INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

COMPUTER SCIENCE AND ENGINEERING(DATA SCIENCE)

DEFINITION AND TERMINOLGY

Course Title	**SOFTWARE ENGINEERING**				
Course Code	ACDC04				
Program	B.Tech				
Semester	V	CSE(DS)			
Course Type	Core				
Regulation	IARE-UG-20				
Course Structure	Theory			Practical	
	Lecture	Tutorials	Credits	Laboratory	Credits
	3	-	3	-	-
Course Coordinator	Ms. Y Sujana, Assistant Professor				

COURSE OBJECTIVES:

The students will try to learn:

I	The elicitated requirements for a software development life cycles.
II	The design considerations for enterprise integration and deployment.
III	Quality assurance techniques and testing methodologies.
IV	The plan for a software project that includes the size , effort, schedule, resource allocation, configuration control, and project risk.

COURSE OUTCOMES:

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

CO 1	**Illustrate** process models, approaches and techniques for managing a software development process.	Understand
CO 2	**Summarize** the importance of project planning activities that accurately help in selection and initiation of individual projects and portfolios of projects in the enterprise.	Understand
CO 3	**Explain** software design model and behavior of a software system.	Understand
CO 4	**Develop** the approaches for implementaion,verification and validation including static analysis and reviews.	Apply
CO 5	**Demonstrate** the concept of risk management through risk identification, risk measurement and mitigation.	Understand

CO 6	**Make use of** earned value analysis and project metric for scheduling and improving the quality of software.	Apply

DEFINITION AND TERMINOLOGY:

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	MODULE I	
	SOFTWARE PROCESS AND PROJECT MANAGEMENT	
1	**Illustrate software?** 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.	CO 1
2	**State software engineering?** The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.	CO 1
3	**What is software process?** Software process is defined as the structured set of activities that are required to develop the software system.	CO 1
4	**Define System Engineering?** Systems engineering is an interdisciplinary field of engineering and engineering management that focuses on how to design and manage complex systems over their life cycles.	CO 1
5	**Demonstrate process model?** Process models are processes of the same nature that are classified together into a model. Thus, a process model is a description of a process at the type level. Since the process model is at the type level, a process is an instantiation of it	CO 1
6	**Define perspective process model?** A software process model is a simplified representation of a software process. Each model represents a process from a specific perspective. These generic models are abstractions of the process that can be used to explain different approaches to the software development.	CO 1
7	**State specialized process models?** Specialized process models take on many of the characteristics of one or more of the traditional models. These models tend to be applied when a specialized or narrowly defined software engineering approach is chosen.	CO 1

8	**Give the meaning for LOC.** 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.	CO 1
9	**Define software estimation?** 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.	CO 1
10	**What is prototyping?** Prototyping refers to an initial stage of a software release in which developmental evolution and product fixes may occur before a bigger release is initiated. These kinds of activities can also sometimes be called a beta phase or beta testing, where an initial project gets evaluated by a smaller class of users before full development.	CO 1
11	**Define project scheduling?** Software project scheduling is an activity that distributes estimated effort across the planed project duration by allocating the effort to specific software engineering tasks.	CO 1
12	**Illustrate earned value analysis?** Earned Value Analysis (EVA) is one of the key tools and techniques used in Project Management, to have an understanding of how the project is progressing. EVA implies gauging the progress based on earnings or money. Both, schedule and cost are calculated on the basis of EVA.	CO 1
13	**What is legacy software?** Legacy software is an old and outdated program that is still used to perform a task for a user, even though newer and more efficient options are available.	CO 1
14	**Define COCOMO model?** 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.	CO 1
15	**State software myths?** A belief of software managers, customers, and developers believe falsely.	CO 1
16	**What is spiral lifecycle model?** 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.	CO 1

17	**What is Rapid Application Development model?** It is a type of incremental model. The developments are time boxed, delivered and then assembled into a working prototype.	CO 1
18	**What is Agile model?** 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.	CO 1
19	**What is V model?** The V-model is a type of SDLC model where process executes in a sequential manner in V-shape. It is also known as Verification and Validation model.	CO 1
20	**What is the Scrum process?** Scrum is an agile way to manage a project, usually software development.	CO 1
MODULE II		
REQUIREMENT ANALYSIS AND SPECIFICATION		
1	**Define a requirement?** A condition or capability needed by a user to solve a problem or achieve an objective. A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.	CO 3
2	**State functional requirements?** 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.	CO 3
3	**State non functional requirements?** 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.	CO 5
4	**Define user requirements?** 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.	CO 2

5	**Define system requirements?** 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 requirements.	CO 2
6	**Elaborate domain requirements?** A domain is a field of study that defines a set of common requirements, terminology, and functionality for any software program constructed to solve a problem in the area of computer programming, known as domain engineering. The word domain is also taken as a synonym of application domain.	CO 2
7	**Define Source traceability?** These are basically the links from requirement to stakeholders who propose these requirements.	CO 3
8	**State validation process?** Validation is the process of evaluating software at the end of the development process to determine whether software meets the customer expectations and requirements	CO 3
9	**Define verification process?** Verification is the process of evaluating products of a development phase to find out whether they meet the specified requirements	CO 4
10	**What is requirements management?** 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.	CO 4
11	**Elaborate requirements elicitation?** In requirements engineering, requirements elicitation is the practice of researching and discovering the requirements of a system from users, customers, and other stakeholders. The practice is also sometimes referred to as "requirement gathering".	CO 4
12	**Define requirements analysis?** 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.	CO 3

13	**State requirements specification?** A software requirements specification (SRS) is a description of a software system to be developed.	CO 1
14	**Define data dictionary?** The data dictionary can be defined as an organized collection of all the data elements of the system with precise and rigorous definitions so that user and system analyst will have a common understanding of inputs, outputs, components of stores and intermediate	CO 2
15	**Elaborate structured system analysis?** 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.	CO 4
16	**Define the term Traceability?** Traceability is a property of an element of documentation or code that indicates the degree to which it can be traced to its origin or "reason for being". Traceability also indicates the ability to establish a predecessor-successor relationship between one work product and another.	CO 2
17	**State Software maintainability?** The ease with which a software system or component can be modified to correct faults, improve performance or other attributes, or adapt to a changed environment.	CO 6
18	**What is the purpose of Requirements Traceability Matrix?** The purpose of the Requirements Traceability Matrix is to ensure that all requirements defined for a system are tested in the test protocols.	CO 5
19	**Define feasibility report?** A feasibility report is a document that assesses potential solutions to the business problem or opportunity, and determines which of these are viable for further analysis.	CO 2
20	**State Software Reliability?** According to ANSI, Software Reliability is defined as: the probability of failure-free software operation for a specified period of time in a specified environment.	CO 3
MODULE III		
SOFTWARE DESIGN		
1	**Define a design process?** The Design Process is an approach for breaking down a large project into manageable chunks. Use this process to define the steps needed to tackle each project, and remember to hold to all of your ideas and sketches throughout the process	CO 4

2	**State design model?** 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 test.	CO 5
3	**Elaborate transaction flow?** 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.	CO 5
4	**Define Coupling?** Coupling is the measure of interconnection among modules in a program structure. It depends on the interface complexity between modules.	CO 5
5	**What is a cohesive module?** A cohesive module performs only "one task" in software procedure with little interaction with other modules. In other words cohesive module performs only one thing.	CO 5
6	**Define architectural design?** 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."	CO 5
7	**Illustrate architectural pattern?** An architectural pattern is a general, reusable solution to a commonly occurring problem in software architecture within a given context. Architectural patterns are often documented as software design patterns.	CO 5
8	**Define the principle of user interface design?** The design should make simple, common tasks easy, communicating clearly and simply in the user's own language and providing good shortcuts that are meaningfully related to longer procedures.	CO 5
9	**State component based development?** Component-based development (CBD) is a procedure that accentuates the design and development of computer-based systems with the help of reusable software components. With CBD, the focus shifts from software programming to software system composing.	CO 5

10	**What is a component design?** The Component Design Activity is an activity of the Product Design Activity for creating a Component Design. The Product Architecture identifies a set of Adaptable Components that may be used to implement a work product family. A Component Design is a design specification for one of these Adaptable Components.	CO 4
11	**State Transform mapping?** The transform mapping is a set of design steps applied on the DFD in order to map the transformed flow characteristics into specific architectural style.	CO 3
12	**Define Procedural cohesion?** When processing elements of a module are related with one another and must be executed in some specific order then such module is called procedural cohesion.	CO 5
MODULE IV		
TESTING AND IMPLEMENTATION		
1	**Define software testing?** Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design, and coding.	CO 5
2	**Elaborate System Testing?** The groups of components are integrated to create a system or sub-system is done. These tests are based on the system specification.	CO 5
3	**Define Component testing?** Individual components are tested. Tests are derived from developer's experience not from customers.	CO 5
4	**State black box testing?** 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.	CO 4
5	**What is a boundary value analysis?** A boundary value analysis is a testing technique in which the elements at the edge of the domain are selected and tested. It is a test case design technique that complements equivalence partitioning technique. Here instead of focusing on input conditions only, the test cases are derived from the output domain	CO 4
6	**Illustrate Cyclomatic complexity?** Cyclomatic complexity is software metric that gives the quantitative measure of logical complexity of the program. The Cyclomatic complexity defines the number of independent paths in the basis set of the program that provides the upper bound for the number of tests that must be conducted to ensure that all the statements have been executed at least once.	CO 5

7	**Define white box testing?** White Box Testing is a software testing method in which the internal structure/ design/ implementation of the item being tested is known to the tester.	CO 6
8	**State Alpha testing?** The Alpha testing is attesting in which the version of complete software is tested by the customer under the supervision of developer. This testing is performed at developer's site.	CO 4
9	**Define Beta testing?** The Beta testing is a testing in which the version of the software is tested by the customer without the developer being present. This testing is performed at customer's site.	CO 2
10	**State debugging?** Debugging is defined as the process of removal of defect. It occurs as a consequence of successful testing.	CO 4
MODULE V		
PROJECT MANAGEMENT		
1	**What is software maintenance?** Software maintenance is an activity in which program is modified after it has been put into use.	CO 6
2	**Define software metric?** A software metric is a standard of measure of a degree to which a software system or process possesses someproperty.	CO 5
3	**Elaborate software measurement?** Measurement is defined as a quantitative indication of the extent, amount, dimension, or size of some attribute of a product or process.	CO 4
4	**Define Indirect metrics?** It refers to the aspects that are not immediately quantifiable or measurable. Example: functionality of a program.	CO 5
5	**State Configuration management plan?** Configuration management plan focuses on the configuration management procedures and structures to be used.	CO 6
6	**Define Maintenance plan?** The purpose of maintenance plan is to predict the maintenance requirements of the system, maintenance cost and efforts required.	CO 5
7	**Illustrate Software re-engineering?** New features can be added to existing system and then the system is reconstructed for better use of it in future.	CO 6

8	**Define task set?** Task set is the collection of software engineering work tasks, milestones, and deliverables that must be accomplished to complete a particular project. Task sets are designed to accommodate different types of projects and different degrees of rigor.	CO 5
9	**What is task networks?** Constraints among tasks are expressed in the form of networks, called (hierarchical) task networks. A task network is a set of tasks and constraints among them. Such a network can be used as the precondition for another compound or goal task to be feasible.	CO 4
10	**Define risk management?** Risk management is the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level. The risk management approach determines the processes, techniques, tools, and team roles and responsibilities for a specific project.	CO 3

Course Coordinator: **HOD CSE**
Ms. Y Sujana, Assistant Professor