grouped into and the relationships between the objects.	
13	**Object Relational Data Model?**	CO 5
	Both Relational data models and Object oriented data models are very useful. But it was felt that they both were lacking in some characteristics and so work was started to build a model that was a combination of them both..	
14	**Define Data Objects?**	CO 5
	A data object is a representation of composite information that must be understood by software. By composite information, I mean something that has a number of different properties or attributes	
15	**Define functional modeling?**	CO 5
	Functional Modelling is the final component of object-oriented analysis. The functional model shows the processes that are performed within an object and how the data changes as it moves between methods..	
16	**Define dynamic modeling?**	CO 5
	After the static behaviours of the system is analyzed, its behaviour with respect to time and external changes needs to be examined. This is the purpose of dynamic modelling.	
17	**Define feasibility report?**	CO 5
	Two valves commonly used in pressurized feed systems are isolation valves and latch valves.	
18	**Define structured system analysis?**	CO 5
	Structured systems analysis is a set of standards for systems analysis and application design. It uses a formal methodical approach to the analysis.	

19	**Define requirements management?**	CO 5
	Requirements management is the process of documenting, analyzing, tracing, prioritizing and agreeing on requirements and then controlling change and communicating to relevant stakeholders. It is a continuous process throughout a project. A requirement is a capability to which a project outcome (product or service) should conform.	
20	**Define the term project stakeholder?**	CO 5
	According to the Project Management Institute (PMI), the term project stakeholder refers to, "an individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.	
MODULE IV	
DESIGN	
1	**What is Design concepts and principles?**	CO 5
	A design concept is the core idea driving the design of a product, explained via a collection of sketches, images, and a written statement. This helps the designers and, later, the developers stay on track throughout the creative process, ensuring they bring a product to market with value to target users. Software design principles are concerned with providing means to handle the complexity of the design process effectively. Effectively managing the complexity will not only reduce the effort needed for design but can also reduce the scope of introducing errors during design.	
2	**Define design process?**	CO 5
	Design Process is often described as a problem solving process, but this is one reason it might seem confusing. If you have seen a list of steps for the design process, the first step was probably "define the problem".	
3	**Describe modular design?**	CO 5
	A modular design is an approach for product designing which is used to produce a complete product by integrating or combining smaller parts that are independent of each other	
4	**Define design effective modularity?**	CO 4
	A module is the essential part of any modular design. It is a logically separable part of a program. It is a program unit that is discrete and identifiable with respect to compiling and loading. So a module can be a macro a function a procedure (or subroutine) a process or a package. In system which use functional abstraction a module is usually a procedure of function or a collection of these all	

5	**Define software architecture?**	CO 4
	Software architecture provides a design plan, a blueprint of a system, an abstraction to help manage the complexity of a system, and also a communication medium between stakeholders.	
6	**Define data design?**	CO 5
	Data design is the first design activity, which results in less complex, modular and efficient program structure. The information domain model developed during analysis phase is transformed into data structures needed for implementing the software.	
7	**What is transform mapping?**	CO 6
	Transform mapping is a technique in which data flow diagrams (DFDs) are mapped to a specific scenario. In other words, it's a data flow-oriented mapping technique that uses DFDs to map real life scenarios to a software architecture	
8	**Define transaction mapping?**	CO 4
	It is a set of design steps that allows a DFD with transforms flow characteristics to be mapped into a specific architectural style. In transform, mapping is described by applying design steps to an example system a portion of the safe home security software. The Safe Home security system is representative of many computer-based products and systems in use today.	
9	**Define object oriented design?**	CO 2
	In the object-oriented design method, the system is viewed as a collection of objects (i.e., entities). The state is distributed among the objects, and each object handles its state data. For example, in a Library Automation Software, each library representative may be a separate object with its data and functions to operate on these data	
10	**Define system design process?**	CO 4
	System design is the process of defining the elements of a system such as the architecture, modules and components, the different interfaces of those components and the data that goes through that system.	
11	**Define object design process?**	CO 4
	The Design process is an approach for breaking down a large project into manageable chunks. use this process to define the step needed to tackle each project..	
12	**Define design patterns?**	CO 4
	TDesign patterns are typical solutions to common problems in software design. Each pattern is like a blueprint that you can customize to solve a particular design problem in your code	

13	**Define a design model?**	CO 4
	The design model is an object model describing the realization of use cases, and serves as an abstraction of the implementation model and its source code. The design model is used as essential input to activities in implementation and.	
14	**Define transaction flow?**	CO 4
	A unit of work seen from a system user's point of view is known as transaction. It contains the sequence of operations, some of which are performed by a system, persons or devices that are outside of the system. Transactions begin with birth, i.e. they are created as a result of some external act. At the conclusion of the transactions processing, the transaction is no longer in the system..	
15	**Define architectural design?**	CO 4
	IEEE defines architectural design as "The process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer system.	
16	**Define cardinality in data modeling?**	CO 4
	Cardinality in data modeling, cardinality specifies how the number of occurrences of one object is related to the number of occurrences of another object.	
17	**Define a design pattern?**	CO 4
	A design pattern describes a design structure which solves a particular design problem in a specified content..	
18	**Define a transaction?**	CO 4
	A transaction is a unit of work seen from a system user's point of view. A transaction consists of a sequence of operations, some of which are performed by a system, persons or devices that are outside of the system	
19	**What are Superordinate systems?**	CO 4
	Superordinate systems use the target system like a part of some higher-level processing scheme.	
20	**Define Functionality of a software system?**	CO 4
	The degree to which the software satisfies stated needs as indicated by the following sub attributes: suitability, accuracy, interoperability, compliance, and security	
MODULE V		
IMPLEMENTATION, TESTING AND MAINTENANCES		
1	**Differentiate Top - down, bottom-up?**	CO 6
	Top-down and bottom-up approaches are methods used to analyze and choose securities. However, the terms also appear in many other areas of business, finance, investing, and economics. While the two schemes are common terms, many investors get them confused or don't fully understand the differences between the approaches	

2	**Elaborate object oriented product implementation and integration?**	CO 5
	object-oriented design are the implementation level features that are built into the programming language. These features are often referred to by these common names.	
3	**Define Software testing methods?**	CO 4
	There are different methods that can be used for software testing. This chapter briefly describes the methods available: 1.block box testing 2.white box testing.	
4	**Define white box testing ?**	CO 5
	White-box testing is the detailed investigation of internal logic and structure of the code. White-box testing is also called glass testing or open-box testing. In order to perform white-box testing on an application, a tester needs to know the internal workings of the code.	
5	**Define basis path?**	CO 6
	Path testing is a structural testing method that involves using the source code of a program in order to find every possible executable path. It helps to determine all faults lying within a piece of code	
6	**Define control structure?**	CO 5
	Control structure testing is a part of white box testing. it includes following methods: 1) Condition testing 2) Loop testing 3) Data validation testing 4) Branch testing/Path testing	
7	**Define black box testing?**	CO 6
	Black Box Testing is a software testing method in which the functionalities of software applications are tested without having knowledge of internal code structure, implementation details and internal paths.	
8	**Define unit testing?**	CO 5
	A unit test is a way of testing a unit - the smallest piece of code that can be logically isolated in a system. In most programming languages, that is a function, a subroutine, a method or property.	
9	**What is integration testing?**	CO 4
	Integration testing is the second level of the software testing process comes after unit testing. In this testing, units or individual components of the software are tested in a group.	
10	**What is validation and system testing?**	CO 3
	Validation Testing ensures that the product actually meets the client's needs. It can also be defined as to demonstrate that the product fulfills its intended use when deployed on appropriate environment	

11	**Define system testing.**	CO 3
	system testing and validation of the CCSM is required to ensure that model quality and integrity is maintained throughout the development process. This section establishes the system testing standards and the procedures that will be used to verify the standards have been me	
12	**Define testing tools?.**	CO 3
	TESTING TOOLS in software testing can be defined as products that support various test activities starting from planning, requirement gathering, build creation, test execution, defect logging and test analysis. These testing tools are mainly used for testing software firmness, thoroughness, and other performance parameters.	
13	**Define black box testing?**	CO 6
	Software maintenance is one of the stages in the software development life cycle. It starts after the deployment of software in the working field.	
14	**What is reengineering?**	CO 3
	Reengineering is the analysis of existing software system and modifying it to constitute into a new form. Chikofsky and Cross define reengineering as 'the examination and alteration of a subject system to reconstitute it in a new form and subsequent implementation of that forml.	
15	**Define black box testing?**	CO 3
	The black box testing is also called as behavioral testing. This method fully focuses on the functional requirements of the software. Tests are derived that fully exercise all functional requirements.	
16	**Define software testing?**	CO 3
	Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design, and coding.	
17	**Define System Testing?**	CO 3
	The groups of components are integrated to create a system or subsystem is done. These tests are based on the system specification.	

18	**Define Component testing?**	CO 3
	Individual components are tested. Tests are derived from developer's experience not from customers	
19	**Define Accessibility testing?**	CO 3
	Accessibility testing is a subset of usability testing where in the users under consideration people with all abilities and disabilities are. The significance of this testing is to verify .	
20	**Define manual testing?**	CO 3
	Manual testing is performed without taking help of automated testing tools. The software tester prepares test cases for different sections and levels of the code, executes the tests and reports the result to the manager ..	

Course Coordinator: **HOD, CSE(AI&ML)**
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