Government of Karnataka
Department of Technical Education
Bengaluru

	**Course Title: Software Engineering**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS51T**
	Type of Course: **Lectures, Self Study & Student Activity.**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Basic knowledge about the development of programs.

Course Objectives

1. Discuss factors like cost, schedule, quality that drive a software project and to Learn the role of software process and a process model in a project.
2. Understand the role of SRS in a project and to know how requirements are validated.
3. Understand software architectural views and learn planning and estimation of a software project.
4. Describe the key design concepts of software engineering and articulate in Projects.
5. Illustrate principles of structured programming, testing modules using unit test frameworks and code inspection to improve quality of code.
6. Identify evolving trend in software Engineering with DevOps.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Identify the factors that drive software project and summarize the role of process model in a project	***R,U***	**1,2,9,10**	**10**
CO2	Appraise SRS and to develop use cases for a project	***R,U,A***	**1,2,3,8,9,10**	**08**
CO3	Evaluate system architecture and develop detailed task schedule from the overall estimates and planning	***U,A***	**1,2,3,8,9,10**	**12**
CO4	Summarize structured design Methodologies	***U,A***	**1,2,3,4,8,9,10**	**08**
CO5	Illustrate different coding principles with unit test process	***R,U,A***	**1,2,3,7,8,9,10**	**10**
CO6	Identify the need for DevOps.	***R,U***	**1,2,4,9,10**	**04**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Software Engineering	**3**	**3**	**3**	**2**	**-**	**-**	**1**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	The software problem & Software process	**10**	05	15	05	25	17
II	Software requirements analysis and specifications.	**08**	05	10	10	25	17
III	Software architecture & planning a software project	**12**	--	20	15	35	25
IV	Design	**08**	05	10	10	25	17
V	Coding and Testing	**10**	--	15	10	25	17
VI	Devops	**04**	--	05	05	10	7
	Total	**52**	**15**	**75**	**55**	**145**	**100**

UNIT I : The software problem & Software process 10 Hrs

Software Problem - Cost, Schedule and quality, Scale and Change.
Software Process - Process and Project, Component Software Processes, Software development Process Models, Waterfall, Prototyping, Iterative development, Rational Unified Process, Time boxing Model, Extreme programming and Agile processes, Using process model in a project, Project Management Process.

UNIT II: Software requirements analysis and specifications 08 Hrs

Value of good SRS, Requirement process, Requirement Specification, Desirable Characteristics of an SRS, Components of an SRS, Structure of a Requirements Documents, Functional Specification with use cases, Basics, Examples, Extensions, Developing use cases, Other Approaches for Analysis, Data Flow Diagram, Validation.

UNIT III: Software architecture & Planning a software project 12 Hrs

Software Architecture - Role of Software Architecture, Architecture Views, Component and Connector view, Components, Connectors, Example, Architecture styles for C&C View, Pipe and Filter, Shared data Style, Client Server style, Some other styles, Documenting Architecture Design, Evaluating Architectures.

Planning a software project - Effort Estimation, Top-Down Estimation Approach, Bottom-Up Estimation Approach, Project Schedule and Staffing, Quality Planning, Risk Management Planning, Risk Management Concepts, Risk Assessment, Risk Control, A Practical Risk Management Approach, Project Monitoring Plan, Measurements, Project Monitoring and tracking**,** Detailed Scheduling.

UNIT IV: Design 08 Hrs

Design Concepts, Coupling, Cohesion, the Open-Closed Principle, Function Oriented Design, Structure Charts, Structured Design Methodology, Example, Object Oriented Design, OO Concepts Unified Modelling Language (UML), A Design Methodology, Examples, Detailed Design, Logic/Algorithm Design, State Modelling of Classes, Verification.

UNIT V: Coding & Testing 10 Hrs

Coding - Programming Principles and Guidelines, Structured Programming, Information Hiding, Some Programming Practices, Coding Standards, Incrementally Developing Code, An incremental coding process, Test Driven development, Pair Programming, Managing Evolving Code, Source Code Control and Build, Refactoring, Unit Testing, Testing procedural units, Unit testing of Classes, Code Inspection, Planning, Self review, Group review meeting.

Testing - Testing Concept, Error, Fault and Failure, Test Case, Test Suite and Test Harness, Psychology of Testing, Levels of Testing, Testing Process, Test Plan, Test Case Design, Test Case Execution.

UNIT VI:Devops 04Hrs

Devops, Introduction-Definition, Devops Tool chain, Why Devops?, Goals, Benefits, Relationship to Agile and Devops (continuous delivery), Devop Tools.

Text books

1. Software Engineering –A Precise Approach, Pankaj Jalote, edition 2010, Wiley India, ISBN: 9788126523115.
2. https://en.wikipedia.org/wiki/DevOps
3. http://www.informationweek.com/devops/agile-vs-devops-10-ways-theyre-different/d/d-id/1326121

References

1. Software Engineering A Practitioners Approach, Roger S Pressman, 2010, Tata McGraw Hill Publishing Co Ltd, ISBN 9780070701137
2. Software Engineering, Sajan Mathew, 2009 Reprint, S Chand publications.
3. Software Engineering Principles and Practices, Rajesh Narang.Mc Graw Hill Education.
4. Software Engineering, Subramanian Dutt, 2015 Pearson Publications

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

1. Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.

2. Each student should conduct different activity and no repeating should occur

1. A survey on Software Development Life Cycle(SDLC).
2. Presentation on Software Architecture.
3. A report on testing the software products.
4. Quiz.

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1,2,3,4
				Student activities	05	Report	1,2,3,4
				Total	**25**		
	SEE	End Exam		**End of the course**	**100**	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks evaluated through appropriate rubrics.
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10

2	Understanding	50
3	Application	40

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

4. Blue books (20 marks)
5. Student suggested activities report for 5 marks
6. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	**Semester/year**	**Course/Course Code**	**Max Marks**
Ex: I test/6 th week of sem 10-11 AM	V SEM		20
	Year:		
Name of Course coordinator : Units:__ CO's:____			

Question no	**Question**	MARKS	**CL**	**CO**	**PO**
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	**Semester/year**	**Course/Course Code**	**Max Marks**
Ex: I test/6 th week of sem 10-11 AM	V SEM	Software Engineering	20
	Year: 2017-18	Course code:**15CS51T**	
Name of Course coordinator : Units:1,2 Co: 1,2			

Note: Answer all questions

Question no	**Question**	**CL**	**CO**	**PO**
1	Explain components of software processes.(5) **OR** Discuss the desirable characteristics of an SRS.(5)	U	1,2	1,2
2	Discuss the various notations used in ER-diagram.(5) **OR** Compare scale and change in a software problem.(5)	U	1,2	1,2
3	Explain Waterfall model with a neat diagram. (10) **OR** Explain Prototyping model.(10)	U	1	1,2

Format for Student Activity Assessment

DIMENSION	**Unsatisfactory 1**	**Developing 2**	**Satisfactory 3**	**Good 4**	**Exemplary 5**	**Score**

Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned course co-ordinator for assessing the given activity.

MODEL QUESTION PAPER Code: **15CS51T**

Diploma in Computer Science & Engineering

V- Semester

Course Title: Software Engineering

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. Explain cost, schedule and quality.
2. Explain components of software processes.
3. Explain desirable characteristics of an SRS.
4. Explain Data Flow Diagram.
5. Discuss the role software architecture.
6. Explain Bottom-Up estimation approach.
7. Explain Structure charts.
8. Discuss the various OO concepts.
9. Define use case. List out the terms used in use cases.
10. Explain different attributes of software quality.
11. Define the term Error, Fault, Failure, Test Case and Test Suite.
12. Define Devops. Discuss the goals and benefits of Devops.
13. Explain the life cycle of defect.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Explain the Waterfall model with a neat diagram.
2. Explain Time boxing model with a neat diagram.
3. Explain components and connectors with an example.
4. Explain different architectural styles.
5. Explain the effort estimation of a software project.
6. Explain the Risk management concepts.
7. Explain various design concepts.
8. Explain structured design methodology.
9. Explain Test Driven development.
10. Compare Agile and Devops.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

V Semester

Course Title: Software Engineering

CO	Question	CL	Marks

I	Define software Engineering. Differentiate between process and project	R	05
	Discuss the main differences between student software and industrial software.	U	
	Explain cost, schedule and quality.	U	
	Define scale and change in a software problem.	U	
	Define different attributes of software quality.	U	
	Explain software process and software project.	A	
	Classify the software process components.	U	
	Explain software development process model. List the various software development process models.	A	
	Explain project management process.	A	
	Explain Extreme programming.	U	
	Explain Agile processes.	U	
	Explain the temporal relationship between development and management process.	A	
	Discuss the software process and software project.	A	10
	Explain components of software processes.	A	
	Explain Waterfall model with a neat diagram.	A	
	Explain Time boxing model with a neat diagram.	U	
	Explain Prototyping model.	U	
	Explain iterative development model.	U	
	Explain Rational Unified Process(RUP) model.	A	
	Explain Extreme programming and Agile processes.	A	
	Explain the phases of project management process.	U	
II	Mention the values of good SRS.	R	05
	Explain requirement process.	A	
	Discuss the desirable characteristics of an SRS.	U	
	Explain the general structure of SRS.	A	
	Define use case. List out the terms used in use cases.	R	
	Explain the various abstractions in each level while developing use cases.	A	
	Write the steps for analysis when employing use cases.	A	
	Explain the concept of state and projection .List the different approaches for problem analysis.	U	
	Discuss the various notations used in ER-diagram.	U	
	Explain the validation of SRS.	A	
	Explain the components of SRS.	U	10
	Explain the Data Flow Diagram with a neat diagram.	A	
	Discuss use case scenario with an example.	A	
III	Define software architecture. Explain the important uses of software architecture.	R	05
	Explain the role of software architecture.	A	
	Explain Components view.	U	
	Explain Connectors view.	U	
	Define architectural styles. List the architecture styles.	U	

	Explain Peer-to-Peer & Publish-Subscribe styles.	**U**	
	Discuss how to evaluate a proposed architecture.	**A**	
	Describe the role of effort estimation in a project.	**A**	
	Explain Top-Down estimation approach.	**U**	
	Explain Bottom-Up estimation approach.	**U**	
	Explain project scheduling and staffing with an example.	**A**	
	Define quality plan. Explain quality control activities.	**R**	
	Explain Risk Control.	**U**	
	Explain practical approach for Risk management planning.	**A**	
	Explain measurements in project monitoring plan.	**U**	
	Explain project monitoring and tracking plan.	**U**	
	Explain detailed scheduling.	**A**	
	Explain the architectural view.	**U**	
	Explain architectural view with an example.	**U**	
	Explain components and connectors with a neat diagram.	**U**	
	Explain different architectural styles.	**U**	
	Explain Pipe and Filter Style.	**U**	
	Explain Shared-Data Style.	**U**	**10**
	Explain Client-Server Style.	**U**	
	What should an architecture document for a system contain?	**A**	
	Explain COCOMO Model.	**A**	
	Explain Bottom-Up approach.	**U**	
	Explain Quality Planning.	**U**	
	Explain Risk management concepts.(any one)	**U**	
	Explain the goal of Risk Assessment to prioritize the risk.	**A**	
IV	Identify the goal of Design and mention the main criteria for evaluating the design.	U,A	
	Define coupling. List the different types of it.	**R**	
	Define cohesion. List the different levels of cohesion.	**R**	
	Describe the cohesion in OO system.	**U,A**	
	Explain open closed principle.	**U**	
	Explain Structure Charts for creating function oriented design.	**U**	
	Explain OO design methodology.	**U**	**05**
	Define UML. List the different types of UML modelling.	**R**	
	With an example explain word counting problem for OO design.	**U,A**	
	Write a note on Logic/Algorithm Design.	**A**	
	Write a note on State Modelling of Classes.	**A**	
	Explain the approaches for design verification.	**A**	
	Explain the various Design concepts.	**U**	
	Explain the different types of coupling between the modules.	**U**	
	Explain the different levels of cohesion.	**A**	**10**
	Explain Structure Design Methodology for function oriented design.	**U**	
	Explain the word counting problem through DFD and factoring.	**A**	
	Explain main Object Oriented Concepts.	**U**	

	Explain Class diagram with an example.	**U**	
	Explain Sequence diagram with an example.	**U**	
	Explain Collaboration diagram with an example.	**U**	
	Explain state diagram and activity diagram.	**U**	
	Explain the OO Design methodology.	**U**	
V	Define coding. Explain the basic goal of coding.	**R,U**	**05**
	Predict the necessity of coding standards explain any one	**U,A**	
	Write a note on Source code control.	**U**	
	Write a note on Bad smells of refactoring.	**A**	
	Define Unit Testing. Write a note on Testing Procedural Units.	**R,U**	
	Define Code inspection and summarize the report of an inspection.	**R,A**	
	Define testing. Discuss the goal of testing.	**U**	
	Define error, fault, failure, Test case, Test suite and test harness.	**R**	
	Write a note on Test plan.	**U**	
	Explain the test case specification in the test case design.	**A**	
	Explain the life cycle of defect.	**U,A**	**10**
	Explain the necessary Programming Practices for coding	**U,A**	
	Explain Coding standards.	**U**	
	Explain Incremental Coding process with a neat flow chart.	**U**	
	Explain Test Driven Development (TDD) with a neat flow chart.	**U**	
	Explain Structured Programming.	**A**	
	Explain Information Hiding.	**U**	
	Explain Pair Programming.	**U**	
	Explain Refactoring.	**A**	
	Explain Unit testing of Classes with example.	**U,A**	
	Explain Code Inspection.	**U**	
	Explain different levels of testing and the goals of each level.	**U,A**	
	Explain the Testing process.	**U,A**	
VI	Define DevOps. Discuss the goal of DevOps	**R,U**	**5**
	Explain the benefits of DevOps.	**U**	
	Explain DevOps tool chain.	**U**	
	Explain the DevOps Tools.	**U**	**10**
	Explain the necessity of DevOps in detail	**U,A**	
	Compare Agile and DevOps.	**A**	

Government of Karnataka
Department of Technical Education
Bengaluru

	**Course Title: Web Programming**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS52T**
	Type of Course: **Lectures, Self Study & Student Activity.**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites:

Knowledge of HTML and CSS.

Course Objectives

To study the concepts of web application development such as XHTML, XML, PHP, Java web software, and Database access through JDBC and PHP.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Discuss the fundamentals of web and concept of XHTML.	***R,U,A***	**1,2,3,6,7,8,9,10**	**06**
CO2	Describe different concepts of JavaScript and XHTML documents and Construct dynamic documents with JavaScript.	***U,A***	**1,2,3,6,7,8,9,10**	**12**
CO3	Describe XML using the user defined tags, DTD, Namespaces and Schemas with simple programs.	***R,U,A***	**1,2,3,6,7,8,9,10**	**08**
CO4	Discuss the concepts of PHP with associated programs	***R,U,A***	**1,2,3,6,7,8,9,10**	**10**
CO5	Discuss different ways to access the database through the web using examples.	***U,A***	**1,2,3,6,7,8,9,10**	**06**
CO6	Discuss various server based software using different technologies.	***U,A***	**1,2,3,6,7,8,9,10**	**10**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Web Programming	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	**Fundamentals and Introduction to XHTML**	**06**	05	05	05	15	10.35
II	**Java Script and XHTML Documents and Dynamic documents with JavaScript**	**12**	-	20	15	35	24.13
III	**Introduction to XML**	**08**	05	10	05	20	13.79
IV	**Introduction to PHP**	**10**	05	15	10	30	20.69
V	**Database Access through Web**	**06**	-	05	10	15	10.35
VI	**Java Web Software**	10	-	15	15	30	20.69
	Total	**52**	**15**	**70**	**60**	**145**	**100**

UNIT I : Fundamentals and Introduction to XHTML 06 Hrs

Fundamentals – A brief introduction to Internet, Origins, What the Internet Is, Internet Protocol Addresses, Domain Names, The World Wide Web, Origins, Web or Internet, Web browsers, Web servers, Web Server Operations, General Server Characteristics, Apache, IIS, Uniform Resource Locators, URL Formats, URL Paths, Multipurpose Internet Mail Extensions, Type Specification, Experimental Documental Types, Hypertext Transfer Protocol, The Request Phase, The Response Phase, Security, The web Programmers Toolbox
Introduction to XHTML: Syntactic differences between HTML and XHTML

UNIT II: JavaScript and XHTML documents and Dynamic documents with JavaScript 12 Hrs

JavaScript and XHTML documents – The JavaScript Execution Environment, The Document Object Model, Element Access in JavaScript, Events & Event Handling, Basic Concepts of Event handling, Events, Attributes & Tags, Handling Events from Body Elements, Handling Events from Button Elements, Handling Events from Textbox & password Elements, The Focus Event, Validating from Input, The DOM2 Event Model, Event Propagation, Event handler registration, An Example of the DOM2 Event Model, The Navigator Object, DOM Tree Traversal and Modification, DOM Tree Traversal, DOM Tree Modification.

Dynamic documents with JavaScript: Introduction, Positioning Elements, Absolute Positioning, Relative Positioning, Static Positioning, Moving Elements, Element Visibility, Changing Colors & Fonts, Changing Colors, Changing Fonts, Dynamic Contents, Stacking Elements, Locating the Mouse Cursor, Reacting to the Mouse Click, Slow Movement of Elements, Dragging & Dropping Elements.

UNIT III: Introduction to XML — 08 Hrs

Introduction, The Syntax of XML, XML Document Structure, Document Type Definitions, Declaring Elements, Declaring Attributes, Declaring Entities, A Sample DTD, Internal & External DTDs, Namespaces, XML Schema, Schemas Fundamentals, Defining the Schema, Defining the Schema Instances, An Overview of Data types, Simple Types, Complex Types, Displaying Raw XML Documents, Displaying XML Documents with CSS.

UNIT IV: Introduction to PHP — 10 Hrs

Introduction to PHP: Origins and Uses of PHP, Overview of PHP, General Syntactic Characteristics, Primitives, Operations and Expressions, Variables, Integer Type, Double Type, String Type, Boolean Type, Arithmetic Operations & Expressions, String Operations, Scalar Type conversions, Output, Control statements, Relational Operators, Boolean Operators, Selection Statements, Loop statements, An Example, Arrays, Array Creation, Accessing array Elements, Functions for Dealing with Arrays, Sequential Access to Array Elements, Sorting Arrays, Functions, General Characteristics of Functions, Parameters, The scope of Variables, The Lifetime of Variables, Pattern Matching, Form Handling, Files, Opening and Closing Files, Reading from a File, Writing to a File, Locking Files, Cookies, Introduction to Cookies, PHP Support for Cookies, Session Tracking.

UNIT V: Database access through the Web — 06 Hrs

Database Access with PHP & MySQL, Potential Problems with Special Characters, Connecting to MySQL & Selecting the Database, Requesting MySQL Operations, A PHP/ MySQL Examples, Database Access with JDBC & MySQL, JDBC & MySQL, Metadata, Examples.

UNIT V: Java Web Software — 10 Hrs

Introduction to Servlets, Overview, Details, Servlet Containers, The NetBeans IDE, Storing information on Clients, Cookies, Servlet support for Cookies, Examples, JavaServer Pages(JSP), Motivation for JSP, JSP Documents, The Expression Language, The JSTL control action elements, JavaBeans, Model-View-Controller Application Architecture, JavaServer Faces, The tag libraries, JSF event handling, An example application.

Text books

1. Programming the World Wide Web, 7th edition, Robert W.Sebesta , Pearson Education, ISBN- 9789332518827

References

1. http://www.tutorialspoint.com/
2. http://www.w3schools.com/
3. Web Programming – Building Internet Applications, 3rd edition, Chris Bates, Wiley publisher

4. Web Technologies— HTML,JavaScript,PHP,java,JSP,ASP.Net,XML & Ajax – Black Book, Wiley, ISBN : 978-81-7722-997-4
5. PHP A Begineer's Guide --- Vikram Vaswami , TMH publishers. ISBN: 13:978-0-07-014069-1

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

1. Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each student should conduct different activity and no repeating should occur

1	Prepare a simple website using NetBeans IDE.
2	Demonstration of PHP program which includes database access.
3	Create a simple webpage using JSON.
4	Quiz

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	**1 to 6**
				Student activities	05	Report	**1 to 6**
				Total	**25**		
	SEE	End Exam		**End of the course**	**100**	Answer scripts at BTE	**1 to 6**
Indirect Assessment	Course Survey		Students	Middle of the course		Feedback forms	1, 2, 3 Delivery of course
				End of the course		Questionnaires	**1 to 6** Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	50
3	Application	40

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	V SEM		20
	Year:		

Name of Course coordinator : Units:__
CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	V SEM	Web Programming	20
	Year: 2017-18	Course code: **15CS52T**	

Name of Course coordinator :
Units:1,2 COs: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Explain the operation of web server. (5) OR Explain MIME with its type specification. (5)	U	1	1,2,3,6,7,8,9,10
2	Explain how to handle the focus event with an example (5) OR Illustrate Moving elements with simple example. (5)	A	2	1,2,3,6,7,8,9,10
3	Illustrate the HTTP protocol's request and response phases with an example for each. (10)	A	1	1,2,3,6,7,8,9,10

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Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned course co-ordinator for assessing the given activity.

MODEL QUESTION PAPER Code: **15CS52T**

Diploma in Computer Science & Engineering

V- Semester

Course Title: Web Programming

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. Define Web Browser, Web Server, Event, Event Handling and Internet.
2. Describe the parameters and actions of the setTimeout and setInterval functions.
3. Define DTD. Mention four possible keywords in DTD declaration.
4. Explain four scalar types of PHP.
5. Explain built-in sting manipulation functions.
6. Explain potential problems associated with special characters.
7. Construct a PHP script to insert records through form into a database.
8. Write a note on JavaBeans.
9. Explain JSF event handling.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Illustrate the HTTP protocol's request and response phases with an example for each.
2. Illustrate with an example for dynamic stacking of images
3. Explain declaring of elements, attributes and entities in DTD with an example.
4. Explain different XSD indicators.
5. Explain how to create indexed and associated array with an example.
6. Write a PHP script to illustrate sort, assort and ksort functions.
7. Write a PHP script to insert record into the table and retrieve records from the tabl. Assume a table "my_detail" is already created with fields name, city, phone_no and mail_id.
8. Explain the steps involved in accessing mySQL database through JDBC.
9. Explain life cycle of a Servlet.
10. Explain steps in JDBC.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

V Semester

Course Title: Web Programming

CO	Question	CL	Marks
I	Define Web Browser, Web Server, Event, Event Handling and Internet	R	05
	Explain domain names with an example.	U	
	Explain the operation of web server.	U	
	Illustrate the general server characteristics.	U	
	Explain the file structure of web server.	U	
	Define MIME, Web security, URL	R	
	Discuss URL format with its different paths.	U	
	Explain MIME with its type specification	U	
	Illustrate the HTTP protocol's request and response phases	U	
	Discuss web security issues.	U	
	Mention the differences between html and xhtml.	U	
	Explain the HTTP protocol's request and response phases with an example for each.	A	10
	Explain the operation of Web Server with its file structure.	U	
II	Explain the structure of DOM.	U	05
	List DOM node properties	U	
	Describe the parameters and actions of the setTimeout and setInterval functions.	U	
	Illustrate Moving elements with simple example.	A	
	Explain Element visibility with simple example	A	
	Explain how to locate the mouse cursor.	U	
	Explain different types of positioning with an example	U	10
	Illustrate with an example for dynamic stacking of images	A	
	Explain with an example how to change dynamically background and foreground Colors of the document.	A	
	Illustrate moving elements and element visibility with an example.	A	
	Discuss the two ways to register an event handler in DOM-0 event model.	A	
	Explain the 3 phases of event processing in the DOM-2 event model	A	
	Illustrate how to handle blur event and change event with an example	A	
	Explain how to handle the focus event with an example	A	
	Write a note on XML.	U	05
	List the features of XML	U	
	Write a note on XML document structure.	U	
	Define DTD. Mention four possible keywords in DTD declaration.	R	
	Define XML schema. List the advantage of XML schema over DTD.	R	
	Differentiate between simple type and complex type XML elements.	U	
	Explain Internal and External DTD's with an example.	U	

III	Illustrate declaring of elements, attributes and entities in DTD with an example.	**A**	**10**
	Explain different XSD indicators.	**A**	
	Explain how to declare namespace with example.	**A**	
	Explain schema and schema instance with an example.	**A**	
	Explain how to create simple type and complex type element with an example.	**A**	
IV	Write a note on PHP.	**U**	**5**
	Explain four scalar types of PHP.	**U**	
	Explain built-in sting manipulation functions.	**U**	
	Explain Implicit and Explicit type conversions.	**U**	
	Write PHP script to compute the sum of positive integers upto 30 using do-while statement.	**A**	
	Write PHP script to compute factorial of 'n' using while or for loop construct.	**U**	
	Explain the syntax of for-each statement with an example.	**A**	
	Write a PHP script to sort an array of elements.	**A**	
	Explain how cookies are extracted using PHP.	**U**	
	Write a note on session tracking.	**U**	
	Explain preg_match() and preg_split() functions with example.	**U**	
	Construct a PHP script to compute the squareRoot, Square, Cube and Quad of 10 numbers.	**A**	**10**
	Explain how to create indexed and associated array with an example.	**U**	
	Write a PHP script to illustrate sort, assort and ksort functions.	**A**	
	Write a note on PHP and its scalar types.	**U**	
	Explain types of arrays with an example in PHP.	**A**	
V	Explain potential problems associated with special characters.	**U**	**05**
	Write PHP functions used to connect to MYSQL database and selecting a database	**U**	
	Construct a PHP script to insert records through form into a database.	**A**	
	Construct a PHP script to retrieve records from the database table.	**A**	
	Discuss how the collection of metadata extracted from a database.	**U**	
	Explain the use of mysql_query() method used to execute SQL queries with its syntax.	**U**	
	Write a PHP script to create a table, insert records into the table, retrieve records from the table. Assume database "Student" and table "cs_student" with fields name, sem, regno, address	**A**	**10**
	Write a PHP script to insert record into the table and retrieve records from the tabl. Assume a table "my_detail" is already created with fields name, city, phone_no and mail_id	**A**	
	Construct a PHP script to insert and retrieve records from the database table.	**A**	
	Illustrate the use of: Mysql_query(), mysql_connect(), mysql_select_db(), mysql_num_rows() and mysql_num_fields()	**U**	
	Explain the steps involved in accessing mySQL database through JDBC.	**U**	
	Write a note on Servlet Containers.	**U**	

VI	Explain doGet and doPost methods of the HttpServlet class.	**U**	**05**
	Write a note on Cookies.	**U**	
	List the five parts of JSTL.	**U**	
	Explain three elements associated with JSP.	**U**	
	Write a note on MVC application Architecture.	**U**	
	Explain the two standard tag libraries of JSF.	**U**	
	Explain the different methods of Cookies with an example.	**A**	**10**
	Explain the processing flow of JSP documents with a neat diagram.	**U**	
	Illustrate JSTL control action elements with an example for each.	**A**	

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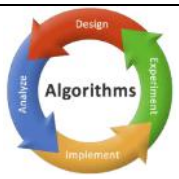
	**Course Title: Design and Analysis of Algorithms**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS53T**
	Type of Course: **Lectures, Self Study & Student Activity.**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites:

Knowledge of Data Structures.

Course Objectives

Study the concepts of fundamentals of algorithm, Analysis of algorithm efficiency, Brute force techniques, Divide-and-Conquer, Decrease-and-Conquer, Greedy techniques.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Discuss the fundamentals of algorithm.	***R,U***	**1,2,3,7,8,9,10**	**10**
CO2	Describe the analysis of algorithm efficiency using different notations.	***R,U,A,AL***	**1,2,3,7,8,9,10**	**10**
CO3	Discuss various problems using Brute force technique.	***U,A,AL***	**1,2,3,7,8,9,10**	**12**
CO4	Describe various problems using Divide-and-Conquer Technique.	***U,A,AL***	**1,2,3,7,8,9,10**	**08**
CO5	Describe various problems using Decrease-and-Conquer	***U,A,AL***	**1,2,3,7,8,9,10**	**06**
CO6	Discuss Greedy Techniques	***U,A***	**1,2,3,7,8,9,10**	**06**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply AL=Analyze E=Evaluate C= Create and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Design and Analysis of Algorithms	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE				Marks Weightage	Marks Weightage (%)
			R	U	A	AL	A	
I	Introduction	**10**	10	15	05	-	30	20.68
II	Fundamentals of the Analysis of Algorithm Efficiency	**10**	05	05	10	10	30	20.68
III	Brute Force	**12**		10	10	15	35	24.14
IV	Divide-and-Conquer	**08**	-	05	05	10	20	13.79
V	Decrease-and-Conquer	**06**	-	05	05	05	15	10.35
VI	Greedy Technique	**06**	-	05	05	05	15	10.35
	Total	**52**	**15**	**45**	**40**	**45**	**145**	**100**

UNIT I : Introduction 10 Hrs

What is an Algorithm? Fundamentals of Algorithmic problem solving, Important problem types. Fundamental data structures

UNIT II: Fundamentals of the Analysis of Algorithm Efficiency 10 Hrs

Analysis Framework, Measuring the input size, Units for measuring Running time, Orders of Growth, Worst-case, Best-case and Average-case efficiencies, Asymptotic Notations and Basic Efficiency classes, Informal Introduction, O-notation, Ω-notation, θ-notation, mathematical analysis of non-recursive algorithms, mathematical analysis of recursive algorithms.

UNIT III: Brute Force & Exhaustive Search 12 Hrs

Introduction to Brute Force approach, Selection Sort and Bubble Sort, Sequential search, Exhaustive Search- Travelling salesman Problem and Knapsack Problem, Depth First Search, Breadth First Search

UNIT IV: Divide-and-Conquer 08 Hrs

Introduction, Merge Sort, Quick Sort, Binary Search, Binary Tree traversals and related properties.

UNIT V: Decrease-and-Conquer 06 Hrs

Decrease-and-Conquer: Introduction**,** Insertion Sort, Topological Sorting.

UNIT VI: Greedy Technique 06 Hrs

Greedy Technique: Introduction**,** Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm

Text books

1. **Introduction to the Design and Analysis of Algorithms**, 3rd edition, Anany Levitin, Pearson Publication, ISBN: 9789332583771

References

1. http://nptel.ac.in/courses/106101060/
2. http://www.tutorialspoint.com/data_structures_algorithms/
3. Design & Analysis of Algorithms, S. Nandagopalan, Sapna Book House.

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes, etc.

1. Each individual student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each student should conduct different activity and no repeating should occur

1	Build and execute programs from the unsolved exercises given from the course textbook at the end of each chapters.
2	Quiz

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1 to 6
				Student activities	05	Report	1 to 6
				Total	**25**		
	SEE	End Exam		**End of the course**	**100**	Answer scripts at BTE	1 to 6
Indirect Assessment			Students	Middle of the course		Feedback forms	1, 2, 3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	30
3	Application	30
4	Analysis	30

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 Am	V SEM		20
	Year:		
Name of Course coordinator : Units:__ CO's:____			

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	V SEM	**Design and Analysis of Algorithms**	20
	Year: 2017-18	Course code: **15CS53T**	
Name of Course coordinator : Units:1,2 Co: 1,2 **Note: Answer all questions**			

Question no	Question	CL	CO	PO
1	Explain Euclid's algorithm for computing GCD of two numbers.(5) **OR** Explain Linear data structures with example. (5)	U, A	1,2	1,2,3,7,8, 9,10
2	Write an algorithm for sequential search and analyse its worst-case, best-case and average-case efficiencies. (5) OR Write a recursive algorithm for computing the factorial	U, A	1,2	1,2,3,7,8, 9,10

	function for an arbitrary non-negative integer.(5)			
3	Apply selection sort to the following array 45,23,89,10,11,27,38 (5)	A, AL	2	1,2,3,7,8, 9,10
4	Differentiate undirected and directed graphs with examples. (5)	U	1	1,2,3,7,8, 9,10

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned course co-ordinator for assessing the given activity.

MODEL QUESTION PAPER Code: **15CS53T**

Diploma in Computer Science & Engineering

V Semester

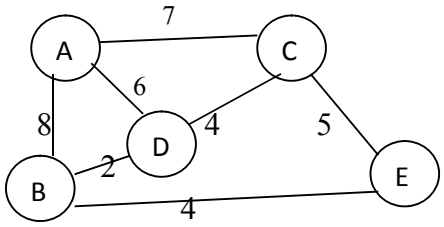
Course Title: Design and Analysis of Algorithms

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. Explain Euclid's algorithm for computing GCD of two numbers.
2. Differentiate undirected and directed graphs with examples.
3. Write a pseudo code for finding the value of the largest element in a list of n numbers.
4. Write a recursive algorithm for computing the factorial function for an arbitrary non-negative integer.
5. Define Brute force and explain it with example.
6. Define binary tree. Explain its traversals.
7. Derive an expression for worst case analysis of binary search algorithm
8. Apply Prim's algorithm for the graph shown below

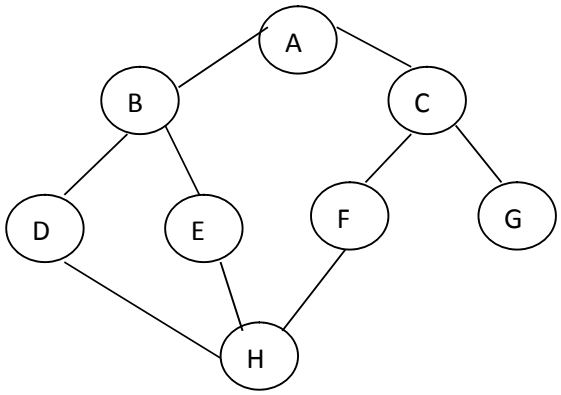


9. Write Greedy algorithm and explain

PART-B

Answer any SEVEN questions. Each carries 10 marks. 7X10=70 Marks

1. Explain the steps involved in designing and analysing an algorithm.
2. Write a note on Sorting and Searching problem types.
3. Write an algorithm for sequential search and analyse its worst-case, best-case and average-case efficiencies.
4. Apply selection sort to the following array : 45,23,89,10,11,27,38
5. Explain bubble sort method with an example. Use Brute Force approach.
6. Solve using DFS algorithm



8. Write an algorithm of Quick Sort and trace it for an example data set.
9. Compute time complexity of insertion sort in the best, worst and average cases.
10. Write the Kruskal's algorithm to find the minimum cost spanning tree.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

V Semester

Course Title: Design and Analysis of Algorithms

CO	Question	CL	Marks
I	Define Algorithm. Give an example illustrating the notion of an algorithm.	R	05
	Explain Euclid's algorithm for computing GCD of two numbers.	U,A	
	Explain Linear data structures with example.	U	
	Define Graph, Vertex, Edge, Path and Length of a path with example for each.	R	
	Write a note on Weighted graph with an example.	U	
	Give the differences between sets and dictionaries.	R	
	Explain the steps involved in designing and analysing of an algorithm.	U	10
	Write a note on Sorting and Searching problem types.	U	
	Explain Rooted Trees and Ordered Trees with example for each.	U	
II	Write an algorithm for sequential search.	U,A	05
	Write a pseudo code for finding the value of the largest element in a list of n numbers.	U,A	
	Write a recursive algorithm for computing the factorial function for an arbitrary non-negative integer.	U,A	
	Illustrate an algorithm for sequential search and Analyse its worst-case, best-case and average-case efficiencies.	AL	10
	Explain Big-oh notation, Big-omega notation and Big-theta notation along with its graph.	AL	
	Explain basic Asymptotic efficiency classes.	U	
	Illustrate the recursive solution to the Tower of Hanoi Puzzle.	A,AL	
III	Define Brute force and explain it with example.	R,U	5
	Write an algorithm for closest pair problem using brute force.	U,A	
	Illustrate an algorithm for Selection sort with example.	A,AL	10
	Illustrate an algorithm for Bubble sort with example.	A,AL	
	Illustrate Travelling salesman problem with example.	A,AL	
	Explain Breadth First Search algorithm	A,AL	
	Consider knapsack for the instance given below N=3 [w1,w2,w3]=[100,10,10] [p1,p2,p3]=[20,15,15] M=105 Find all feasible and infeasible solutions	A,AL	
	Explain Depth First Search algorithm	A,AL	
IV	Write an algorithm for binary search.	U,A	5
	Define binary tree. Explain its traversals.	R,U	
	Explain Divide-and-Conquer technique with neat diagram.	U	
	Explain Merge sort algorithm with example.	A,AL	10
	Write Quick Sort algorithm and trace it with an example.	A,AL	
	Analyze the binary search algorithm for best case, worst case and average cases.	AL	
V	Explain Decrease-and-Conquer technique with neat diagram.	U	05
	Explain topological sorting with example.	A	
	Write an algorithm for Insertion sort with example.	A,AL	10
	Compute time complexity of insertion sort in the best, worst and average cases.	AL	
	Explain greedy method with appropriate example	U,A	5

VI	Can the Prim's algorithm be applied for directed graphs? justify	**U,A**	
	Write the algorithm to find the minimum cost spanning tree based on Prim's logic	**A, AL**	
	Explain Kruskal's algorithm for constructing a minimum spanning tree.	**AL**	**10**
	Write Prim's algorithm for constructing a minimum spanning tree	**AL**	
	Explain Dijkstra algorithm with an example.	**AL**	

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	**Course Title: Green Computing**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS54T**
	Type of Course: **Lectures, Self Study & Student Activity.**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites:

Knowledge of basic IT trends and technologies.

Course Objectives

Study the concepts related to Green IT, Green devices and hardware along with software methods, green enterprise activities, managing the green IT and various laws, standards, protocols along with outlook of green IT.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Discuss Green IT with its different dimensions and Strategies.	***R,U***	**1,2,3,7,8,9,10**	**08**
CO2	Describe Green devices and hardware along with its green software methodologies.	***R,U***	**1,2,3,7,8,9,10**	**12**
CO3	Discuss the various green enterprise activities, functions and their role with IT.	***R,U***	**1,2,3,7,8,9,10**	**08**
CO4	Describe the concepts of how to manage the green IT with necessary components.	***R,U***	**1,2,3,7,8,9,10**	**08**
CO5	Discuss the various laws, standards and protocols for regulating green IT.	***R,U***	**1,2,3,7,8,9,10**	**08**
CO6	Identify the various key sustainability and green IT trends.	***R,U***	**1,2,3,7,8,9,10**	**08**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Green Computing	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Green IT: An Overview	**08**	05	10	-	15	10.34
II	Green Devices and Hardware with Green Software	**12**	10	20	-	30	20.68
III	Green Enterprises and the Role of IT	**08**	05	20	-	25	17.24
IV	Managing Green IT	**08**	05	20	-	25	17.24
V	Regulating the Green IT: Laws, Standards and Protocols	**08**	05	20	-	25	17.24
VI	Green IT: An Outlook	**08**	05	20	-	25	17.24
	Total	**52**	**35**	**110**	**-**	**145**	**100**

UNIT I : Green IT: An Overview 08 Hrs

Introduction, Environmental Concerns and Sustainable Development, Environmental Impacts of IT, Green IT, Holistic Approach to Greening IT, Greening IT, Applying IT for enhancing Environmental sustainability, Green IT Standards and Eco-Labelling of IT, Enterprise Green IT strategy, Green IT: Burden or Opportunity?

UNIT II: Green Devices and Hardware with Green Software 12 Hrs

Green Devices and Hardware: Introduction, Life Cycle of a device or hardware, Reuse, Recycle and Dispose.

Green Software: Introduction, Energy-saving software techniques, Evaluating and Measuring software Impact to platform power.

UNIT III: Green Enterprises and the Role of IT 08 Hrs

Introduction, Organization and Enterprise Greening, Information systems in Greening Enterprises, Greening Enterprise: IT Usage and Hardware, Inter-Organizational Enterprise activities and Green Issues, Enablers and making the case for IT and Green Enterprise.

UNIT IV: Managing Green IT 08 Hrs

Introduction, Strategizing Green Initiatives, Implementation of Green IT, Information Assurance, Communication and Social media.

UNIT V: Regulating the Green IT: Laws, Standards and Protocols 08 Hrs

Introduction, The regulatory environment and IT manufacturers, Non regulatory government initiatives, Industry associations and standards bodies, Green building standards, Green data centers, Social movements and Greenpeace.

UNIT VI: Green IT: An Outlook 08 Hrs

Introduction, Awareness to implementations, Greening by IT, Green IT: A megatrend?, A seven-step approach to creating green IT strategy, Research and Development directions.

Text books

1. **Harnessing Green IT Principles and Practices** , San Murugesan, G.R. Gangadharan Wiley Publication, ISBN:9788126539680

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes, etc.

1. Each individual student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each group should conduct different activity and no repeating should occur

1	Any two discussion question to be solved given at the end of each chapter of the text book.
2	Quiz

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1 to 6
				Student activities	05	Report	1 to 6
				Total	**25**		
	SEE	End Exam		**End of the course**	**100**	Answer scripts at BTE	1 to 6
Indirect Assessment			Students	Middle of the course		Feedback forms	1, 2, 3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	24
2	Understanding	76

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	V SEM		20
	Year:		

Name of Course coordinator : Units:__ CO's:___

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and	Semester/year	Course/Course Code	Max Marks

Time			
Ex: I test/6 th week of sem 10-11 AM	V SEM	Green Computing	20
	Year: 2017-18	Course code: **15CS54T**	

Name of Course coordinator :
Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Define Green IT and list the benefits of Green IT.(5) **OR** Explain the 3Rs of Green IT. (5)	R,U	1	1,2
2	Explain different types of processor power states. (5) **OR** Discuss the impacts of various chemicals used in manufacturing process of electronic devices. (5)	U	2	1,2
3	Explain the life cycle of a device or hardware with diagram.(10)	U	2	1,2

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Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (Course Coordinator) for assessing the given activity

MODEL QUESTION PAPER Code: **15CS54T**

Diploma in Computer Science & Engineering

V- Semester

Course Title: Green Computing

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. Define Green IT and list the benefits of Green IT.
2. Explain the 3Rs of Green IT.
3. Explain different types of processor power states.
4. Discuss the impacts of various chemicals used in manufacturing process of electronic devices.
5. Explain the four major categories of enablers for Green IT.
6. List the different issues in integrating ERP with EMIS system.
7. Give the differences between strategic thinking and strategic planning.
8. List the steps of Risk Assessment.
9. Discuss the various functions of Green-IT based applications.
10. List any five principles of Green Engineering.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Explain the life cycle of a device or hardware with diagram.
2. Discuss the different methods of data efficiency.
3. Explain with diagram ERP system with modules and relationships.
4. Explain different software and database aspects of an EMIS.
5. Explain Enterprise Architecture Planning with different layers.
6. Explain the continuous Risk Management with a neat diagram.
7. Give the differences between RoHS, REACh and WEEE.
9. Explain with diagram for the global regulatory environment for the electrical, electronic and IT sectors.
10. Explain seven-step approach to create Green IT strategy.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

V Semester

Course Title: Green Computing

CO	Question	CL	Marks

I	Define Green IT and list the benefits of Green IT.	R	05
	Define climate change, global warming, greenhouse gases and greenhouse effect.	R	
	Explain how the software impact the environment and the energy consumption of computing systems.	U	
	Describe different dimensions or directions of Green IT.	U	
	Mention six holistic approaches that addresses Green IT.	R	
	Discuss whether Green IT is burden or Opportunity?	U	
	Explain the 3Rs of Green IT.	U	
II	Discuss the impacts of various chemicals used in manufacturing process of electronic devices.	U	05
	Explain the various e-waste disposal techniques and which is the most effective among them and why?	U	
	Explain different types of processor power states.	U	
	Write a note on context awareness in computers.	U	
	Explain how data buffering can save energy.	U	
	Explain the life cycle of a device or hardware with diagram.	U	10
	Describe Reuse, Recycle and Disposal methods of an electronic device.	U	
	Explain the different programming methods used to achieve computational efficiency.	U	
	Discuss the different methods of data efficiency.	U	
III	List the different issues in integrating ERP with EMIS system.	R	05
	Explain the four major categories of enablers for Green IT.	U	
	Write a note on Greening the Enterprise: IT Usage and Hardware.	U	
	Describe the major categories of information systems within an organization? Provide examples of greening enterprise activities at each level.	U	10
	Explain different software and database aspects of an EMIS.	U	
	Explain with diagram ERP system with modules and relationships.	U	
	Explain with diagram the flows and operations of a de-manufacturing facility.	U	
IV	Give the differences between strategic thinking and strategic planning.	R	5
	Explain the different enterprise architecture planning levels.	U	
	List the four key components of Green IT management.	R	
	List the steps of Risk Assessment.	R	
	Explain the three steps GQM paradigm.	U	
	Write a note on communication and social media.	U	
	Explain Enterprise Architecture Planning with different layers.	U	10
	Explain the continuous Risk Management with a neat diagram.	U	
V	Discuss the various functions of Green-IT based applications.	U	05
	Mention the several key standards for process and product of Green IT.	R	
	Mention the four criteria to evaluate electronics manufacturers employed by Greenpeace.	U	
	Write a note on Industry associations and Standard bodies.	U	
	Write a note on RoHS.	U	
	Write a note on REACh.	U	
	Write a note on WEEE.	U	
	Give the differences between RoHS, REACh and WEEE.	U	10
	Explain with diagram for the global regulatory environment for the electrical, electronic and IT sectors.	U	
	Write a note on Green Engineering.	U	

VI	List any five principles of Green Engineering.	**R**	**05**
	Mention the various features for a modern smart Grid.	**R**	
	Explain the key benefits of smart Grid.	**U**	
	Discuss the general guidelines for making an enterprise's functional units green.	**U**	
	Mention the various measures adopted by an organization to green their supply chain.		
	Explain the various key sustainability and Green IT trends.	**U**	**10**
	Explain seven-step approach to create Green IT strategy.	**U**	

Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: **Web Programming Lab**		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CS55P**
	Type of Course: **Tutorial and Practical's**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Prerequisites

Knowledge of HTML, CSS.

Course Objectives

To study the concepts of web applications which includes XHTML, XML, PHP, Java, Ruby with data base access.

Course Outcome

On successful completion of the course, the students will be able to attain CO:

Course Outcome		Experiment linked	CL	Linked PO	Teaching Hrs
CO1	Create dynamic documents using XHTML and java script.	***1 and 2***	U,A,AL	1 to 10	**18**
CO2	Develop programs by XML which includes user defined tags.	***3 and 4***	U,A,AL	1 to 10	**18**
CO3	Construct PHP documents by using string, arrays, methods and also database access through PHP.	***5 to 8***	U,A,AL	1 to 10	**24**
CO4	Create applications using Java Servlets and JSP.	***9 to 12***	U,A,AL	1 to 10	**18**
			Total sessions		**78**

Legends: R = Remember U= Understand; A= Apply AL= Analyze E= Evaluate C= Create and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Web Programming Lab	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

List of Graded Practical Exercises

Sl.No	Practical/Exercise
	Dynamic Documents with Java Script
1	The document must have a paragraph of text that describes your home. Choose atleast three different phrases (3 to 6 words) of this paragraph and make them change font, font style, color and font size when the mouse cursor is placed over them. Each of the different phrases must change to different fonts, font styles, colors and font sizes.
2	The document must contain four short paragraphs of text stacked on top of each other with only enough of each showing so that the mouse cursor can also be placed over some part of them. When the cursor is placed over the exposed part of any paragraph it should raise to the top to become completely visible.
	XML
3	Design an XML document to store information about patience in a hospital. Information about patients must include name (in 3 parts, first name, middle name, last name), social security number (SSN), age, room number, primary insurance company – including member identification number, group number and address – secondary insurance company (in the same sub parts as for the primary insurance company), known medical problems, and known drug allergies. Both attributes and nested tags must be included. Make up sample data of atleast 4 patients. Create a CSS style sheet for the above XML document and use it to create a display of that document.
4	Create the XSLT style sheet to format all the patient elements of the XML, document of exercise 3 and use it to create a display of whole element.
	PHP- Write, test and debug PHP scripts for the following specification

5	Write an XHTML document to include an anchor tag, that calls a PHP document also write the called PHP document which returns a randomly chosen greeting from a list of five different greetings. The greetings must be stored as constant strings in the script. A random number between 0 and 4 can be computed with these line.
	#set the seed for mtrand with the number of microseconds
	#since the last full second of the clock
	mt_strand((double) microtime() * 1000000);
	$number=mtrand(0,4); #computes a random integer 0-4
	
	Write the PHP script for above to count the number of visitors and display that number for each visitor.
	Hint: Use a file to store current count.

6	Write the XHTML code using JavaScript Object Notation (JSON) to create the form with the following capabilities a) A text widget to collect the users name b) Four check boxes, one each for the following items i) Four 100 watt light bulbs for Rs. 20=39 ii) Eight 100 watt light bulbs for Rs 40=20 iii) Four 100 watt long life light bulbs for Rs. 30=95 iv) Eight 100 watt long life light bulbs for Rs 70=49 c) A collection of 3 radio buttons that are labeled as follows i) Visa ii) Master Card iii) Discover Write a PHP script that computes the total cost of the ordered light bulbs for the above program after adding 13.5% VAT. The program must inform the buyer of

	exactly what was ordered in table.
7	Write a XHTML code to provide a form that collects names and telephone numbers. The phone numbers must be in the format ddd-ddd-dddd. Write a PHP script that checks the submitted telephone number to be sure that it confirms to the required format and then returns a response that indicates whether the number was correct.
8	Write the XHTML code using JavaScript Object Notation (JSON) to accept from the user name, phone no, mail-id, stored in database. Retrieve same information from database using a separate PHP script.
	Java Servlets and JSP
9	Write a servlet that returns a randomly chosen greeting from a list of five different greetings. The greeting must be stored as constant strings in the program.
10	Write a servlet for the XHTML code of exercise 6 that computes the total cost of ordered light bulbs after adding 2% sales tax. The servlet must inform the buyer of exactly what was ordered in table.
11	Write and test a JSP document that displays the form of exercise 6 and produces the same response document as exercise 10.
12	Write a markup document to create a form that collects favourite popular songs, including the name of the song, the composer and the performing artist or group. This document must call a servlet when the form is submitted and another servlet to request a current list of survey results.
13	Create a simple Java web application using Servlet and JDBC
14	Open Ended exercise- Mini project using Responsive Web Design (RWD) concept. *Not for exam, but compulsory to be included in record.*

Reference

1. http://www.tutorialspoint.com
2. http://www.w3schools.com/
3. Programming the World Wide Web, 7th edition, Robert W. Sebesta , Pearson Education, ISBN- 9789332518827
4. Web Programming – Building Internet Applications, 3rd edition, Chris Bates, Wiley publisher
5. Web Technologies— HTML, JavaScript, PHP, Java, JSP, ASP.Net, XML & Ajax – Black Book, Wiley, ISBN : 978-81-7722-997-4

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes. Activity should be done individually.

1. Each individual student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course co-ordinator and programme co-ordinator.
2. Each student should conduct different activity and no repeating should occur.

1	Make presentation on latest web designing softwares.
2	Demonstrate any application using word press or joomla.
3	Quiz

Course Delivery

The course will be delivered through Demonstration and Practices

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	IA	Students	Two tests (average of two tests)	10	Blue books	1,2,3,4,5
				Record	10	Record	1,2,3,4,5
				Student activity.	05	Report.	
				Total	**25**		
	SEE (Semester End Examination)	End Exam		**End of the course**	**50**	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4 & 5 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	20
3	Application	70

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (10 marks)

2. Record (10 marks)
3. Student suggested activities report for 5 marks
4. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned course co-ordinator for assessing the given activity.

Scheme of Valuation for End Examination

SN	Particulars	Marks
1	Writing one program from Java scripting or XHTML or XML	10
2	Writing one program from PHP or Java Servlets and JSP	10
3	Executing any one program with result.	20
4	Viva Voce	10
	Total	**50**

***Evaluation should be based on the screen output only. No hard copy required.*

***Change of question is allowed only once. Marks of 05 should be deducted in the given question.*

Resource requirements for Web Programming Lab

(For an Intake of 60 Students [3 Batches])

Sl. No.	Equipment	Quantity
1	PC systems (latest configurations with speakers)	20
2	Laser Printers	01
3	Networking (Structured) with CAT 6e / wireless 24 Port switches / Wireless Router I/O Boxes for networking(as required)	03
4	Broad Band Connection	01

***Open Source Software should be encouraged*

Sl.No	Practical/Exercise
	Dynamic Documents with Java Script
1	The document must have a paragraph of text that describes your home. Choose atleast three different phrases (3 to 6 words) of this paragraph and make them change font, font style, color and font size when the mouse cursor is placed over them. Each of the different phrases must change to different fonts, font styles, colors and font sizes.
2	The document must contain four short paragraphs of text stacked on top of each other with only enough of each showing so that the mouse cursor can also be placed over some part of them. When the cursor is placed over the exposed part of any paragraph it should raise to the top to become completely visible.
	XML
3	Design an XML document to store information about patience in a hospital. Information about patients must include name (in 3 parts, first name, middle name, last name), social security number (SSN), age, room number, primary insurance company – including member identification number, group number and address – secondary insurance company (in the same sub parts as for the primary insurance company), known medical problems, and known drug allergies. Both attributes and nested tags must be included. Make up sample data of at least 4 patients. Create a CSS style sheet for the above XML document and use it to create a display of that document.
4	Create the XSLT style sheet to format all the patient elements of the XML, document of exercise 3 and use it to create a display of whole element.
	PHP

5	Write an XHTML document to include an anchor tag, that calls a PHP document also write the called PHP document which returns a randomly chosen greeting from a list of five different greetings. The greetings must be stored as constant strings in the script. A random number between 0 and 4 can be computed with these line.
	#set the seed for mtrand with the number of microseconds
	#since the last full second of the clock
	mt_strand((double) microtime() * 1000000);
	$number=mtrand(0,4); #computes a random integer 0-4
	
	Write the PHP script for above to count the number of visitors and display that number for each visitor.
	Hint: Use a file to store current count.

6	Write the XHTML code using JavaScript Object Notation (JSON) to create the form with the following capabilities a) A text widget to collect the users name b) Four check boxes, one each for the following items v) Four 100 watt light bulbs for Rs. 20=39 vi) Eight 100 watt light bulbs for Rs 40=20 vii) Four 100 watt long life light bulbs for Rs. 30=95 viii) Eight 100 watt long life light bulbs for Rs 70=49 c) A collection of 3 radio buttons that are labeled as follows iv) Visa v) Master Card vi) Discover Write a PHP script that computes the total cost of the ordered light bulbs for the above program after adding 13.5% VAT. The program must inform the buyer of

	exactly what was ordered in table.
7	Write a XHTML code to provide a form that collects names and telephone numbers. The phone numbers must be in the format ddd-ddd-dddd. Write a PHP script that checks the submitted telephone number to be sure that it confirms to the required format and then returns a response that indicates whether the number was correct.
8	Write the XHTML code using JavaScript Object Notation (JSON) to accept from the user name, phone no, mail-id, stored in database. Retrieve same information from database using a separate PHP script.
	Java Servlets and JSP
9	Write a servlet that returns a randomly chosen greeting from a list of five different greetings. The greeting must be stored as constant strings in the program.
10	Write a servlet for the XHTML code of exercise 6 that computes the total cost of ordered light bulbs after adding 2% sales tax. The servlet must inform the buyer of exactly what was ordered in table.
11	Write and test a JSP document that displays the form of exercise 6 and produces the same response document as exercise 10.
12	Write a mark-up document to create a form that collects favorite popular songs, including the name of the song, the composer and the performing artist or group. This document must call a servlet when the form is submitted and another servlet to request a current list of survey results.
13	Create a simple Java web application using Servlet and JDBC

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	Course Title: **Design and Analysis of Algorithms Lab**		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CS56P**
	Type of Course: **Tutorial and Practical's**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Prerequisites

Knowledge of Data Structures.

Course Objectives

1. Write sorting programs using Divide-and-Conquer techniques.
2. Implement to find the minimum cost spanning tree and shortest path using different Greedy techniques.
3. Construct DFS, BFS programs and topological ordering using Decrease-and-Conquer technique.
4. Implement knapsack, travelling salesperson

Course Outcome

On successful completion of the course, the students will be able to attain CO:

Course Outcome		Experiment linked	CL	Linked PO	Teaching Hrs
CO1	Demonstrate Quick sort and Merge sort and calculate the time required to sort the elements.	***1,2***	***U,A,AL***	1,2,3,4,6,7,8,9,10	**12**
CO2	Implement the topological ordering of vertices, travelling salesman problem and Knapsack problem.	***3 to 5***	***U,A***	1,2,3,4,6,7,8,9,10	**18**
CO3	Construct programs to check graph is connected or not using BFS and DFS methods	***6,7***	***U,A,AL***	1,2,3,4,6,7,8,9,10	**15**
CO4	Implement programs on divide and conquer, decrease and conquer	***8,9***	***U,A,AL***	1,2,3,4,6,7,8,9,10	**15**
CO5	Experiment finding the minimum cost of spanning tree using Prim's algorithms and shortest path using Dijkstra' algorithm.	***10,11***	***U,A,AL***	1,2,3,4,6,7,8,9,10	**18**
			Total sessions		**78**

Legends: R = Remember U= Understand; A= Apply AL=Analyze E=Evaluate and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Design and Analysis of Algorithms Lab	**3**	**3**	**3**	**3**	**-**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

List of Graded Practical Exercises

Sl.No	Practical/Exercise
1	Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n.
2	Sort a given set of elements using merge sort method and determine the time required to sort the elements. Repeat the experiment for different of values of n.
3	Write a program to obtain the topological ordering of vertices in a given digraph.
4	Implement travelling salesman problem.
5	Implement the knapsack problem (0/1).
6	Print all the nodes reachable from a given starting node in a digraph using BFS method.
7	Check whether a given graph is connected or not using DFS method.
8	Write a program to implement binary search using divide and conquer technique
9	Write a program to implement insertion sort using decrease and conquer technique
10	Find minimum cost spanning tree of a given undirected path using a Prim's algorithm.
11	From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.

Note: Use any programming tools like C/Java/Python to execute the above exercises.

Reference

1. **Introduction to the Design and Analysis of Algorithms** ,3rd edition, Anany Levitin, Pearson Publication, ISBN: 9789332583771

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1. Each student should conduct different activity and no repeating should occur.

1.	Using C/Java/Python, build and execute any one of the unsolved exercise given at the end of each chapter of the reference text.

Course Delivery

The course will be delivered through Demonstration and Practices

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	IA	Students	Two tests (average of two tests)	10	Blue books	1,2,3,4,5
				Record	10	Record	1,2,3,4,5
				Student activity.	05	Report.	
				Total	**25**		
	SEE (Semester End Examination)	End Exam		**End of the course**	**50**	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4 & 5 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	30
3	Application	30
4	Analysis	30

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (10 marks)
2. Record (10 marks)
3. Student suggested activities report for 5 marks
4. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned course co-ordinator for assessing the given activity.

Scheme of Valuation for End Examination

SN	Particulars	Marks
1	Record	05
2	Writing two programs	20
3	Execution of any one program	15
4	Viva Voce	10
	Total	**50**

***Evaluation should be based on the screen output only. No hard copy required.*

***Change of question is allowed only once. Marks of 05 should be deducted in the given question.*

Resource requirements for Design and Analysis of Algorithms Lab

(For an Intake of 60 Students [3 Batches])

Sl. No.	Equipment	Quantity
1	PC systems (latest configurations with speakers)	20
2	Laser Printers	01
3	Networking (Structured) with CAT 6e / wireless 24 Port switches / Wireless Router I/O Boxes for networking(as required)	03
4	Broad Band Connection	01

MODEL QUESTION BANK

1	Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n.
2	Sort a given set of elements using merge sort method and determine the time required to sort the elements. Repeat the experiment for different of values of n.
3	Write a program to obtain the topological ordering of vertices in a given digraph.
4	Implement travelling salesman problem.
5	Implement the knapsack problem (0/1).
6	Print all the nodes reachable from a given starting node in a digraph using BFS method.
7	Check whether a given graph is connected or not using DFS method.
8	Write a program to implement binary search using divide and conquer technique
9	Write a program to implement insertion sort using decrease and conquer technique
10	Find minimum cost spanning tree of a given undirected path using a Prim's algorithm.
11	From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	Course Title: **PROFESSIONAL PRACTICES (Computer Science)**		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code:**15CS57P**
	Type of Course: **Assignment Group talk and Practice**	Credit **:03**	Core/ Elective: **Core(practice)**
CIE- 25 Marks			SEE- 50 Marks

PREREQUISITES

Enthusiasm to Explore New things by taking individual tasks and acquires skills from participating in group activities.

COURSE OBJECTIVES

To meet the industrial requirements and practices, the course introduces the students to various personality development skills through communication, group discussions, listening and technical skills through guest lectures and Presentations.

COURSE OUT COME

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked activity	Linked PO	Teaching Hrs
CO1	Recognize ethical responsibilities with respect to community, society, discipline and profession through oral communication skills	Analysis	1	2-10	15
CO2	Search the information related to topic, and acquire knowledge of contemporary issues related to advancements in Computer Science engineering.	Application/ analysis	2	2-10	15
CO3	Discuss & disseminate about advancements in related profession including societal, environmental	Innovative /Analysis	3	2-10	15
CO4	Demonstrate the ability to analyse a problem and communicate competently in groups.	Application	4	2-10	18
CO5	Exposure to various industry environment practice and global, societal, economic, and/or environmental issues, by listening experts talks and interact with them and make a presentation	Analysis /Creation	5	2-10	15
				Total	**78**

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
PROFESSIONAL PRACTICES	**0**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

I. Communication skills 15 HRS

Communication Today

- Introduction
- Significance of Communication
- GSC's 3M Model of Communication: A Simple Approach
- Vitality of the Communication Process
- Virtues of Listening
- Fundamentals of Good Listening
- Nature of Non-Verbal Communication
- Need for Intercultural Communication
- Communication in a Digital World

Ref: Soft Skills: An Integrated Approach to Maximize Personality, Gajendra Singh Chauhan, Sangeeta Sharma, Wiley India, ISBN: 9788126556397

Method of achieving task: Practice in pairs through role play
Suggested activities:

1. Telephonic conversation of a customer and supplier.
2. A computer product show room sales person and a customer.
3. Negotiation between marketing representative of a computer firm and a technical representative at a polytechnic

Standards to be met:

- Given a telephone number, a student must be able to call and gather information from the person, sustaining the conversation for about 3 min using proper etiquettes and report on the enquiry made about the product or service. [e.g., call a toll free number to ask details about a product or service]
- Given a situation, a student must be able to talk to a person face to face in simulation, gather information about a product, discuss about it and also negotiate with him in the specified time (here, time can be specified by the Course Coordinator as per the need).

II. Information Search and Data collection: 15 HRS

Information search can be done through manufacturer's catalogue, websites, magazines; books etc. *Following topics are suggested.*

1. Network Storage Devices
2. High – end computing servers
3. Print server devices
4. Indoor Wireless access points
5. Outdoor Wireless access points
6. Indoor Antennas and amplifiers
7. Indoor Antennas and amplifiers
8. LCD Projectors
9. LED Projectors
10. Monitors for high end graphics
11. Graphics Cards
12. Mobile devices – Tablets, Mobile phones etc.
13. Operating systems – Window, Linux, Android, Mac
14. Laptops
15. Desktops
16. CRM software's and tools
17. ERP software's
18. Any other relevant technical topic.

Method for conducting Graded activities

1. The student should individually select the topic, and search the information related to topic.
2. Comparisons related to make, model, configuration, speed, price etc.
3. The report is strictly hand written document to have knowledge of precise writing and report making based on data collection

III. Guest Lecturers / Workshops: To be organized Minimum Two, preferably one technical and one General 15 HRS

Experts / Professionals from different fields/industries are invited to deliver lectures at least TWO sessions in a semester. The topics may be selected by the teacher /industry expert to develop required skills.

Note: The ISTE student chapter/CCTEK/ Institute of engineers (Institute chapter)/ student clubs of polytechnic may be used as platform to conduct this activity.

1. Cloud computing
2. Expert systems
3. Hadoop
4. Go Programming
5. Huskell programming
6. Big Data
7. Python
8. Raspberry PI
9. Pollution control and E-waste management
10. Fire Fighting / Safety Precautions and First aids.
11. Computer Networking and Security.
12. Career opportunities,

13. Yoga Meditation,
14. Aids awareness and health awareness.
15. Interview Techniques.
16. Road safety
17. Environmental pollution & control.
18. Nanotechnology
19. Rapid prototyping
20. Programmable logic controllers
21. TQM
22. Any other areas identified by the course co-ordinator

Method for conducting Guest lectures

1. The teacher/ISTE student chapter convener should fix up the date for guest lecture
2. The HOD of the department should chair the event
3. The students of class allowed to participate in the session
4. Watch the talk and make the brief hand written report on the guest lecture delivered by each student as a part of Term work.
5. Make Audio/visual record of the guest lecture by using any smart devices
6. Opportunity should be provided for students for live Interaction with experts and record it on any one smart device.

IV. Group Discussion: (Four topics) 18 HRS

- Introduction
- Ambience / Seating Arrangement for Group Discussion
- Importance of Group Discussions
- Difference between Group Discussion, Panel Discussion and Debate
- Traits Evaluated in Group Discussions
- Types of Group Discussions
- Topic-based Group Discussion
- Case-based Group Discussion
- Tips for Successful Participation in Group Discussion
- Individual Traits

Ref: Soft Skills: An Integrated Approach to Maximise Personality, Gajendra Singh Chauhan, Sangeeta Sharma, Wiley India, ISBN: 9788126556397

The students shall discuss in group of six students. Some of the suggested topics are. Minimum four topics to be discussed.

1. Polythene bags must be banned!
2. Do we really need smart cities?
3. E – Books or Printed books – what's your choice?
4. Is Face book for the attention – seeking and lazy people?
5. Globalization and its impact on Indian Culture.
6. Analytically evaluate the solutions to traffic problems
7. Global warming is caused more by developed countries
8. Rain forests help in maintaining the earth's ecosystem
9. Reservation for women would help the society

10. How to deal with terrorism
11. Water resources should be nationalized
12. Daughters are more caring than sons
13. NGOs - Do they serve people's interests?
14. Managers are born, not trained
15. Managerial skills learnt in the classroom
16. Women are good managers
17. India's growth rate is bridging gap between rich and poor.
18. Nuclear power is a safe source of energy
19. Electronic media vs. print media
20. Corruption is the price we pay for democracy
21. Multinational corporations: Are they devils in disguise?
22. Advertising is a waste of resources.
23. Privatization will lead to less corruption.
24. China market - a threat to Indian market
25. Technology Creates Income Disparities
26. India should be reorganized into smaller states.
27. Rising petrol prices - Govt. can control?
28. Smaller businesses and start-ups have more scope
29. Developing countries need trade, not aid.
30. Business and Ethics do not go together
31. Performance based bonuses for government employees should be welcomed
32. Depreciation of Indian Rupee has only negative impact on the economy
33. Gold: Best investment or a bursting bubble?
34. Freedom of press should exist
35. India needs a strong dictator
36. Media is a mixed blessing/How ethical is media?
37. Computer viruses are good
38. India should practice "Swadeshi"
39. The government should stop funding IIT's and IIM's
40. Food Bill - Is it really something India needs?
41. Will India really be the superpower of 21st century?
42. Quality is a myth in India.
43. China - A threat to India?
44. Indian villages - our strength or our weakness?
45. Mobile phones - requirement of the day.
46. Cursing the weather is bad farming
47. If you want peace, prepare for war
48. Education is a progressive way of discovering your ignorance.
49. Beauty contests degrade womanhood
50. Examinations - has it killed education?
51. The medium of teaching in schools should be English
52. A room without books is like a body without soul.
53. Educated Indians lack national commitment.
54. E-Learning is good for the education system and society
55. Any relevant topic

Methodology for conducting Group discussion/Seminar

1. The teacher will allot a topic for a group of six students
2. The teacher should give an introductory talk on Ways and rules to carry out group discussion

3. The students should ask to show interest with others and work effectively with them to meet common objective. The teacher should provide tips to accept feedback in a constructive and considerate way and how to handle frustrations in group, while discussion.
4. The placement officer and any other senior faculty of the institute/ HOD of other department should be invited and they should act as observing members, apart from teacher
5. The teacher should fix up the time duration for initiating and conducting the activity
6. Documentation to be produced for validation
   - Hand written document on minutes of discussion, description of the topic discussed
   - Record the few minutes of discussion by smart device

V. Professional Presentation 15 HRS

- Nature of Oral Presentation
- Planning a Presentation
- Preparing the Presentation
- Delivering the Presentation

Ref: Soft Skills: An Integrated Approach to Maximize Personality, Gajendra Singh Chauhan, Sangeeta Sharma, Wiley India, ISBN: 9788126556397

- *Carry out the presentation in activity No. 2 i.e Information search and Data Collection. Student should carry out the presentation individually.*

Course Delivery:

The course will be delivered through discussions and activities

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Each activities @5 marks each	25	Assessment report for each activity.	1,2,3,4,5
				End of the course	50	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, Effectiveness of Delivery of instructions & Assessment Methods

Note to IA verifier: The following documents to be verified by CIE verifier at the end of semester

1. Student activities report for 25 marks.
2. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

Scheme of Valuation for End Examination

SN	Description	Marks
1	One oral practices exercise on Communication skills	10
2	Report and Presentation on Information Search and Data Collection	20
3	Report on guest lecturers/Seminars conducted	10
4	One oral practices exercise on Group Discussion	10
	Total	**50**

Note:
1. The records of the activities should be preserved in the department for minimum three years.
2. The examiner should verify these records to prevent duplication of the activity.

MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY

RUBRICS FOR ACTIVITY						
Dimension	**Unsatisfactory**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	Ex: 4
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	5
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	2
					Average / Total marks=(4+5+3+2)/4=14/4=3.5=4	

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: **Project Work Phase-I**		
	Scheme (L:T:P) : **0:1:2**	Total Contact Hours: **39**	Course Code: **15CS58P**
	Type of Course:	Credit **:-**	Core/ Elective: **Core**
CIE- 25 Marks		SEE- At the end of sixth semester	

Prerequisites

Knowledge of tools used for Problem Solving.

Course Objectives:

1. The objective of this project is to provide opportunity for the students to implement their skills acquired in the previous semesters
2. Make the students come up with innovative/ new ideas in their area of interest.
3. Identify, analyze and develop opportunities to solve process related problems.
4. Enhance students' to appreciate the values of social responsibility, legal and ethical principles, through analysis and discussion of relevant articles and real time projects.

Course outcome

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Allotted hours
CO1	Get an idea and confidence in designing, analyzing and executing the project.	Analysis/creation	1, 2.	**3hrs/Week**
CO2	Apply the knowledge of latest trends in process execution.	Analysis/creation	1 to 10	
CO3	Prepare document in team and enhance the students' written and oral communication.	Analysis/creation	1 to 10	
CO4	Develop individual confidence to handle various engineering assignments and expose themselves to acquire life skills to meet social challenges	Analysis/creation	1 to 10	
			TOTAL	**39**

MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PROJECT WORK-I	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

As far as possible students should be given application oriented project problems with a view to:

1. Develop an understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the course of study in Computer Science & Engineering.
2. Develop an understanding of subject based knowledge given in the classroom in the context of its application at work places.
3. Provide hands on experience to develop confidence amongst the students to enable them to use and apply acquired technical knowledge and skills.
4. Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.
5. Practical exposure to an industrial activity

Each Project batch must have Maximum of 4 students.

Effort should be made to identify actual field problems to be given as project work to the students. Project selected should not be too complex which is beyond the comprehension level of the students. The placement of the students for such a practical cum project work should match with the competency profile and interest of students.

Students may be assessed as per the suggested performance criteria given below:

a) Punctuality and regularity **(Log book - mandatory and to be produced during IA verification)**
b) Initiative in learning / Demonstration and design of model (DFD, Algorithms, ER diagrams, Flow Charts etc)
c) Level / proficiency of practical skills acquired
d) Originality
e) Scope for patentability
f) Sense of responsibility
g) Self expression/Communication skills
h) Interpersonal skills.
i) Report writing skills
j) Viva voce

The Project Report should consist of following items.

1. Selection of project and feasibility of study
2. Preparation of synopsis.
3. Market survey, cost and estimation of project

GUIDELINES FOR THE PREPARATION OF SYNOPSIS

Project reports should be typed neatly in Times New Roman letters with font size 14 for titles and 12 for text on both sides of the paper with 1.5 line spacing on a A4 size paper (210 x 297 mm). The margins should be: Left - 1.5", Right -1", Top and Bottom - 0.75".

Format of Synopsis

1. Title
2. Objective
3. Problem definition
4. Methodology (DFD, Algorithms etc.)
5. Software/Tools
6. References

ROADMAP FOR PROJECT GUIDES

1. The project work is proposed to be carried out during the V and VI semesters so that learners prepare during the V semester, do some field work based on the preparation during the mid semester vacation and report the analysis and inferences during the VI semester.

2. The learners would reach a level of maturity by the time they reach V semester and so a meaningful project lasting for a year can be executed by them.

3. To execute the project with involvement needs constant guidance and monitoring of the progress of the learners by the guide.

4. This does not mean teacher has to advice learners.

5. Be confident about the ability of the learner and "intellectually provoke" them with challenging questions. These questions should prompt the learners to search information and update themselves (to be carried out during the first two weeks).

6. Do not feed information to learners. Instead crate a 'cognitive dissonance' (a challenging question or situation that the learner is not able to find an immediate answer but feels the need to search for information to find a solution).

7. Defer judgement on learners and give them identified sources if required like a journal article, book or a web site.

8. Even if the learners report their inability to solve do NOT give or prescribe a solution.

9. Be patient and give time for the learner to construct his knowledge.

10. Give corrective feedback to the learner by challenging his solutions so that his logic is questioned and it develops further.

11. This leads to the first activity viz., literature survey and conceiving a project.

12. During this phase meet the project team in a group and create a healthy competition among the learners to search different sources and synthesise their findings in the group.

13. Aim for bringing out a workable innovative project conceived within the first eight weeks as given in the schedule attached.

14. During these two phases and the third phase the teacher should assess the strengths and weakness of the members of the group and allocate differential work to team members on the remaining tasks to be carried out during the next thirty weeks.

15. This is to ensure active participation of all the members of the team.

16. By the end of the twelfth week finalise the project and a schedule of further activities for each member indicating the time frame in which his activities are to be executed may be made ready. A soft copy of this schedule may be collected from each learner by the guide to follow up.

17. This schedule prepared by each learner need to be documented for checking further progress of the project.

18. The next few phases of the project may require active guidance of the guide especially regarding the sources of collecting data, if a sample data is to be collected the number of units has to be decided, collating the data/fabricating, tryout/analysis and finally coming out with meaningful conclusions or models or application.

19. Data like models, designs, technical specifications, source code, protocols and original records need be collected from one authentic source as there will not be any variation. The teacher may guide the learners to authentic source.

20. Data having limited variability like product/service quality, processes and standards, procedures need to be collected from a sample as there is a variation. The number of units from whom (source) the data is to be collected is called sample. The sample needs to be representative of the expected variation. The decision on the size of the sample and the number of units need guidance from the teacher. For example, data regarding the quality of a product/service need be collected from 3 to 5 personnel at different levels of a service provider or dealers of a product. The numbers given are suggestive but a guide based on his experience has to make valid suggestions.

21. Data having a wide range of variation like customer satisfaction where the customers are members of the public need a larger number of units to accommodate the diversity. A tool like questionnaire with predetermined questions need to be prepared,

tried out on a small sample and finalise the questions. Data may be collected from at least 30 units. This number is suggested to apply statistical analysis for meaningful conclusions. Guides may decide on the sample size depending on the accessibility of data.

22. The intention of the above three points viz., 19, 20 and 21 is to ensure objectivity in data collection i.e., to reduce the subjectivity of the human mind.

23. All the above activities need to be completed before three to four weeks before the end of V semester (refer the spread sheet related to scheduling).

24. The learners may be instructed to collect data objectively with identified sample during the next 4 to six weeks which includes the mid semester holidays. This would enable the learners to visit the field and collect data without the constraint of reporting to institution and attending classes on a regular basis.

25. The collected data need to be organised and entered to spread sheets or similar formats for analysis. Qualitative data may be converted to quantitative using a rating scale or similar data organisation procedures.

26. The result of most analysis on spreadsheet could be obtained in tables or graphs as per the requirement.

27. Activities mentioned in points 24, 25 and 26 may be carried out by learners during 4 to 8 weeks after commencement of VI semester.

28. Interpretation of the analysed tables and graphs to arrive at meaningful inference. The guide at this stage may defer his ideas on interpretation allowing the learners to do this. In case the learners err in the process they may be given corrective feedback.

29. A report of the whole process of doing the project may be written, word processed and submitted in triplicate.

30. Guides may contact industries and try to solve their problems so that the learners get a field experience and they get ready for the industry.

31. Innovations and innovative practices may be encouraged among the learners to be pursued as a project. Developing prototypes, (in simulation or real) trying out feasibility of new ideas, changing existing systems by adding modules, combining, assembling new modules and developing new systems may be given higher priority over routine bookish projects.

32. The schedule of events proposed is for an investigative project as a model. Guides may alter the prescribed schedule to suit the kind of innovative projects sited in point No.31 above.

33. Concerned guide may be involved in conceiving, executing and evaluating projects. This gives credibility to the institute.

GUIDELINES TO LEARNERS TO CARRY OUT A TWO SEMESTER PROJECT

1. Carry out the project work through the V and VI semesters. Preparation must be done during the V semester and based on this, field work should be done during the mid semester vacation and reporting of analysis and inferences should be done in the VI semester.
2. You have the ability and the level of maturity needed to conceive an innovative and meaningful project accomplishing which gives you recognition by the industry and empowers you with the power of knowledge.
3. Understand your strength and weakness and make an effort to find the strength and weakness of other peers in the team.
4. Complement each other's strength rather than compete with peers within the team. This will enable you to complete a comprehensive and innovative project relevant to the industrial needs rather than doing a routine copy of what others have done.
5. Seek guidance from the course coordinator and update him/her about the progress.
6. Be confident about your ability and that of other members of your group. Take extra efforts to collect information, share with your peers and synthesise your knowledge.
7. Question everything including the ideas of your course coordinator. Accept the ideas and instructions which are internally consistent (logical).
8. Involve actively in group activities and contribute towards the tasks.
9. Do not depend too much on the course coordinator as a source of information, search on your own and build your knowledge structure. Search for authentic sources like journal articles, books and authentic sites rather than blogs and tweets.
10. Though brief, record your thoughts and activities including searches immediately.
11. Prepare a schedule for your work on a spread sheet and encourage your peers to do the same.
12. Show your schedule and that of others to the course coordinator and get his feedback.
13. Keep reviewing the schedule every fortnight and take corrective steps if needed. For doing this keep the general guideline schedule given in the curriculum as a backdrop.

14. Tools used for data collection like instruments, testing machines, questions to be asked and software may be tried out and standardised by the twelfth week of the project. Seek the course coordinator's help who is experienced in doing this.

15. Collect data dispassionately or objectively (without applying your personal prejudice). Complete this task before the VI semester begins.

16. While entering data into the spread sheet ask your peer member to verify. This will ensure accuracy of data entry.

17. Use appropriate mathematics/statistics for calculations. Seek help from external sources (other than your course coordinator) if required.

18. The results of your analysis need to be graphically represented and documented. You may also add photographs and video clips to increase the validity.

19. This task needs to be completed within 8 weeks after commencement of VI semester.

20. Interpret the data (after analysis) and arrive at meaningful inferences on your own in discussion with your peers. Get it ratified by your course coordinator. Suggestions from the course coordinator may be discussed among your peers and incorporated if they are internally consistent.

21. The project report may be word processed (videos, photographs attached in soft copy) and submitted in triplicate two weeks before the end of VI semester.

22. Involve passionately in the team work, make constructive contributions and come out with an industry friendly project which will equip you in your professional development.

Unit No	Unit Name	Hour
I	Introduction	03
II	Review of Literature.	16
III	Study Area.	13
IV	Result and Discussion.	07
	TOTAL	39

COURSE ASSESSMENT & EVALUATION

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Active participation of student in doing project work	25	Log of activities / Review of project report	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5,6 Effectiveness of Delivery of instructions

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Remembering and Understanding: - 10% weightage
Applying the knowledge acquired from the course: - 30 % weightage
Analysis: - 20% weightage
Evaluation: - 5% weightage
Creating new knowledge: - 35% weightage

STAGES OF PROJECT REVIEW IN 5TH SEMESTER

Review	End of - Week	Activity
I Review	6	Presentation of (a) Project Synopsis, (b) Methodology of work to be carried out
II Review	13	Collection of Preliminary data related to Project work

All students of 5h Semester should compulsorily attend each Review Proceedings of the meeting should be maintained in the department and shown during CIE verification.

CIE SCHEME OF EVALUATION

SN	Particulars	Marks
1	Log Activity	05
2	Synopsis	10
3	Presentation	10
	Total	**25**

PROJECT-TIME LINE

SL.No	Task	Responsibility	V Semester				VI Semester						
			1 to 2	3	4 to 6	7 to 14	1	2 to 3	4	5 to 10	11 to 12	13	14
1	Seminar regarding Project work	HOD / Co-ordinator											
2	Batch formation &Guide allocation	HOD											
3	Identification of project	Students / Guide											
4	Project synopsis Submission	Students											
5	Finalizations of Project	Students / Guide											
6	Literature survey	Students / Guide											
7	Identification of facility to do PW	Guide											
8	Study & design of system and Phase 1 presentation	Students / Guide											
9	Results discussion / performance testing	Students											
10	Review of Project work by guide	Students											
11	Project report submission and Phase 2 presentation	Students / Guide											

Government of Karnataka
Department of Technical Education
Bengaluru

	**Course Title: Software Testing**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS61T**
	Type of Course: **Lectures, Self Study & Student Activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Knowledge of Software Engineering

Course Objectives

1. Foundations of software testing, important concepts and the testing process
2. Understand Testing levels and testing methods
3. Study Static testing – how to carry out testing without executing the code
4. Learn about dynamic testing and Test case design techniques. How to do the testing after executing the program and how to design test cases with examples
5. Know the details of Managing the testing Process
6. Know the need for testing tools and how to select a tool.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Understand the challenges and problems faced, what is testing, types of testing and the models	***R, U***	**1,2,5,6,7,8,9,10**	**12**
CO2	Understand the different types of testing with their workings.	***U, A***	**1,2,3,4,5,8,9,10**	**08**
CO3	Describe the techniques used in static testing	***U, A***	**1,2,3,4,5,8,9,10**	**10**
CO4	Visualizing the methods used to perform dynamic testing and case studies on it.	***U A***	**1,2,3,4,5,8,9,10**	**08**
CO5	Identify how to manage the testing process by developing the related documents	***U, A***	**1,2,4,5,8,9,10**	**08**
CO6	Analyze why tools are required, how to use them and understand the ethics required.	***U A***	**1,2,4,5,6,7,8,9,10**	**06**
		Total sessions		**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Software Testing	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Introduction and Fundamentals of Testing	**12**	5	25	-	30	20.69
II	Testing Levels and Types	**08**	-	15	10	25	17.24
III	Static Testing Techniques	**10**	-	25	-	25	17.24
IV	Dynamic Testing and Test case design Techniques	**08**	-	15	10	25	17.24
V	Managing the Testing Process	**08**	-	20	5	25	17.24
VI	Software Testing Tools and Code of Ethics for Software Professionals	**06**	-	10	5	15	10.35
	Total	**52**	**5**	**110**	**30**	**145**	**100**

UNIT I: Introduction and Fundamentals of Testing 12 Hrs

Introduction: Power of software, Challenges in software projects, Software Fiascos, Ariane 5, Patriot Missile, Mars Pathfinder, CT Scanner, The great bank robbery, FBI Virtual case file, Reasons for software failure, What is the solution?, Software Quality Assurance, Software Testing, Code of Ethics, Software Testing Professionals, Skill sets for Testing Professionals, Tasks handled by Testing Professionals

Fundamentals of Testing: What is Testing?, Testing versus Debugging, Testing and Bebugging, Verification and Validation, Root Cause Analysis, Significance of Testing, Cost of Quality, Psychology of Testing, Testing Choices, In-house Testing, Outsourcing, Who does the testing?, Developers as Testers, Independent team Testing, Buddy Testing, Testing Phases, V Model, Testing and Life cycle models, Testing the Systems, Testing the Strategies, Static Testing, Dynamic Testing, Why testing is difficult?, Test Case, Test Oracle, Test Software,

Manual versus Automated Testing, Testing Software of different Technologies, Metrics in Testing Phase, When Testing is Complete?, Criteria for Completion of Testing, Risk-based Testing, Types of risks, The Myths and Realities of Testing

UNIT II: Testing Levels and Types 08 Hrs

Testing Levels, Unit/Component Testing, Module Testing, Integration Testing, System Testing, Acceptance Testing, Testing Approaches, Static Testing vs Dynamic Testing, Positive Testing vs Negative Testing, Top-down Testing vs Bottom-up Testing, Functional Testing vs Structural Testing, Mutation Testing, Confirmation Testing, Regression Testing, Types of Testing, Smoke Testing, Black Box Testing, White Box Testing, Interface Testing, Use Case Testing, Gorilla Testing, Alpha Testing, Beta Testing, Field Trail / Operational Testing, Performance Testing / Load Testing, Stress Testing, Accessibility Testing, Conformance Testing, Internationalization Testing, Security Testing, Maintenance Testing, Acceptance Testing, Documentation Testing

UNIT III: Static Testing Techniques 10 Hrs

Static Testing, Advantages of Static Testing, Manual Reviews, Formal Review Process, Informal Reviews, Walkthroughs, Inspections, Making Reviews Successful, Checklists, Formal Code Reviews, Coding Guidelines, Programming style, C Coding Guidelines, Code Optimization, Java Coding Guidelines, Static Analysis using Tools, Tool for Readability Improvement / Indenting, Portability Testing Tool, Symbolic Execution

UNIT IV: Dynamic Testing and Test case design Techniques 08 Hrs

Dynamic Testing, Review work products, Identify Test Objectives, Test Specifications and Test Design, Design Test Cases, Black Box Test Case Design Techniques, White Box Test Case Design Techniques, Experience-based Test Case Design Techniques, Case Study #1 : Test Cases for an IVR System, Case Study #2 : Test Case for Finger Print Recognition System, Document Test Cases, Execute Test Cases, Generate Incident Report / Anomaly Report, Log the Defects, Test Documentation Standards, Formal Methods of Testing

UNIT V: Managing the Testing Process 08 Hrs

Management Commitment, Organization Structure, Testing Process management, Options for Managers, Testing Process Management Activities, Planning, Budgeting and Scheduling the Testing Phase, Test Plan, Alignment of the Process to the Project, Team Formation, Infrastructure, Testing Tools, Reviewing, Monitoring and Risk Management, Risk Management, Test Reports, Metrics, Software Reliability, Defect tracking, Classification of Defects, Configuration Management, Test Closure and Process Improvement, Software testing Maturity Model (SW-TMM), Information Security

UNIT VI: Software Testing Tools and Code of Ethics for Software Professionals 06 Hrs

Software Testing Tools: Need for Tools, Classification of Tools, Functional / Regression Testing Tools, Performance / Load Testing Tools, Testing Process Management Tools,

Benefits of Tools, Risks Associated with the Tools, Does your Organization Need Tools?, Selecting Tools, Introducing the tools in the Testing Process

Code of Ethics for Software Professionals: Human Ethics, Professional Ethics, Ethical Issues in Software Engineering, Code of Ethics and Professional Practice, Software Engineering Code of Ethics and Professional Practice, Ethical issues: Right versus Wrong

Text Books

1. ISTQB Certification Study Guide, Dr. K.V.K.K. Prasad, Wiley-Dreamtech Press, ISBN: 9788177227116

References

1. Software Testing Principles and Practices, Srinivasn desikan, Goplaswamy Ramesh, Pearson, ISBN: 9788177581218
2. Software Testing Tools, Dr. K.V.K.K. Prasad, Wiley- Dreamtech Press, ISBN 10: 8177225324
   ISBN 13: 9788177225327
3. Software Testing Concepts and Tools, Nageshwara Rao Pusuluri, DreamTech, ISBN 10: 8177227122 ISBN 13: 9788177227123

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1. Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each student should conduct different activity and no repeating should occur

1	Design test cases on validation of time with a format HH : MM : SS
2	Prepare a report on different types of testing.
3	Prepare a presentation on testing tools available

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assess	CIE	IA	Stude	Three IA tests (Average of	20	Blue books	1 to 6

				three tests will be computed)			
				Student activities	05	Report	1 to 6
				Total	**25**		
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	4
2	Understanding	76
3	Application	20

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM		20
	Year: 2017-18		

Name of Course coordinator :
Units:__ CO's:____

Question no	Question	Marks	CL	CO	PO
1					

2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM	Software Testing	20
	Year: 2017-18	Course code:**15CS61T**	

Name of Course coordinator :
Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Differentiate between debugging and bebugging. (5) OR Explain the challenges faced in software projects.	U	1	1,2
2	Explain the levels of testing and corresponding test plans with a neat diagram. (10)	A	2	1,2, 3
3	Explain the significance of testing (5) OR Explain Test Oracle	U	1	1,2

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3

Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

MODEL QUESTION PAPER Code: **15CS61T**

Diploma in Computer science & Engineering

VI Semester

Course Title: SOFTWARE TESTING

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. What is the importance of Gorilla Testing?
2. What are the responsibilities of test manager?
3. Explain the IEEE standard characteristics of an SRS document.
4. Describe the incident report.
5. List the various metrics used in testing phase.

6. Mention the benefits of testing tools.
7. What are the tasks handled by testing professionals?
8. Explain Field-trial testing.
9. Explain configuration management.

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PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Explain V. Model with neat diagram.
2. Differentiate between the following:
   a. Positive and Negative Testing
   b. Alpha and Beta Testing
3. Explain the formal review process.
4. List and briefly explain the steps in dynamic testing
5. Explain the following tools to review testing progress:
   a. Gantt chart
   b. Cost – schedule – milestone chart
6. Explain how tools are introduced in testing process in an organization with help of diagram
7. Explain the classifications of Non-functional requirements.
8.
   a. What criteria are used to declare that the testing is complete?
   b. What is the need for Regression testing?
9. Explain different checklist in Static Testing.
10. What are the various methods used in black box test case design technique?

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

VI Semester

Course Title: Software Testing

CO	Question	CL	Marks
	What are the tasks handled by testing professionals?	R	05
	Explain the significance of testing	U	
	Differentiate between debugging and bebugging.	U	
	Differentiate between static and dynamic testing.	U	
	Discuss important metrics in testing phase.	U	
	What criteria are used to declare that the testing is complete?	R	

I	Explain the challenges faced in software projects.	**U**	
	Explain V. Model with neat diagram.	**A**	**10**
	Explain the following: a. Test ORACLE b. Defect seeding	**U**	
	Explain the advantages and disadvantages of in-house testing and outsourcing	**U**	
	Explain the classifications of Non-functional requirements.	**U**	
II	Explain Field-trial testing.	**U**	**5**
	Compare white-box testing and black-box testing.	**U**	
	Explain the importance of Gorilla Testing.	**U**	
	Explain the need for Regression testing?	**U**	
	Compare structural testing at module level and structural testing at system level.	**A**	
	Explain stages of testing.	**A**	
	Describe the different levels of Testing.	**U**	**10**
	Differentiate between the following: a. Positive and Negative Testing b. Alpha and Beta Testing	**U**	
	Explain how performance and stress testing can be done on database system?	**U**	
	Explain the levels of testing and corresponding test plans with a neat diagram.	**A**	
III	Explain the IEEE standard characteristics of an SRS document.	**U**	**5**
	What factors contribute to the success of review meeting?	**U**	
	What are the advantages of static testing?	**U**	
	Discuss the code optimization guidelines during code review.	**U**	
	Mention guidelines to be followed by Software Engineers while programming in Java.	**U**	
	Explain different checklist in Static Testing.	**U**	**10**
	Explain the formal review process.	**U**	
	Mention important C coding guidelines	**U**	
IV	Describe how to document a test cases.	**U**	**5**
	Explain how Decision tables are used in black box testing.	**U**	
	Describe the incident report.	**U**	
	Write a note on specifications based on testing.	**U**	
	Explain how to design test case	**U**	
	List and briefly explain the steps in dynamic testing.	**U**	**10**
	Explain boundary value analysis.	**U**	
	What are the various methods used in black box test case design technique?	**A**	
V	Explain configuration management.	**A**	**5**
	What factors need to be considered while buying COTS software?	**U**	
	Explain Defect tracking.	**U**	
	What are the responsibilities of test manager?	**U**	
	Explain the content of test report generated after testing phase.	**U**	
	List the various metrics used in testing phase.	**U**	
	Explain the following tools to review testing progress: a. Gantt chart	**A**	

	b. Cost – schedule – milestone chart		**10**
	Explain with a diagram, the change impact analysis in configuration management.	**A**	
VI	Mention the benefits of testing tools.	**U**	**5**
	Explain the risk associated with tools	**U**	
	Write a note on professional ethics	**U**	
	Explain Performance/Load Testing Tools	**U**	
	Discuss the code of Ethics framework.	**U**	
	Explain why testing tools are required	**U**	
	Explain the different classes of Testing Tools.	**U**	**10**
	Explain how tools are introduced in testing process in an organization with help of diagram	**A**	
	Mention the criteria for selecting the tools	**U**	
	Write a note on software engineering code of ethics.	**U**	

Government of Karnataka
Department of Technical Education
Bengaluru

	**Course Title: Network Security & Management**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS62T**
	Type of Course: **Lectures, Self Study & Student Activity.**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites:

Knowledge of Computer Networks.

Course Objectives

To study the concepts of network security and various cryptographic algorithms, hardware and software security, IDS, wireless security, web security, security laws with Internet Governance & Email policy.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Discuss the basic concepts of network security and various cryptographic algorithms.	***R,U,A***	**1,2,3,7,8,9,10**	**06**
CO2	Describe various hardware and software securities for information.	***R,U,A***	**1,2,3,7,8,9,10**	**14**
CO3	Discuss how Intrusion Detection System helps to provide security along with various types of firewalls.	***R,U,A***	**1,2,3,7,8,9,10**	**06**
CO4	Describe how wireless security provided to information.	***R,U***	**1,2,3,7,8,9,10**	**06**
CO5	Discuss various concepts of web security.	***R,U***	**1,2,3,7,8,9,10**	**12**
CO6	Discuss security and law along with Internet Governance and Email policy.	***R,U***	**1,2,3,7,8,9,10**	**08**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Network Security & Management	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Introduction and Cryptography	**16**	10	10	20	40	27.58
II	Hardware & Software Security	**06**	05	05	05	15	10.34
III	Intrusion Detection System and Firewalls	**10**	10	10	10	30	20.68
IV	Wireless Security	**06**	05	15	-	20	13.79
V	Web Security	**08**	05	20	-	25	17.24
VI	Security and Law, Internet Governance and Email Policy	**06**	05	10	-	15	13.79
	Total	**52**	**40**	**70**	**35**	**145**	**100**

UNIT I : Introduction and Cryptography 16 Hrs

Introduction: Computer security concepts, The OSI security architecture, Security attacks, Security services, Security mechanisms, A model for network security, Standards

Cryptography: Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Random and Pseudorandom Numbers, Stream Ciphers and RC4, Cipher Block Modes of Operation, Approaches to Message Authentication, Secure Hash Function, Message Authentication Codes, Public Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures.

UNIT II: Hardware and Software Security 06 Hrs

Hardware Security, Smart Cards, Biometrics, Virtual Private Networks, Types of VPN's, Trusted Operating Systems, Pretty Good Privacy (PGP), Security Protocols, Security Socket Layer, Transport Layer Security, IPSec, S/MIME(Secure/Multipurpose Internet Mail Extension)

UNIT III: Intrusion Detection System and Firewalls 10 Hrs

IDS: What is not an IDS?, Infrastructure of IDS, Classification of IDS, Host-based IDS, Network based IDS, Anomaly Vs Signature Detection, Normal Behaviour Patterns-Anomaly Detection, Misbehaviour Signatures-Signature Detection , Parameter Pattern Matching, Manage an IDS.

Malicious Software, Safeguards, Firewalls, Packet-Filtering Firewalls, State full Inspection Firewalls, Proxy firewalls, Guard, Personal Firewalls, Limitations of Firewalls.

UNIT IV: Wireless Security 06 Hrs

Wireless Application Protocol, WAP Security, Authentication, Integrity, Confidentiality, Security Issues with Wireless Transport Layer Security (WTLS), Wireless LAN, WLAN Configuration, WLAN Technology consideration, Wireless LAN Security, Access Point Security, Work Station Security, Safeguarding Wireless LAN's.

UNIT V: Web Security 08 Hrs

Client/Server Architecture, Security considerations and Threats, Web traffic security approaches, SSL/TLS for secure web services, The Twin concept of "SSL Connection" and "SSL Session", SSL session state, SSL Connection State, SSL Record Protocol, SSL Handshake Protocol, Secure Hypertext Transport Protocol(S-HTTP), Secure Electronic Transaction(SET), Business Requirements, SET Participants, SET Transaction Flow.

UNIT VI: Security and Law, Internet Governance and Email Policy 06 Hrs

Security and Law: Regulations in India, Information Technology Act 2000, Cyber Crime and the IT Act 2000, Indian Contract Act, 1872, Indian Penal Code, Indian Copyright Act, Consumer Protection Act, 1986, Specific Relief Act, 1963, Government Initiatives, Future Trends-Law of Convergence.

Internet Governance and Email Policy: Internet Governance, Network Security Aspects in E-Governance, Security Monitoring Tools, Electronic Mail, What are the e-mail Threats that Organization's face?, Why do you need an E-mail Policy?, How do you create an E-mail Policy?, Publishing the E-mail Policy, University E-mail Policy, Electronic mail policy.

Text books

1. **Network Security Essentials: Applications and Standards**, 4/e, William Stallings, Pearson Educaiton, ISBN: 9788131716649 (Chap 1)
2. **Network Security and Management**, 2nd edition, Brijendra Sing, PHI, ISBN: 9788120339101 (Chap: 2,3,4,5,6)

References

1. Network Security Bible, 2nd edition, Eric Cole, Wiley Publisher, ISBN: 9788126523313

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1. Each individual student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each student should conduct different activity and no repetition should occur.

1	Make a survey in any industry/ institute to understand the way security is provided for information. Videos can also be used to make the survey.
2	Quiz

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1 to 6
				Student activities	05	Report	1 to 6
				Total	**25**		
	SEE	End Exam		**End of the course**	**100**	Answer scripts at BTE	1 to 6
Indirect Assessment			Students	Middle of the course		Feedback forms	1, 2, 3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	28
2	Understanding	48
3	Application	24

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks

3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM		20
	Year: 2017-18		

Name of Course coordinator :
Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM	Network Security Management	20
	Year: 2017-18	Course code: **15CS62T**	

Name of Course coordinator :
Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	List the differences between passive and active security threats.(5) OR List out the design objectives for HMAC.(5)	R	1	1,2
2	Explain essential ingredients of a symmetric cipher with a neat diagram (5) OR Describe the advantages of counter mode. (5)	U	1	1,2
3	Explain with a neat diagram Fiestel Cipher Structure and its design elements.(10)	A	1	1,2

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

MODEL QUESTION PAPER Code: **15CS62T**

Diploma in Computer Science & Engineering

VI- Semester

Course Title: Network Security & Management

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. **5X6=30 Marks**

1. List the differences between passive and active security threats.
2. Explain essential ingredients of a symmetric cipher with a neat diagram
3. List out the design objectives for HMAC.
4. Describe the advantages of counter mode.
5. Write a note on S/MIME.
6. Describe the classification of IDS.
7. Mention the purpose of firewalls and its limitations.
8. Explain how to safeguard Wireless LANs.
9. List the services provided by SSL record protocol.
10. Write a short note on Indian Penal Code.

PART-B

Answer any SEVEN full questions each carries 10 marks. **10X7=70 Marks**

1. Explain in detail various security services.
2. Explain with a neat diagram Fiestel Cipher Structure and its design elements.
3. Explain the RSA public-key Encryption algorithm with an example.
4. Explain the various hardware securities (Smartcard and Biometrics).
5. Write a note on network based IDS.
6. Explain Packet Filtering Firewall and its importance.
7. Describe WAP protocol architecture.
8. Describe the SET components and their relationships.
9. Explain how do you create an email policy for your organization.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

VI Semester

Course Title: Network Security & Management

CO	Question	CL	Marks

I	Explain OSI security architecture.	U	05
	List the differences between passive and active security threats.	R	
	Define categories of passive and active passive attacks.	R	
	Define categories of security services.	R	
	Discuss categories of security mechanisms.	U	
	Write three key objectives of computer security.	U	
	Explain essential ingredients of a symmetric cipher with a neat diagram.	U	
	Describe cryptography, cryptanalysis and various types of attacks on it.	U	
	Explain CBC mode operations with neat diagram.	U	
	Explain CTR mode operation with neat diagram.	U	
	Explain message authentication code with a neat diagram	U	
	List the design objectives of HMAC.	U	
	Describe the advantages of counter mode.	U	
	Explain in detail various security services.	U	10
	Explain network security model with a neat diagram.	U	
	Explain with a neat diagram Feistel Cipher Structure and its design elements.	A	
	Explain AES algorithm with a neat diagram.	A	
	Describe Data Encryption Standard with a neat diagram	A	
	Explain with a neat diagram Stream Cipher Structure and list its important design considerations.	A	
	Describe RC4 algorithm with a neat diagram.	A	
	Explain the RSA public-key Encryption algorithm with an example.	A	
	Explain message authentication using one way hash function with a neat diagram.	A	
	Write public key encryption structure with neat diagram.	A	
	Perform Encryption and Decryption using RSA algorithm for the following values P=3,q=11,e=7,M=5	A	
	In a RSA system the Public Key of a given user is e=31,n=3599 what is the private key of this user?	A	
II	Describe trusted operating system.	R	05
	Explain hardware security. Give an example of common hardware problem and safeguards for hardware security.	U	
	Explain Pretty Good Privacy (PGP).	U	
	Write a note on S/MIME.	U	
	Explain the various hardware securities (Smartcard and Biometrics).	A	10
	Describe VPN and its types with a neat diagram.	U	
	Explain Security protocols SSL and TLS with a neat diagram.	U	
	Discuss IPSec with Authentication and ESP headers.	U	
III	Explain infrastructure of IDS with a neat diagram.	U	05
	Describe the classification of IDS.	U	
	Define IDS? List the functions performed by Intrusion Detection System.		
	Explain the need for firewalls.	U	
	Describe malicious software and its types.	U	
	List the types of firewalls.	R	
	Mention the limitations of firewalls.	R	
	Write a note on network based IDS.	U	
	Write a note on host based IDS.	U	

	Write a note on Anomaly detection and signature detection.	**U**	**10**
	Describe misbehaviour signatures – signature detection with its disadvantages.	**U**	
	Explain Packet Filtering Firewall and its importance.	**A**	
	Explain host-dependent programs and host-independent programs.	**U**	
	Explain Proxy Firewall with a neat diagram.	**A**	
IV	Mention advantages of wireless network.	**R**	**5**
	Explain how to safeguard Wireless LANs.	**U**	
	Write a short note on Wireless LAN security.	**U**	
	List various WLAN configurations.	**R**	
	Explain WAP protocol architecture.	**U**	**10**
	Describe WAP security.	**U**	
V	Indicate the security of threats faced while using web.	**U**	**05**
	List the parameters of SSL session state.	**R**	
	List the parameters of SSL Connection state.	**R**	
	List the services provided by SSL record protocol.	**R**	
	Write a note on S-HTTP.	**U**	
	Write a note on Secure Electronic Transaction (SET).	**U,A**	
	Explain the client/server architecture of web.	**U**	**10**
	Describe web traffic security approaches.	**U**	
	Explain the importance of SSL/TLS for secure web services.	**U**	
	Explain the parameters of SSL session and SSL connection states.	**U**	
	Describe SSL record protocol with a neat diagram	**U**	
	Explain SSL handshake protocol	**U**	
	Explain the flow of transaction in SET with a diagram.	**U**	
	Describe the SET components and their relationships.	**U**	
VI	Write a short note on Indian Penal Code.	**U**	**05**
	Describe Information Technology act, 2000.	**U**	
	Explain the consumer protection act, 1986.	**U**	
	Discuss Consumer Protection Act.	**U**	
	Discuss the constituents of consumer complaint and its stakeholders	**U**	
	Describe network security aspects in E-Governance.	**U**	
	List the email threats that an organization face.	**R**	
	Explain the purpose of email policy.	**U**	
	Discuss initiatives undertaken by government to upgrade security standards.	**U**	**10**
	Describe Security monitoring tools.	**U**	
	Explain how an email system works with a diagram.	**U**	
	Explain how you create an email policy for your organization.	**U**	

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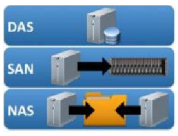	**Course Title: Information Storage and Management**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS63A**
	Type of Course: **Lectures, Self Study & Student Activity.**	Credit **:04**	Core/ Elective: **Elective**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Basic knowledge about Networking.

Course Objectives

To Understand the Concept of Information Storage, Data centre Environment, Data Protection, Fibre Channel SAN and Backup and Archive Techniques.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	To Understand the Concept of Information Storage and Data centre Environment.	***R,U,A***	**1,2,8,9,10**	**12**
CO2	To understand about Data Protection.	***U,A***	**1,2,4,8,9,10**	**08**
CO3	To Know and understand Intelligent Storage System.	***R,U,A***	**1,2,4,8,9,10**	**08**
CO4	To Understand Fibre Channel SAN	***U,A***	**1,2,4,8,9,10**	**10**
CO5	To Understand Network Attached Storage (NAS).	***U,A***	**1,2,4,8,9,10**	**06**
CO6	To Know the Backup and Archive Technologies.	***U,A***	**1,2,4,8,9,10**	**08**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Information Storage and Management	**3**	**3**		**3**				**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Introduction to Information Storage and Data centre Environment.	12	10	15	05	30	22.75
II	Data Protection : RAID	08	-	10	10		15.17
III	Intelligent Storage System.	08	10	10	10		15.17
IV	Fibre Channel Storage Area Networks	10	-	20	20		19.32
V	Network Attached Storage	06	-	10	10		12.42
VI	Backup and Archive	08	-	10	10		15.17
	Total	**52**	**20**	**80**	**70**	**145**	**100**

UNIT I : Introduction to Information Storage and Data centre Environment. 12 Hrs

Introduction to Information Storage- Information Storage, Data, Types of Data, Big Data, Information, Storage, Evolution of Storage Architecture, Data Centre Infrastructure, Core Elements, Key characteristics for Data Centre Elements, Managing Data centre, Virtualization and Cloud Computing.

Data Centre Environment -Application, DBMS, Host, OS, Memory Virtualization, Device Driver, Volume Manager, File System, Compute Virtualization, Connectivity- Physical Components of Connectivity, Interface protocols- IDE/ATA and Serial ATA, SCSI and Serial SCSI, Fibre Channel, Internet Protocol, Storage, Disk Drive Components- Platter, Spindle, R/W Head, Actuator Arm Assembly, Drive Controller Board, Physical Disk Structure, Zoned Bit Recording, Logical Block Addressing, Disk Drive Performance- Disk Service Time, Seek Time, Rotational Latency, Data Transfer Rate; Host Access to Data, Direct-Attached Storage- Benefits and Limitations, Storage Design Based on Application,

Requirements and Disk Performance, Disk Native Command Queuing, Introduction to Flash Drives- Components and Architecture of Flash Drives, Features Of Enterprise Flash drives.

UNIT II: Data protection: RAID **08 Hrs**

Data Protection: RAID - Implementation of RAID, Software RAID, Hardware RAID, RAID Array Components, RAID Techniques- Striping, Mirroring, Parity; RAID Levels- RAID 0, RAID 1, Nested RAID, RAID 3, RAID 4, RAID 5, RAID 6, RAID Impact on Disk Performance, Application IOPS and RAID Configurations, RAID Comparison, Hot Spares.

UNIT III: Intelligent Storage System **08 Hrs**

Intelligent Storage System - Components of an Intelligent Storage System, Front End, Cache- Structure of Cache, Read Operation with Cache, Write Operation with Cache, Cache Implementation, Cache management, Cache Data Protection, Back End, Physical Disk, Storage Provisioning- Traditional Storage Provisioning, LUN Expansion: Meta LUN, Virtual Storage Provisioning, Comparison between Virtual and Traditional Storage Provisioning, LUN Masking, Types of Intelligent Storage Systems- High end Storage Systems, Mid Range Storage Systems.

UNIT IV: Fibre Channel Storage Area Networks **10 Hrs**

Fibre Channel Storage Area Networks - Fibre Channel: Overview, The SAN and Its Evolution, Components of FC-SAN, Node Ports, Cables and Connectors, Interconnect Devices, SAN Management Software, FC Connectivity, Point-to-Point, Fibre Channel Arbitrated Loop, Fibre Channel Switched Fabric, FC-SW Transmission, Switched Fabric Ports, Fibre Channel Architecture, Fibre Channel Protocol Stack- FC-4 Layer, FC-2 Layer, FC-1 Layer, FC-0 Layer, Fibre Channel Addressing, World Wide Names, FC Frame, Structure and Organization of FC Data, Flow Control- BB_Credit, EE_Credit,, Classes of Service, Fabric Services, Switched Fabric Login Types, Zoning, FC SAN Topologies- Mesh Topology, Core-Edge Fabric, Benefits and Limitations of Core Edge Fabric.

UNIT V: Network Attached Storage **06 Hrs**

Network-Attached Storage - General-Purpose Servers vs. NAS Devices, Benefits of NAS, File Systems and Network File Sharing- Accessing a File System, Network File Sharing; Components of NAS, NAS I/O Operations ,NAS Implementations- Unified NAS, Unified NAS Connectivity, Gateway NAS, Gateway NAS Connectivity, Scale Out NAS, Scale Out NAS Connectivity, NAS File-Sharing Protocols- NFS, CIFS; Factors Affecting NAS Performance, File Level Virtualization.

UNIT VI: Backup and Archive **08 Hrs**

Backup Purpose- Disaster Recovery, Operational Backup, Archival, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Architecture, Backup and Restore Operations, Backup Topologies, Backup in NAS Environments- Server Based and Server less Backup, NDMP- Based Backup; Backup Targets- Backup to Tape, Physical Tape Library, Limitations of Tape; Backup to Disk, Backup to Virtual Tape, Data Deduplication for Backup- Data Deduplication Methods, Data Deduplication Implementation, Backup in Virtualized Environments, Data Archive, Archiving Solution Architecture- Use Case- Email and File Archiving.

Text books

1. Information Storage and Management, Second Edition, EMC Education Services, Wiley India Edition, ISBN: 9788126537501.

References

1. Storage Networks Explained, Ulf Tropan, Rainer Erkens, Wofgang Muller, Wiley, ISBN: 9788126518326

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

1. Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each student should conduct different activity and no repeating should occur

1	Prepare a presentation on different types of topologies
2	Survey on Network-Attached Storage
3	Survey on RAID Calculator

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1,2,3,4
				Student activities	05	Report	1,2,3,4
				Total	**25**		
	SEE	End Exam		**End of the course**	**100**	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	14
2	Understanding	55
3	Application	48

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF IA TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM		20
	Year: 2017-18		

Name of Course coordinator :
Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM	**Information Storage and Management**	20
	Year: 2017-18	Course code: **15CS63A**	

Name of Course coordinator :
Units:1,2 CO- 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Define data. Explain the types of data with diagram.	R	CO1	1,2,8,9, 10
2	Differentiate between server-centric and information-centric storage architecture.	U	CO1	
3	Explain the different RAID techniques with diagrams. **OR** Briefly explain the different RAID levels with diagrams.	A	CO2	1,2,4,8, 9,10

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time	3

					frame	
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

MODEL QUESTION PAPER Code: **15CS63A**

Diploma in Computer Science & Engineering

VI- Semester

Course Title: Information Storage & Management

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. Mention the key challenges in managing information.
2. Write a note on Virtualization
3. Explain the two different methods to implement RAID.
4. Write a note on hot spares.
5. Write a note on Storage provisioning
6. What are the two techniques to protect the data in a Cache
7. Explain SAN and its Evolution.
8. Write a note on NFS
9. Explain SAN-Based Backup Topology.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Discuss various Interface Protocols.
2. Explain with Diagram RAID 5 and RAID Levels
3. What is Intelligent Storage Systems (ISS)? Explain the different components of an ISS with a neat diagram.
4. Explain the read and write operations with Cache.
5. What is Fibre Channel? Explain in brief the FC SAN implementation.
6. Discuss the types of Zoning.
7. How to implement NAS? Explain.
8. Explain File-Level Virtualization.
9. Discuss Backup and Restore Operations.
10. Discuss Backup in NAS Environments.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

VI Semester

Course Title: Information Storage & Management

CO	Question	CL	Marks
I	Define data. Explain the types of data with diagram.	R	05
	Differentiate between server-centric and information-centric storage architecture.	U	
	Discuss the five core elements of a data centre.	U	
	Mention the key challenges in managing information.	R	
	Write a note on Virtualization.	U	
	Explain key characteristics of a Data Centre.	R	
	Write a note on Volume manager	R	
	List and Explain the physical components of connectivity.	U	
	Define DAS. Explain different types of DAS with diagram.	U	
	List the benefits and limitation of DAS.	R	
	Write a note on zoned bit recording.	U	
	Write a note on Flash drives.	U	
	Write a note on physical disk structure.	R	
	List and Explain the features of Enterprise Flash Drives.	A	
	Explain the Logical Block Addressing	U	
	Discuss various disk drive interfaces.	A	
	Discuss various Interface Protocols.	A	10
	Discuss briefly various Disk Drive Components.	U	
	Explain the components of Disk drive Performance.	U	
II	Explain RAID Array Components.	U	05
	Discuss Mirroring RAID Technique	U	
	Explain the two different methods to implement RAID.	U	
	Explain Striping technique in RAID.	U	
	Write a note on hot spares.	U	
	Explain with Diagram RAID 5 and RAID Levels	A	10
	Discuss Impact on Disk performance.	U	
	Explain Nested RAID.	U	
	Explain the different RAID techniques with diagrams.	A	
	Briefly explain the different RAID levels with diagrams.	A	
III	What is meant by Read-hit and read-miss? Explain	U	05
	Write a note on Cache management.	U	
	Discuss the structure of Cache.	U	
	Write a note on Storage provisioning	A	
	Explain the types of flushing	A	
	Compare Virtual and traditional storage provisioning.	A	

	What are the two techniques to protect the data in a Cache.	**U**	
	Explain the types of Intelligent Storage Systems with a neat diagram.	**A**	
	What is Intelligent Storage Systems (ISS)? Explain the different components of an ISS with a neat diagram.	**A**	**10**
	Explain the read and write operations with Cache.	**U**	
	Discuss the types of MetaLUN.	**A**	
IV	Explain SAN and its Evolution.	**U**	**05**
	Explain different ports used in Switched Fabrics with a neat diagram.	**U**	
	Explain different Fabric Services.	**U**	
	Write a note on Zoning.	**A**	
	Explain Fibre Channel Protocol Stack.	**A**	
	Explain FC Frame with a neat diagram.	**U**	
	Explain Fibre Channel Switched Fabric.	**A**	
	Explain Mesh Topology.	**A**	
	List the benefits and limitations of Core-Edge fabric.	**U**	
	Discuss Core-Edge Fabric.	**A**	
	Write a note on VSAN	**A**	
	Write a note on Virtualization in SAN.	**U**	
	Discuss switched fabric login types.	**U**	
	What is Fibre Channel? Explain in brief the FC SAN implementation.	**U**	**10**
	Discuss the components of FC SAN	**U**	
	Discuss the types of Zoning.	**A**	
	Explain the three basic FC Connectivity.	**A**	
	Discuss FC SAN Topologies.	**A**	
	Explain the different components of FC SAN.	**U**	
V	What is Network-Attached Storage (NSS)? Explain different benefits of NAS.	**U**	**05**
	Explain the components of NAS with a neat diagram.	**U**	
	Explain the NAS I/O operation with a neat diagram.	**A**	
	Explain different file-sharing protocols in NAS.	**U**	
	Write a note on NFS.	**A**	
	Explain the benefits of NAS.	**U**	
	Write a note on Network File Sharing.	**U**	
	How to implement NAS? Explain.	**U**	**10**
	Explain File-Level Virtualization.	**A**	
	Explain different factors affecting NAS performance.	**A**	
VI	Discuss the purpose of backup.	**U**	**05**
	Explain Backup Architecture.	**U**	
	Explain Direct-attached Backup Topology.	**A**	
	Write a note on Virtual Tape Library.	**A**	
	Explain LAN-Based backup Topology.	**A**	
	Explain SAN-Based Backup Topology.	**A**	
	Discuss Archiving Solution Architecture.	**A**	

	Explain the backup methods.	**U**	
	Explain Data Archive Types.	**U**	
	Explain Data Deduplication methods.	**U**	
	Discuss Data Deduplication Implementations.	**A**	
	Discuss Backup and Restore Operations.	**A**	
	Explain Backup in Virtualized Environments	**A**	**10**
	Discuss Backup in NAS Environments.	**A**	
	Explain backup topologies.	**U**	

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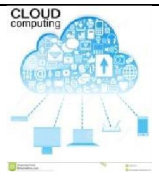	Course Title: **CLOUD COMPUTING**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS63B**
	Type of Course: **Lectures, Self Study & Student Activity.**	Credit **:04**	Core/ Elective: **Elective**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Knowledge of Computer Networks

Course Objectives

To understand cloud computing, the different models and architectures and study about the services offered by cloud, software plus services, understand about virtualization of cloud and various examples of cloud computing.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Understand need of cloud computing, cloud essentials, benefits, challenges, limitations, usage and applications, business models	***R,U,A***	**1,2,3,4,6,7,8,9,10**	**07**
CO2	Discuss the meaning of cloud computing, understand cloud models, cloud application architecture, cloud computing architecture and various infrastructure models	***U,A***	**1,2,3,4,6,7,8,9,10**	**10**
CO3	Understand the various cloud services	***U,A***	**1,2,3,4,6,7,8,9,10**	**10**
CO4	Determine the various software plus services possible for the users to place the very sensitive data housed on-site	***U,A***	**1,2,3,4,6,7,8,9,10**	**08**
CO5	Get knowledge of virtualization to know about virtual machines, virtual cluster, types of virtualization	***R,U,A***	**1,2,3,4,6,7,8,9,10**	**10**
CO6	Illustrate the different approaches to cloud computing, examples like Aneka, Autonomic computing engine	***U,A***	**1,2,3,4,6,7,8,9,10**	**07**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Introduction to cloud computing	**06**	05	10	05	20	13.79
II	Cloud models	**10**	-	15	10	25	19.31
III	Cloud services	**10**		15	10	25	19.31
IV	Software plus services	**10**	-	15	10	25	15.17
V	Virtualization for cloud	**08**	-	15	10	25	19.31
VI	Examples of cloud computing	**08**	-	10	10	25	13.10
	Total	**52**	**05**	**82**	**58**	**145**	**100**

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Cloud Computing	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

UNIT I: Introduction to Cloud computing 06 Hrs

Evolution of cloud, Essentials, Cloud Computing definition, Benefits and Challenges, Limitations, Usage and Applications, Business Models around Cloud Computing, Characteristics, Cloud Adoption

UNIT II: Cloud models 10 Hrs

Introduction, Collaboration to cloud, Cloud Models, Cloud Applications and Architecture, Cloud Computing Architecture, Cloud Infrastructure Models, Cloud Infrastructure Self Service, Scaling a cloud infrastructure

.

UNIT III: Cloud services 10 Hrs

Introduction to Services, Storage as a Service, Database as a Service, Information as Service, Process as a Service, Application as a Service, Management/Governance as Service, Platform as a Service, Security as a Service, Testing as Service, Integration as Service, Infrastructure as Service

UNIT IV: Software plus Services 10 Hrs

Introduction, Mobile Device Integration, Providers, Microsoft Online Intuit Quick base, Cast Iron Cloud, Bungee Connect, Introduction to Map Reduce, Goggle File System, Hadoop framework, Hadoop Distributed File System

UNIT V: Virtualization for cloud 08 Hrs

Introduction, Pros and Cons of Virtualization, Virtualization Architecture, Virtualization Machine, Virtualization in Clusters/Grid Context, Virtual Network, Types of Virtualization, Virtual Machine Monitor, Virtual Desktop Infrastructure

UNIT VI: Examples of Cloud Computing 08 Hrs

Introduction, Types of clouds, Cloud Comparing Approaches, Aneka Integration of private and public cloud, Aneka Cloud Platform, Introduction,, Resource Provisioning Service, Aneka Hybrid Cloud Implementation, Comet Cloud Architecture, Autonomic Behaviour, Comet Cloud, Overview of Comet Cloud Based Applications, Implementation

Text books

Cloud Computing, M.N RAO, PHI Learning Private Limited, ISBN: 978-81-203-5073-1

References

1. Cloud Computing – A practical approach for learning and implementation Pearson A.Srinivasan J.Suresh
2. Cloud Computing A hands-on-Approach, universities Press Arshdeep Bahga and Vijay Madisetti
3. Cloud Computing – Concepts, Technology and Architecture Pearson Thomas Erl

Web Sources

1. http://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf
2. http://www.thbs.com/downloads/Cloud-Computing-Overview.pdf
3. https://www.priv.gc.ca/resource/fs-fi/02_05_d_51_cc_e.pdf
4. Lewis, Grace. Basics About Cloud Computing. http://www.sei.cmu.edu/library/abstracts/whitepapers/cloudcomputingbasics.cfm (2010).
5. http://www.intel.in/content/dam/www/public/us/en/documents/guides/cloud-computing-virtualization-building-private-iaas-guide.pdf
6. http://manjrasoft.com/aneka_architecture.html

Suggested list of student activities

Note: The following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)
Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1 to 6
				Student activities	05	Activity Reports	1 to 6
				Total	**25**		
	SEE	End Exam		**End of the course**	**100**	Answer scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1 to 3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	4
2	Understanding	57
3	Application	39

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF IA TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM		20
	Year: 2017-18		

Name of Course coordinator :
Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM	Cloud computing	20
	Year: 2017-18	Course code: **15CS63B**	

Name of Course coordinator :
Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question		CL	CO	PO
1	Explain the need of cloud computing	(5)	U	1	1,2
2	Illustrate the development of cloud to an organization.	(5)	A	1	1,2
3	Explain and illustrate cloud computing	(5)	U	2	1,2
4	Explain in detail about cloud application architecture	(5)	U	2	1,2

Note: Internal choice may be given in each CO at the same cognitive level (CL).

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

MODEL QUESTION PAPER Code: **15CS63B**

Diploma in Computer Science & Engineering

VI- Semester

Course Title : Cloud Computing

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. Explain the business models around the cloud
2. Explain the characteristics of cloud computing
3. Compare public cloud verses private cloud
4. Explain in detail about cloud application architecture
5. Define Cloud Service. List the main features of cloud services.
6. List the examples of SaaS, PaaS and IaaS.
7. Discuss about Software plus services in brief.
8. Describe Google Map Reduce.
9. Describe the types of server virtualization

.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. List and explain the usage scenarios and applications of cloud.
2. Write advantages and disadvantages of cloud computing
3. Explain the two main sections of cloud computing architecture
4. Explain briefly the cloud infrastructure self service.
5. Discuss about the security aspects of cloud computing
6. Summarize the different forms of testing related to cloud.
7. Write a short note on GFS and HDFS.
8. Explain the Hadoop architecture with the help of a diagram.
9. Compare server virtualization and storage virtualization and network virtualization
10. Explain Aneka hybrid cloud implementation

MODEL QUESTION BANK

Diploma in Computer Science & Engineering
VI Semester
Course Title: Cloud computing

CO	Question	CL	Marks
I	Explain the evolution of cloud computing	R	05
	Why cloud computing?	U	
	Describe the essentials of cloud computing	U	
	Illustrate the development of cloud to an organization	A	
	Explain the benefits and strategies of cloud	U	
	Discuss the limitations of cloud computing	U	
	Explain the business models around the cloud	U/A	
	Explain the characteristics of cloud computing	A	
	Explain the business and it perspectives of cloud	U	10
	Describe in detail cloud computing	U	
	List and explain the usage scenarios and applications of cloud	A	
	Write advantages and disadvantages of cloud computing	U	
	Illustrate the cloud adoption	U	
II	Explain and illustrate cloud computing	U	05
	Discuss about various cloud models	U	
	Write the advantages of cloud computing architecture	U	
	Discuss the value of cloud computing	U	
	Explain cloud infrastructure models	U	
	Compare public cloud verses private cloud	U	
	Explain in detail about cloud application architecture	U	10
	Discuss about various cloud models	U	
	Explain the two main sections of cloud computing architecture	A	
	Describe cloud infrastructure. Explain about each component clearly	A	
	Discuss how do you scale a cloud infrastructure	A	
	Explain regarding different categories of scalability	U	
	Explain briefly the cloud infrastructure self service.	U	
III	Define Cloud Service. List the main features of cloud services.	R	05
	List the advantages of cloud services.	U	
	Describe various modes of software as service.	U	
	Identify the applications of software as service.	A	
	Describe briefly the integration platform as a service.	U	
	List the examples of SaaS, PaaS and IaaS.	A	
	Describe the importance of platform as a service.	U	
	Describe the three main services provided by cloud computing.	A	10
	Explain management as a service.	A	
	Compare the advantages of SaaS, PaaS, IaaS.	U	
	Explain database as a service with a neat diagram.	U	
	Summarize the different forms of testing related to cloud.	A	
	Discuss about the security aspects of cloud computing	U	
IV	Discuss about Software plus services in brief.	U	05
	Explain mobile device integration.	R	
	List the services provided by Microsoft.	U	
	Explain about cast iron cloud.	U	

	Explain Bungee Connect.	**U**	
	Describe Google Map Reduce.	**U**	
	Differentiate between google map reduce and hadoop map reduce.	**U**	
	List the main functions in map reduce. Explain with diagram.	**U**	**10**
	Write a short note on GFS and HDFS.	**U**	
	Explain the Hadoop architecture with the help of a diagram.	**A**	
	Describe the Hadoop Map Reduce framework.	**U**	
V	Define virtualization. Illustrate the pros and cons of virtualization,	**R**	**05**
	Explain virtual machines.	**U**	
	Define virtualization in cluster.	**U**	
	Explain Virtual machine monitor.	**U**	
	Describe the properties of virtual machine.	**U**	
	Distinguish between desktop virtualization and desktop infrastructure virtualization.	**U**	
	Describe briefly the types of virtual machines.	**U**	**10**
	Describe the types of server virtualization	**A**	
	Identify the need of storage virtualization. list the advantages and disadvantages	**A**	
	Define virtual desktop infrastructure. Discuss its advantages and disadvantages.	**U**	
	List the different types of server virtualization. Explain them briefly.	**U**	
	Compare server virtualization and storage virtualization and network virtualization.	**U**	
VI	List and explain various types of clouds.	**U**	**05**
	Compare and contrast different types of cloud approaches.	**U**	
	Explain Aneka Integration of private and public cloud.	**U**	
	Demonstrate Aneka cloud platform.	**U**	
	Explain the overview of comet cloud based applications.	**A**	
	Explain the fundamental cloud functions.	**A**	
	Demonstrate the overlay joins overheads.	**U**	
	Compare and contrast the execution time and utilized funds with or without a scheduling agent	**A**	
	Explain Aneka hybrid cloud implementation	**A**	**10**
	Draw and explain comet cloud architecture.	**A**	
	Explain Autonomic cloud bursting and autonomic cloud bridging.	**A**	
	Explain the autonomic cloud behaviours	**A**	

Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: **MOBILE COMPUTING**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS63C**
	Type of Course: **Lectures, Self Study & Student Activity**	Credit **:04**	Core/ Elective **Elective**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Knowledge of basic concepts of computer networks.

Course Objectives

1. To study the basics of wireless, cellular technology and the working of Mobile IP, ad hoc network, features of mobile operating systems.
2. To know J2ME, SDK, android that helps the mobile application development.
3. To understand the use of M-Commerce application.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO	Teaching Hours
CO1	Recognize and explain wireless and Mobile Communication system and Bluetooth technology.	***R,U***	**1,2,4,9,10**	**06**
CO2	Describe and Differentiate Mobile Computing vs Wireless Networking, GSM,GPRS,UMTS and SDR	***U,A***	**1,2,3,4,9,10**	**16**
CO3	Explain the working of Mobile IP and Mobile Ad Hoc Networks, Vehicular Ad Hoc Network.	***U,A***	**2,3,4,8,9,10**	**12**
CO4	Describe the constraints and survey of commercial mobile Operating Systems.	***U***	**2,10**	**06**
CO5	Discuss and explain Mobile Application Development.	***U,A***	**2,3,4,9,10**	**08**
CO6	Explain different Mobile Commerce applications.	***A***	**2,7,9,10**	**04**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
MOBILE COMPUTING	**3**	**3**	**2**	**2**	**-**	**-**	**1**	**1**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Basics of Communication Technologies	**06**	05	10	05	20	13.79
II	Introduction to Mobile Computing and Wireless Networking	**16**	05	25	10	40	27.60
III	Mobile IP and Mobile Ad Hoc Networks	**12**	05	25	05	35	24.14
IV	Operating Systems for Mobile Computing	**06**	05	10	05	20	13.79
V	Mobile Application Development and Protocols	**08**	-	10	10	20	13.79
VI	Mobile Commerce	**04**	-	05	05	10	6.89
	Total	**52**	**20**	**85**	**40**	**145**	**100**

UNIT I: Basics of Communication Technologies 06 Hrs

Mobile handsets, Wireless Communications and Server Applications, Cell phone System, Types of Telecommunication Networks, Components of wireless communication system, Architecture of mobile telecommunication system, wireless networking standards,

Wireless LANs,Wireless LAN Architecture, Applications of WLANs, Advantages of WLANs over wired LANs, Bluetooth Technology,Protocol stack of Bluetooth.

UNIT II: Introduction to Mobile Computing and Wireless Networking 16 Hrs

Define Mobile Computing, Mobile Computing vs. Wireless Networking, Mobile Computing Application, Characteristics of Mobile Computing, Structure of Mobile Computing Application, Cellular Mobile Communication, Generation of Cellular Communication

Technologies, Global System for Mobile communications(GSM),GSM Services, System Architecture of GSM,GSM security, General Packet Radio Service(GPRS),GPRS Services, GPRS ArchitectureUniversal Mobile Telecommunication System (UMTS),UMTS Network Architecture, SDR, Mobile phone and human body.

UNIT III: Mobile IP and Mobile Ad Hoc Networks(MANET) 12 Hrs

Mobile IP, Packet Delivery, Desirable features of Mobile IP,Key mechanism used in Mobile IP, Route Optimization, Dynamic Host Configuration Protocol(DHCP),significance of DHCP.A Few Basics concepts-How is an Ad Hoc Network setup without the infrastructure Support?, Why is Routing in a MANET a Complex Task?, Characteristics of Mobile Ad Hoc Networks(MANETs)-MANET Operational Constraints, Applications of MANETs, MANET Design issues, Routing ,Vehicular Ad Hoc Networks(VANETs), MANET vs VANET, Security issues in a MANET.

UNIT IV: Operating Systems for Mobile Computing 06 Hrs

A Few Basic Concepts, Special Constraints and Requirements of Mobile OS,A Survey of Commercial Mobile Operating Systems,Windows Mobile, Palm OS, Symbian OS, iOS, Android, Blackberry OS,A Comparative study of Mobile OS,OS for sensor Network.

UNIT V: Mobile Application Development and Protocols 08 Hrs

Mobile Devices as Web Clients ,HDML(Handheld Markup Language) ,WAP, J2ME - J2ME Configuration, Android Application Development - Software Development Kit(SDK), Features of SDK, Android Application Components, Android Software stack Structure, Advantages of Android.

UNIT VI: Mobile Commerce 04 Hrs

Application of M-Commerce,Business to Consumer(B2C) Applications, Business to Business (B2B) Applications,. Structure of M-Commerce, Pros and Cons of M-Commerce, Mobile Payment System,Mobile Payment Schemes, Desirable properties of a Mobile Payment system, Mobile Payment solutions, Process of Mobile Payment, Security Issues.

Text books

1. Fundamentals of Mobile Computing**,** Prasant Kumar Pattanaik, Rajib Mall**,** Second Edition, PHI, ISBN: 978-81-203-5181-3

References

1. Mobile Computing, ASOKE TALUKDER HASAN AHMED ROOPA R YAVAGAL,Second Edition.Mc GrawHill

Suggested student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

1. Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.
2. Each group should conduct different activity and no repeating should occur

1	Give a presentation on call setup between two mobile phones.
2	Prepare a report and demonstrate Bluetooth technology.
3	Prepare a report on the working of GSM and GPRS
4	List and prepare a report any one application used by MANET.
5	With a real world example prepare a report on different mobile payment solutions for different payment schemes.
6	Prepare a report on procedure for working of software in shopping mall.

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1 to 6
				Student activities	05	Report	1 to 6
				Total	**25**		
	SEE	End Exam		End of the course	**100**	Answer scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	45
3	Application	45

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF IA TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM		20
	Year: 2017-18		
Name of Course coordinator : Units:__ CO's:____			

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM	MOBILE COMPUTING	20
	Year: 2016-17	Course code:**15CS63C**	

Name of Course coordinator :
Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	List the types of telecommunication networks and Distinguish between data and voice networks. (5)	R	1	1,2
2	Define mobile computing. Mention at least three applications of mobile computing (5)	R	2	1,2
3	Interpret the necessary of using standard in networking (5)	U	1	1,2
4	List the advantages of GPRS. (5)	U	2	1,2

Note: Internal Choice may be given in each CO at the same cognitive level (CL).

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

MODEL QUESTION PAPER Code: **15CS63C**

Diploma in Computer Science & Engineering

VI- Semester

Course Title : Mobile Computing

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX questions. Each carries 5 marks. 5X6=30 Marks

1. Explain the advantages of wireless LANs.
2. Define mobile computing.Mention at least three applications of mobile computing.
3. Define MANET(Mobile Ad Hoc Network).Explain the schematic model of a MANET.
4. Comparison of features of various mobile Oss
5. Explain the components of Android application.
6. Explain different M-payment schemes (mechanisms) that exist at present.
7. Explain the characteristics of mobile computing.
8. Explain the desirable features of Mobile IP.
9. Define microkernel OS.Give some reasons to prefer microkernel for developing mobile OS.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Discuss the architecture of Mobile telecommunication system using schematic diagram.
2. Explain the various services provided by GSM.
3. Describe the Key mechanism used in Mobile IP.
4. Explain the operation of mobile IP with a help of a suitable schematic diagram(Sequence of steps involved in packet delivery to and from a mobile node)
5. Discuss architecture GPRS using schematic diagram.
6. Explain the special constraints of mobile OS.
7. Explain J2ME configuration.
8. Discuss the Pros and Cons of M-Commerce.
9. Explain WAP Protocol stack.
10. Explain the important design constraints(issues)on a MANET.

MODEL QUESTION BANK

Diploma in Computer Science & Engineering

VI Semester

Course Title: MOBILE COMPUTING

CO	Question	CL	Marks
I	List the types of telecommunication networks and Distinguish between data and voice networks.	R	05
	List the components of wireless communication system and explain any two of them	R U	
	Interpret the necessary of using standard in networking.	U	
	List the IEEE 802.11 standard used in wireless LAN.	R	
	Identify and Explain the components of WLAN	U	
	Summarize the application of Wireless LANs.	U	
	Explain the advantages of wireless LANs.	U	
	Write a note on Bluetooth	U	
	Define piconet and scatternet.	R	
	Explain the function cellular communication system.	U	10
	Compare Data network and voice network and their relative advantages and services	A	
	Identify and overcome the main difficulties if digitalized voice signals are to be transmitted over a data network.	U A	
	Explain the components of wireless communication system.	U	
	Discuss the architecture of Mobile telecommunication system using schematic diagram.	U	
	Explain Architecture of Wireless LAN.(Infrastructure based IEEE 802.11 network).	U	
	Explain application and advantages of WLAN.	U	
	With a neat diagram describe the Bluetooth protocol stack.	A	
II	Define mobile computing. Mention at least three applications of mobile computing	R, A	05
	Explain the characteristics of mobile computing.	R	
	Explain the functions of each tier structure of mobile computing.	U	
	Explain cellular mobile communication.	U	
	Compare 2G and 3G cellular communication technology.	U	
	Summarize the characteristics of cellular technologies.	U	
	Summarize the transport technologies used various generations of cellular networks.	U	
	Explain GSM Security.	U	
	Describe the function of HLR and VLR in call routing and roaming.	U	

	Define GPRS and explain GPRS Services.	**R**	
	List the advantages of GPRS.	**R**	
	List the limitations of GPRS.	**R**	
	Define UMTS. Discuss the dissimilarities between UMTS and GSM.	**U**	
	Explain UMTS Network architecture.	**U**	
	List out the problems faced by human by using mobile phones.	**A**	
	With a neat diagram explain the structure of mobile computing application.	**A**	**10**
	Explain the various services provided by GSM.	**U**	
	With a neat diagram explain the functional architecture of GSM system.	**U**	
	Discuss architecture GPRS using schematic diagram.	**U**	
	Discuss the features and advantages of SDR.	**U**	
III	Define the following mobile IP terms a. Mobile Node b. Foreign Agent c. Foreign Network d. Home Network e. Home agent	**R**	**05**
	Write short notes on the following: a. Correspondent node b. Care-of-Address c. Agent Discovery d. Tunnelling and Encapsulation	**R**	
	Define tunnelling process .	**R**	
	Explain agent advertisement.	**U**	
	Explain agent solicitation.	**U**	
	Discuss the process of packet delivery by suitable example.	**U**	
	Explain the desirable features of Mobile IP.	**U**	
	Explain the Mobile IP mechanism of Discovering the COA.	**U**	
	Explain the Mobile IP mechanism of Registering the COA.	**U**	
	Explain the Mobile IP mechanism of Tunnelling the COA.	**U**	
	Give a brief account of route optimization in mobile IP.	**U**	
	Define binding. Explain the messages transmitted in Optimized mobile IP.	**U**	
	Explain DHCP.	**U**	
	Explain three important mechanisms for IP address allocation by DHCP.	**U**	
	State some applications of DHCP.	**U**	
	Define MANET(Mobile Ad Hoc Network).Explain the schematic model of a MANET.	**U**	
	Compare the MANET routing strategies with the routing strategies of traditional networks.	**U**	

	List the characteristics of MANETs.	**R**	
	List the MANET Operational constraints.	**R**	
	Describe the applications of MANETs.	**A**	
	Define routing. List out the problems arises in MANET by routing.	**U**	
	Explain VANET and few important applications of it.	**A**	
	Compare MANET and VANET.	**U**	
	Write a short note on characteristics of secure MANET.	**U**	
	Explain the characteristics of MANET that can be exploited to cause security vulnerabilities.	**U**	
	Explain the operation of mobile IP with a help of a suitable schematic diagram(Sequence of steps involved in packet delivery to and from a mobile node)	**U**	**10**
	Explain the agent discovery methods.	**U**	
	Describe the Key mechanism used in Mobile IP.	**U**	
	Explain the characteristics of MANETs.	**U**	
	Explain the important design constraints(issues)on a MANET.	**U**	
	Explain security issues in a MANET.	**U**	
IV	Explain the special features that an operating system for a mobile device needs to support compared to the features provided by a traditional operating system.	**U** **A**	**05**
	Define microkernel OS.Give some reasons to prefer microkernel for developing mobile OS.	**U** **A**	
	Write a short on the following commercial OS a. Windows Mobile b. Palm OS c. Symbian OS d. IOS e. Android f. Kernel g. Blackberry OS	**U**	
	Comparison of features of various mobile OS	**U**	
	Explain the important ways in which the operating system for a sensor network is different from a traditional operating system.	**U**	
	List and explain the special constraints of mobile OS	**U**	
	List and explain the special service requirements of mobile OS.	**U**	**10**
V	Explain the problems arise by mobile devices used as a web client.	**U**	**05**
	Explain HDML.	**U**	
	Define WAP. Explain the traditional web access mechanism.	**U**	
	Explain the working of WAP based web access.	**U**	
	Define J2ME.List the applications of J2ME.	**A**	
	Difference between J2ME device and conventional computers.	**U**	
	Define Android and their applications.	**A**	

	Define Android SDK.Compare Java byte code with Android byte code	**A**	
	Explain the features of SDK.	**U**	
	Explain the components of Android application.	**U**	
	List out the Android APIs.	**R**	
	Summarize the advantages of Android	**U**	
	Explain WAP Protocol stack.	**U**	
	Explain J2ME configuration.	**U**	
	Explain J2ME functional architecture.	**U**	**10**
	Explain the structure of Android software stack.	**U**	
VI	Define M-Commerce	**R**	
	List the features required by a mobile device to potentiate M-Commerce.	**A**	
	Explain the Pros(Advantages) of M-Commerce	**A**	
	Discuss the Cons(Disadvantages) of M-Commerce	**A**	**05**
	Define Mobile payment Systems.	**U**	
	Explain different M-payment mechanisms that exit at present	**U**	
	Discuss the different M-payment solution in a M-commerce.	**U**	
	List the characteristics of M-payment system.	**R**	
	Describe the security issues in M-commerce.	**U**	
	Explain B2B Commerce.	**U**	
	Explain B2C Commerce.	**U**	
	List the application of M- Commerce and explain any one application.	**A**	**10**
	Describe the architecture of a M-Commerce	**U**	
	Discuss the Pros and Cons of M-Commerce	**U**	
	Explain different M-payment schemes (mechanisms) that exist at present.	**U**	
	Explain the properties (characteristics) of M-payment system.	**U**	
	Discuss a model of M-payment process	**U**	

Government of Karnataka
Department of Technical Education
Bengaluru

	**Course Title: Internet of Things**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS63F**
	Type of Course: **Lectures, Self Study & Student Activity**	Credit **:04**	Core/ Elective: **Elective**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Basic knowledge computer networks and related courses.

Course Objectives

1. To assess the vision of IoT.
2. To classify Real World IoT applications in various Domains.
3. To understand design methodology for IoT platforms.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Interpret the vision of IoT from a global context.	***R,U***	**1,2,5,6,7,8,9,10**	**12**
CO2	Illustrate the application of IoT in various Domains.	***U, A***	**1,2,4,5,6,8,9,10**	**12**
CO3	Understand the differences and Similarities between IoT and M2M.	***R,U***	**1,2,3,4,5,6,10**	**06**
CO4	Interpretation of different IoT platforms design methodology.	***U A***	**1,2,5,6,8,9,10**	**08**
CO5	Illustration of IoT Physical Devices.	***U, A***	**1,2,5,6,8,9,10**	**08**
CO6	Narration of Ethics in IoT.	***U A***	**1,2,5,6,7,9,10**	**06**
			Total	**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Internet of Things	**3**	**3**	**1**	**2**	**3**	**3**	**2**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Introduction to Internet of Things	**12**	5	20	10	35	24.13
II	Domain specific IoT	**12**	-	20	10	30	20.68
III	IoT and M2M	**06**	5	10	-	15	10.35
IV	IoT Platforms Design Methodology	**08**	-	10	15	25	17.24
V	IoT Physical Devices & Endpoints.	**08**	-	15	10	25	17.24
VI	Ethics in IoT	**06**	-	15	-	15	10.35
	Total	**52**	**10**	**90**	**45**	**145**	**100**

UNIT I: Introduction to Internet of Things 12 Hrs

Definition and characteristics of IoT, Physical design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT, IoT functional blocks, IoT communication Models, IoT communication API's, IoT enabling Technologies Wireless sensor networks, Cloud Computing, Big Data Analytics, Communication protocols, embedded systems. IoT Levels and Deployment templates – IoT Level-1, IoT Level-2, IoT Level-3, IoT Level-4, IoT Level-5, IoT Level-6

UNIT II: Domain specific IoT 12 Hrs

Introduction, Home automation- Smart lighting, smart appliances, intrusion detection, smoke for gas detectors; Cities- Smart Parking, Smart lighting, Smart Roads, Structural Health Monitoring, surveillance, Emergency Response; Environment- Weather monitoring, air pollution monitoring, noise pollution monitoring, forest fire detection, river flood's detection;

Energy- Smart grids, renewable energy systems, prognostics; Retail- Inventory management, smart payments, smart vending machines; Logistics- Route generation and scheduling, Fleet tracking, Shipment monitoring, Remote vehicle diagnostics; Agriculture- Smart Irrigation, Green house control; Industry- Machine diagnosis and prognosis, indoor air Quality monitoring; Health and Life Style- Health and fitness monitoring, Wearable electronics.

UNIT III: IoT and M2M 06 Hrs

Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT- Software defined networking, network function virtualization;

UNIT IV: IoT Platforms Design Methodology 08 Hrs

Introduction, IoT Design and Methodology- Purpose and requirements specification, Process specification, Domain model specification, Information model specification, service specification, IoT level specification, functional view specification, Operational view specification, Device and component integration, application development.

UNIT V: IoT Physical Devices and Endpoints 08 Hrs

What is an IoT device? , Basic Building blocks of an IoT Device, Exemplary Device: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Other IoT devices.

UNIT VI: Ethics in IoT 06 Hrs

Characterizing the IoT, Privacy, Control – Disrupting Control, Crowd sourcing; Environment – Physical thing, Electronics, Internet service; Solutions – The IoT as a part of the solution, cautious optimism,the open IoT definition.

Text Books

1. Internet of Things – A Hands on Approach, By Arshdeep Bahga and Vijay Madisetti Universities Press, ISBN: 9788173719547 (Unit I to V)
2. Designing the Internet of Things – Adrian McEwen & Hakim Cassimality Wiley India, ISBN: 9788126556861 (Unit VI)

References

1. The Internet of Things – Key Applications and Protocols, Wiley Publication, Olivier Hersent, David Boswarthick, Omar Elloumi. ISBN: 9788126557653
2. The Internet of Things , Pearson, By Michael Miller ISBN: 9789332552456
3. http://www.cisco.com/c/dam/en_us/solutions/trends/iot/introduction_to_IoT_november.pdf
4. https://www.bbvaopenmind.com/en/iot-implementation-and-challenges/
5. https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-staff-report-november-2013-workshop-entitled-internet-things-privacy/150127iotrpt.pdf

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1. Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and program coordinator.
2. Each student should conduct different activity and no repeating should occur.

1	Understand the different protocols and their purposes used to communicate in IoT.
2	Learn and Understand different Cloud Platform Services Offered by Vendors.
3	Learn the Deployment steps of any Domain specific IoT Services.
4	Learn/Compare Different Hardware Boards for Creating IoT Services
5	Understand the different functionalities of sensors in IoT Devices.
6	Understand integrating IoT Services to other third party Clouds.
7	Discuss Privacy Issues in IOT
8	Quiz

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1 to 6
				Student activities	05	Report	1 to 6
				Total	**25**		
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: Continuous Internal Evaluation shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	07
2	Understanding	62
3	Application	31

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF IA TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM		20
	Year: 2017-18		
Name of Course coordinator : Units:__ CO's:____			

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM	Internet of Things (IOT)	20
	Year: 2017-18	Course code: **15CS63F**	
Name of Course coordinator : Units:1,2 Co: 1,2			

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Discuss Big Data Analytics role in IoT. (5M) **OR** What is the Role of Things and Internet in IoT? (5M)	U	1	1,2
2	Describe the characteristics of IoT. (5M)	R	1	1,2
3	Describe applications of IoT for Cities. (10M) **OR** Discuss applications of IoT for Logistics. (10M)	A	2	1,2

Note: Internal choice may be given in each CO at the same cognitive level (CL).

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

MODEL QUESTION PAPER Code: **15CS63F**

Diploma in Computer Science & Engineering

VI Semester

Course Title: Internet of Things

Time: **3 Hours** Max Marks**: 100**

PART-A

Answer any SIX full questions. Each carries 5 marks. 5X6=30 Marks

1. Describe an Example of IoT Service that uses publish-subscribe communication Model
2. What are the Differences between Machines in M2M and Things in IoT?
3. Describe the characteristics of IoT.
4. Explain architectural constraints of REST.
5. Discuss noise pollution monitoring and forest fire detection on IoT.
6. Explain Operational view specification with an example.
7. List and explain the functional attributes of an IoT device.
8. How Raspberry pi is different from Desktop Computer?
9. Explain the Privacy v/s the IoT.

PART-B

Answer any SEVEN full questions each carries 10 marks. 10X7=70 Marks

1. Explain IoT Communication Models.
2. Explain the Components of IoT
3. Explain applications of IoT for Retail.
4. Discuss Applications of IoT for Homes.
5. Discuss Smart Irrigation and Green House Control
6. Explain Software Defined Networking (SDN) architecture with neat Diagram.
7. Derive the services from process and information model for Home automation IoT System.
8. List and briefly explain the steps involved in IoT System Design Methodology.
9. Explain in brief the various components and peripherals of Raspberry pi Board.
10. Describe crowd sourcing with an example

MODEL QUESTION BANK

Diploma in Computer Science & Engineering
VI Semester
Course Title: Internet of Things

CO	Question	CL	Marks
I	Describe the characteristics of IoT.	R	05
	Write a Note on Physical Design of IoT	A	
	Explain IoT Functional Blocks.	U	
	Explain IoT Enabling Technologies.	U	
	Discuss Big Data Analytics role in IoT.	U	
	Explain IoT Level-5.	U	
	Describe an Example of IoT Service that uses publish-subscribe communication Model	U	
	Describe an Example IoT Service that uses web socket-based Communication.	U	
	Explain architectural constraints of REST.	U	
	What is the Role of Things and Internet in IoT?	R	
	Discuss IoT Protocols.	A	10
	Explain IoT Communication Models.	A	
	Explain IoT Communication API's	U	
	Explain the Components of IoT	U	
	Discuss IoT Level-1 and IoT Level-2	U	
	Discuss IoT Level-3 and IoT Level-4	U	
II	Explain weather monitoring and air pollution monitoring on IoT.	A	5
	Discuss noise pollution monitoring and forest fire detection on IoT.	A	
	Explain remote vehicle diagnostics using IoT.	A	
	Discuss Smart Irrigation and Green House Control	A	
	Explain the role of IoT in Health and Fitness Monitoring.	A	
	List and Briefly explain Domain Specific IoT Services.	U	
	Discuss Applications of IoT for Homes.	A	10
	Describe applications of IoT for Cities.	A	
	Explain applications of IoT for Energy Systems.	U	
	Explain applications of IoT for Retail.	A	
	Discuss applications of IoT for Logistics.	A	
	Discuss Applications of IoT in Industry.	A	
III	Explain SDN Layers.	U	5
	What are the Differences between Machines in M2M and Things in IoT?	R	
	How do Data Collection and Analysis approaches differ in M2M and IoT.	R	
	What are the differences between SDN and NFV?	U	
	Describe how NFV can be used for virtualizing IoT Devices?	U	
	Explain M2M System architecture.	U	
	Explain the Differences between IoT and M2M	U	

	Explain Software Defined Networking (SDN) architecture with neat Diagram.	**U**	**10**
	Describe NFV architecture with neat block diagram.	**U**	
IV	Explain purpose and requirement specification of IoT Design.	**U**	**5**
	Describe Process specifications for Home Automation IoT Systems.	**A**	
	Describe information Model of the Home automation IoT Systems.	**A**	
	Explain Controller service of Home Automation IoT System.	**A**	
	Explain Operational view specification with an example.	**U**	
	List and Briefly explain the steps involved in IoT System Design Methodology.	**U**	**10**
	Explain Domain Model of the Home automation IoT system.	**A**	
	Derive the services from process and information model for Home automation IoT System.	**A**	
	Explain functional view specification for Home Automation IoT System.	**A**	
V	What is an IoT Device? List Examples.	**U**	**5**
	List and explain the functional attributes of an IoT device.	**A**	
	List and explain Raspberry pi interfaces.	**A**	
	How Raspberry pi is different from Desktop Computer?	**U**	
	List and explain Other IoT Devices.	**U**	
	What's the use of SPI and I2C interfaces on Raspberry pi?	**U**	
	With neat Block diagram explain an IoT Device.	**A**	**10**
	Explain in brief the various components and peripherals of Raspberry pi Board.	**U**	
VI	Illustrate characterizing the Internet of Things.	**U**	**5**
	Explain the ideal ethics for IoT.	**U**	
	Explain the Privacy v/s the IoT	**A**	
	List and explain 5 critical requirements for sensor commons projects.	**A**	
	Explain the environmental issues relating to IoT.	**U**	
	Explain the open Internet of Things definition.	**U**	
	Describe crowdsourcing with an example.	**U**	**10**
	Describe with an example Internet of Things as a part the solutions.	**A**	

Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: Software Testing Lab		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CS64P**
	Type of Course: **Tutorial and Practical's**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Prerequisites

Knowledge about basic JAVA and PHP.

Course Objectives

1. To discuss the distinctions between validation testing and defect testing.
2. To describe the principles of system and component testing .
3. To describe strategies for generating system test cases.
4. To understand the essential characteristics of tool used for test automation.

Course Outcome

On successful completion of the course, the students will be able to attain CO:

Course Outcome		Experiment linked	CL	Linked PO	Teaching Hrs
CO1	Understanding Selenium tool to perform testing	***1 to 4***	***U,A***	1 to 10	**24**
CO2	Writing test suits for applications.	***5 to 8***	***A***	1 to 10	**21**
CO3	Construct and test simple programs.	***9 to 13***	***A***	1 to 10	**21**
CO4	Understanding the use of bug tracking and testing tool Bugzilla, Jira	***14***	***A***	1 to 10	**12**
				Total	**78**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Software Testing lab	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

List of Graded Practical Exercises

Sl.No	Practical/Exercise
1	Understand The Automation Testing Approach (Theory Concept).
2	Using Selenium IDE, Write a test suite containing minimum 4 test cases.
3	Understanding Test Automation. Using Selenium write a simple test script to validate each field of the registration page (Eg: Facebook Registration Page)
4	Install Selenium server and demonstrate it using a script in Java/PHP.
5	Conduct a test suite for any two web sites.
6	Write and test a program to login a specific web page.
7	Write test cases to validate a mobile number using one time pin identification(OTP)
8	Write and Test a program to find out list of employees having salary greater than Rs 50,000 and age between 30 to 40 years.
9	Write and test a program to update 10 student records into table into Excel file.
10	Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
11	Write and test a program to provide total number of objects present / available on the page.
12	Write and test a program to get the number of list items in a list / combo box.
13	Write and test a program to count number of items present on a desktop.
14	Understanding the use of bug tracking and testing tool Bugzilla and Jira
15	Open ended Experiment: Mini Project – Not for exam but to compulsory to be included in Record. (Test cases for Admission form, Shopping cart, Travel Booking, Hotel Booking, Utility Bill Payment..)

Reference

1. Testing in 30+ Open Source Tools, Rahul Shende, Shroff Publishers & Distributor Pvt. Ltd, ISBN 13: 9789350231005 (page numbers from 15 to 117)
2. http://seleniumhq.org/
3. http://sourceforge.net/projects/sahi/
4. http://testng.org/doc/index.html

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1. Each student should conduct different activity and no repeating should occur.

1.	Demonstrate any one open source tool for software other than that used in lab exercises
2.	Prepare test cases for any software application.
3.	Quiz

Course Delivery

The course will be delivered through Demonstration and Practices

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	IA	Students	Two tests (average of two tests)	10	Blue books	1,2,3,4
				Record	10	Record	1,2,3,4
				Student activity.	05	Report.	
				Total	**25**		
	SEE (Semester End Examination)	End Exam		**End of the course**	**50**	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, & 4 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	20
3	Application	70

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (10 marks)
2. Record (10 marks)
3. Student suggested activities report for 5 marks
4. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

Scheme of Valuation for End Examination

SN	Particulars	Marks
1	Writing procedure for two programs	20
2	Execution with results (any one)	20
3	Viva Voce	10
	Total	**50**

***Evaluation should be based on the screen output only. No hard copy required.*

***Change of question is allowed only once. Marks of 05 should be deducted in the given question.*

Resource requirements for Software Testing Lab

(For an Intake of 60 Students [3 Batches])

Sl. No.	Equipment	Quantity
1	Computers	20
2	Internet Connection : Minimum 10 Mbps	Shared for 20
3	Switch – 32 port	01

***Open Source Software should be encouraged*

MODEL QUESTION BANK

1	Install Selenium IDE. Write a test suite containing minimum 4 test cases.
2	Understanding Test Automation. Using Selenium write a simple test script to validate each field of the registration page (Eg: Facebook Registration Page)
3	Install Selenium server and demonstrate it using a script in Java/PHP.
4	Conduct a test suite for any two web sites.
5	Write and test a program to login a specific web page.
6	Write test cases to validate a mobile number using one time pin identification(OTP)
7	Write and Test a program to find out list of employees having salary greater than Rs 50,000 and age between 30 to 40 years.
8	Write and test a program to update 10 student records into table into Excel file.
9	Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
10	Write and test a program to provide total number of objects present / available on the page.
11	Write and test a program to get the number of list items in a list / combo box.
12	Write and test a program to count number of items present on a desktop.
13	Understanding the use of bug tracking and testing tool Bugzilla
14	Understanding the use of bug tracking tool Jira

Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: **Network Security Lab**		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CS65P**
	Type of Course: **Tutorial and Practical's**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Prerequisites

Knowledge of Computer Network Softwares and Components.

Course Objectives

1. Installation of relevant softwares to Demonstrate Virtual box, port scanning, Finding active machines and version of remote OS.
2. Demonstrate active and passive fingerprinting, sniffing the router traffic, use of dumpsec.
3. Perform wireless audit of an access point, ARP poisioning, IPCop installation, study of various crypto algorithms.
4. Demonstrate IDS, Rootkits, Open ssl command, setup and monitoring honeypot.

Course Outcome

On successful completion of the course, the students will be able to attain CO:

Course Outcome		Experiment linked	CL	Linked PO	Teaching Hrs
CO1	Install and demonstrate virtual box or any other equivalent software and Grabbing banner with telnet and netcat	***1, 2***	***A***	1 to 10	**09**
CO2	Demonstrate port scanning, active machines, version of remote OS using NMAP or any other software.	***3,4***	***A***	1 to 10	**12**
CO3	Experiment on active and passive fingerprinting, sniffing the router traffic, use of dumpsec	***5 to 7***	***A***	1 to 10	**15**
CO4	Demonstrate wireless audit of an access point, ARP poisoning, IPCop Firewall installation using relevant softwares.	***8 to 10***	***A***	1 to 10	**18**
CO5	Demostrate different cryptoalgorithms, IDS, Rootkits using suitable softwares.	***11 to 13***		1 to 10	**15**
CO6	Demonstrate open ssl command, setup and monitor honeypot on network.	***14,15***	***A***	1 to 10	**09**
			Total sessions		**78**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Network Security Lab	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

List of Graded Practical Exercises

Sl.No	Practical/Exercise
1	Learn to install Wine/Virtual Box/ or any other equivalent s/w on the host OS
2	Perform an experiment to grab a banner with telnet and perform the task using Netcat
3	Perform an experiment for Port Scanning with nmap, superscan or any other equivalent software
4	Using nmap 1)Find Open ports on a system 2) Find machines which are active 3)Find the version of remote OS on other systems 4)Find the version of s/w installed on other system (using nmap or any othe software)
5	Perform an experiment on Active and Passive finger printing using XProbe2 and nmap
6	Perform an experiment to demonstrate how to sniff for router traffic by using the tool Cain and Abel / wireshark / tcpdump
7	Perform an experiment how to use DumpSec.
8	Perform an wireless audit of an access point / router and decrypt WEP and WPA (softwares netstumbler or airsniff)
9	Perform an experiment to sniff traffic using ARP poisoning
10	Install IPCop on a linux system and learn all the function available on the software.
11	Install JCrypt tool (or any other equivalent) and demonstrate Asymmetric, Symmetric crypto algorithm, Hash and Digital/PKI signatures studied in theory Network Security and Management
12	Demonstrate Intrusion Detection System (IDS) using any tool eg. Snort or any other s/w
13	Install RootKits and study variety of opt
14	Generate minimum 10 passwords of length 12 characters using open ssl command
15	Setup a honey pot and monitor the honey pot on network

Reference

Build Your Own Security Lab: A field guide for network Testing, Michael Gregg, Wiley India edition, ISBN: 9788126516919.

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1. Each individual student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course co-ordinator and programme co-ordinator.
2. Each student should conduct different activity and no repeating should occur.

1.	Demonstration of various software's used for port scanning.
2.	Report on result of various crypto algorithms by using equivalent software.
3.	Prepare a report on firewall along with its uses and functions.

Course Delivery

The course will be delivered through Demonstration and Practices

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	IA	Students	Two tests (average of two tests)	10	Blue books	1,2,3,4,5,6
				Record	10	Record	1,2,3,4,5,6
				Student activity.	05	Report.	
				Total	**25**		
	SEE (Semester End Examination)	End Exam		**End of the course**	**50**	Answer scripts at BTE	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5,6 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	20
3	Application	70

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. Blue books (10 marks)
2. Record (10 marks)
3. Student suggested activities report for 5 marks
4. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the

concerned Course Coordinator for assessing the given activity

Scheme of Valuation for End Examination

SN	Particulars	Marks
1	Record	05
2	Installation of tool (Any two)	15
3	Conduction and Demonstration	20
4	Viva Voce	10
	Total	**50**

***Evaluation should be based on the screen output only. No hard copy required.*

***Change of question is allowed only once. Marks of 05 should be deducted in the given question.*

Resource requirements for Network Security Lab

(For an Intake of 60 Students [3 Batches])

1) For all experiments the student must and should install software's. After the demonstrate the same be uninstalled. Each batch has to learn to install and use the tools. You can use any other equivalent software's other then the mentioned one.

2) The lab should have structured network with 10 mbps internet line. Using Virutal Box, two OS can be installed on one machine, where in one OS acts as a client and other acts a server.

MODEL QUESTION BANK

1	Learn to install Wine/Virtual Box/ or any other equivalent s/w on the host OS
2	Perform an experiment to grab a banner with telnet and perform the task using Netcat
3	Perform an experiment for Port Scanning with nmap, superscan or any other equivalent software
4	Using nmap 1)Find Open ports on a system 2) Find machines which are active 3)Find the version of remote OS on other systems 4)Find the version of s/w installed on other system (using nmap or any othe software)
5	Perform an experiment on Active and Passive finger printing using XProbe2 and nmap
6	Perform an experiment to demonstrate how to sniff for router traffic by using the tool Cain and Abel / wireshark / tcpdump
7	Perform an experiment how to use DumpSec.
8	Perform an wireless audit of an access point / router and decrypt WEP and WPA (softwares netstumbler or airsniff)
9	Perform an experiment to sniff traffic using ARP poisoning
10	Install IPCop on a linux system and learn all the function available on the software.
11	Install JCrypt tool (or any other equivalent) and demonstrate Asymmetric, Symmetric crypto algorithm, Hash and Digital/PKI signatures studied in theory Network Security and Management
12	Demonstrate Intrusion Detection System (IDS) using any tool eg. Snort or any other s/w
13	Install RootKits and study variety of opt
14	Generate minimum 10 passwords of length 12 characters using open ssl command
15	Setup a honey pot and monitor the honey pot on network

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

Course Title: INPLANT TRAINING		
Scheme (L:T:P) : 0:0:4	Total Contact Hours: 52	Course Code: 18CS66P
Type of Course: Periodical Exposure and working in organizational environment	Credit :02	Core/ Elective: Core(Practice)
Only CIE:25 Marks	No SEE	

Prerequisites:

Enthusiasm to explore new things by participating in individual tasks available in outside organizational learning environment and acquires skills from participating in such activities.

Course Objectives:

In plant training is a learning opportunity for students. Students should therefore receive feedback on their performance so that they can grow professionally. Overall professional development of diploma Computer Science engineers is the need of the day for enabling them to sustain in competitive global environment..

COURSE OUTCOME

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Allotted Hours
CO1	Exposure to the organizational environment and recognize the requirement of the organization and cope with the organizational scenario.	**Application/Analysis/Innovative**	2 to 10	4 Hrs/Week
CO2	Identify career paths taking into account their individual strengths and aptitude and prepare a report about the work experience in organization	**Application/Analysis/Innovative**	2 to 10	
CO3	Communicate effectively through technical presentation.	**Application/Analysis/Innovative**	2 to 10	
CO4	Enhancing the employability skills and start-up skills to increase his/her ability to engage in life-long learning.	**Application/Analysis/Innovative**	2 to 10	
CO5	Develop individual confidence to handle various engineering assignments and expose themselves to acquire life skills to meet societal challenges.	**Application/Analysis/Innovative**	2 to 10	
		TOTAL		52 Hours

COURSE-PO ATTAINMENT MATRIX										
Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
INPLANT TRAINING	0	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If >40% sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

1. Inplant training: 52 HRS

A. Introduction

1. Inplant training means a course of training in any organization or establishment undergone by the student of final year diploma in Computer Science Engineering in pursuance of memorandum of understanding between organization and department of the concerned institute or department can make necessary arrangements in the local vicinity industries to get on job learning exposure to the students in industries.
2. Organization means any organization or business in which any trade, occupation or subject field in concerned engineering or technology.
3. The period of inplant training is 52 hours in a semester. The student may be allowed to undergo inplant training in industrial organization on weekly basis preferably Saturday's by allocating four hours per week or a fixed term during semester break or semester beginning ensuring 52 hours of inplant training to the students. The period of training and other modalities will be decided by the respective Head of section/supervisory faculty in consultation with local industrial organization.

B. The Industries where in-plant training can be undergone

1. The supervisory faculty / Head of section / students may identify IT or computer based service / industrial organization preferably in the local vicinity with prior approval of the principal of concerned institution. Structured training to be detailed by the concerned supervisory faculty and a detailed report of the in plant training undergone shall be submitted by the student for evaluation.
2. The students may be allowed to undergo in-plant training in any Government/Private organizations dealing IT/Computer based job or services.

C.Obligation of students

1. Students are required to acquire skills and get industrial exposure in the concerned field of Engineering or Technology conscientiously and diligently during in-plant training.
2. Students must adhere to the rules and regulations stipulated by the in-plant training establishment.
3. Students must be punctual and exhibit good conduct during the training period.

4. Students shall maintain log of activities and submit report on schedule of work entrusted during in-plant training.
5. Students are required undergo in-plant training in stipulated time frame.
6. Students are obligated to get familiar with the process and activities during in-plant training.
7. Students may be encouraged to develop a solution to the tasks/problems related to the software development/networking/software testing/ servicing to acquire knowledge and to reciprocate to the industrial needs.

D. Monitoring of Inplant Training

1. The Head of section shall prepare batches of students and allocate a supervisory faculty to each batch. Supervisory faculty shall assist students in identifying industrial organisation and monitor the activities of the students during the schedule of training.
2. The concerned supervisory faculty in consultation with respective industrial organisation shall review the progress of students undergoing inplant training in a time frame. The head of section must take complete responsibilities in organising inplant training.
3. Student undergoing in-plant training in the respective branch of Engineering in any establishment shall be treated as a trainee. The provision of any law with respect to labour will not apply to such a trainee
4. It shall not be obligatory on the part of the Employer / Organization to offer any stipend and other welfare amenities available, if any, to the students undergoing in-plant training. However, if the organization desirous to do so, at will be a privilege for the students.

E- Continuous Internal Examination-CIE- Scheme of evaluation

SL No	Particulars	Marks
1	Visiting Organization	10
2	Submission of report	10
3	Viva-voce	05
	TOTAL	25

F. Course Assessment and Evaluation Scheme for Project work

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment met	CIE	IA	Students	CIE	25	Report and Log of sheets	CO1, CO2, CO3,CO4,CO5
	SEE	End Exam		SEE	No End Examination		
Indirect Assessment	Student Feedback on course		Students	Middle of the course	Feedback forms		CO1, CO2 Delivery of course
	End of Course Survey			End of the course	Questionnaires		CO1 to CO5 Effectiveness of Delivery of instructions & Assessment Methods

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Note to IA verifier*: *The following documents to be verified by CIE verifier at the end of semester

1. **Student activities / Inplant Training to be assessed through Rubrics.**
2. **Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.**

ANNEXURE

REPORT ON INPLANT TRAINING

FORMAT FOR PREPARATION OF TRAINING REPORT

ARRANGEMENT OF CONTENTS:

The sequence in which the training report material should be arranged and bound as follows:

1. **Cover Page**
2. **Inner Title Page (Same as cover page)**
3. **Certificate by Company/Organization/Institute (Optional)**
4. **Acknowledgement**
5. **About the organization**
6. **Table of Contents**
7. **List of Tables**
8. **List of Figures**
9. **Abbreviations and Nomenclature(If any)**
10. **Chapters**
11. **References**
12. **Data Sheet(If any)**
13. **Appendices (If any)**

The tables and figures shall be introduced in the appropriate places.

TYPING INSTRUCTIONS:

1. **The Inplant training report must be submitted in Two Copies (one for department and 2nd for library) duly signed by the HOD. Students should also submit the soft copy on CD in pdf format in the library.**
2. **The length of the training report may be about 40 to 50 page.**
3. **The training report shall be computer typed (English- British, Font -Times Roman, Size-12 point) and printed on A4 size paper.**
4. **The training report shall be hard bound with cover page in pink colour. The name of the students, degree, duration of training period, institute name shall be printed in Bold Black letters on the cover page**
5. **The training report shall be typed with 1.5 line spacing with a margin 3.5 cm on the left, 2.5 cm on the top, and 1.25 cm on the right and at bottom. Every page in the report must be numbered. The page numbering from acknowledgements and till the beginning of the introductory chapter, should be printed in small Roman numbers, i.e, i, ii, iii, iv..... The page number of the first page of each chapter should not be printed (but must be accounted for). All page numbers from the second page of each chapter should be printed using Arabic numerals, i.e. 2,3,4,5... All printed page numbers should be located at the bottom centre of the page.**
6. **In the training report, the title page [Refer sample sheet (inner title pages)] should be given first and printed in black letters.**
7. **The table of contents should list all headings and sub-headings. The title page and certificates will not find a place among the items listed in the Table of Contents. One and a half line spacing should be adopted for typing the matter under this head.**
8. **The list of tables should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.**
9. **The list of figures should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head.**
10. **The list of symbols, abbreviation & nomenclature should be typed with one and a half line spacing. Standard symbols, abbreviation etc should be used.**
11. **Training report should consist of following chapters.**
    a. **Chapter 1- Introduction**
    b. **Chapter 2- Details of department/Areas where the student undergone**

training.

(Report shall have chapters and each chapter should be numbered separately. A chapter may be further divided into several divisions and sub-divisions depending on the content

c. **Chapter 3- PO/Skills attained by training.**
d. **Chapter 4- Conclusion by the student**

Government of Karnataka
Department of Technical Education
Bengaluru

	**Course Title: Project Work- II**		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CS67T**
	Type of Course: **Lectures, Self Study & Student Activity**	Credit **:03**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 50 Marks

Pre requisites

Application learned concepts form the previous semester studied courses.

Course Objectives

1. Learn the objective of this project is to provide opportunity for the students to implement their skills acquired in the previous semesters to practical problems/problems faced by industry/development of new facilities
2. Make the students come up with innovative/ new ideas in his area of interest.
3. Identify, analyze and develop opportunities as well as to solve broadly defined Computer Science & Engineering problems
4. Enhance students' appreciation of the values of social responsibility, legal and ethical principles, through the analysis and discussion of relevant articles and real time projects

Course outcome

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Allotted hours
CO1	Get an idea and confidence in designing, analysing and executing the project.	Analysis / creation	1 to 10	**6hrs/Week**
CO2	Apply the knowledge of latest trends in software development engineering and relate their ideas while executing the project	Analysis / creation	1 to 10	
CO3	Have complete understanding of Executing the project	Analysis / creation	1 to 10	
CO4	Prepare documents in team and enhance his written and oral communication presentations.	Analysis / creation	1 to 10	
CO5	Develop individual confidence to handle various engineering assignments and expose themselves to acquire life skills to meet societal challenges	Analysis / creation	1 to 10	
			TOTAL	**78 Hours**

Mapping Course Outcomes With Program Outcomes

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments a practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communicati on	Life long learning
PROJECT WORK	3	3	3	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
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PROJECT WORK: 78 HRS

INTRODUCTION

The objective of the project work is to enable the students in convenient groups of minimum of 3-4 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution. Six periods per week shall be allotted in the time table and this time shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.

ROAD MAP FOR THE PROJECT

1. Carry out a session or a seminar from the ISTE Student Chapter coordinator / Programme coordinator with the help of Innovation club / I I I cell for directing the students to identify project areas in the field of their interested including interdisciplinary areas.
2. Power point presentation in seminar should include detail description of project areas related to program, Project report formats, developing personnel writing skills.
3. The Students/Departments may at liberty to form the batch not less than 3 and maximum 4 and get registered with project coordinator / HOD at the end of V semester.
4. Students should take the approval from the Project committee/ Head of department for doing project.
5. After approval the batch of students will be published in department notice board along with guide in the end of 5^{th} semester.
6. All students should finalize their Project immediately before commencement of SEE of 5^{th} semester.
7. The types of project may include:
    - Preparation of a feasibility report
    - Design and development system
    - The improvement of existing system
    - Creation of New facilities

8. The project should be challenging but manageable within the resources and time

available.

9. Students should undergo reviews for one times in 5th semester and at least 4 times in 6th semester during the internal assessment. Time table for IA should include project review. The guide should monitor the progress of Project work periodically and it should be finally evaluated for 25 marks at the end of 5th semester and for 25 marks at the end of 6th semester.
10. The IA marks will be evaluated based on oral presentation and assessment by the internal guide by adopting Rubrics being developed by Project committee.
11. Real time problems, Industry related problems, should be chosen and it is a Responsibilities of the project committee / Programme coordinator/ Innovation club / I.I.T. cell to choose the appropriate project and to accept the Project Proposal
12. **Identification of Topic:** The selection of topic is of crucial importance. It should be field of interest. It is advisable to choose the project can be completed on time and within the budget and resources. The topic should be clear, directional, focussed and feasible.
13. An outline of project proposal submitted & synopsis from student will initiate a dialogue between Student and Project coordinator who will then help you to work on the chosen topic and report.

Thrust areas identified for Project work

Each student may be assigned any one of the following types of project/thesis work:

According to the local needs, the following major projects are suggested:

Automation of booking in Hotel booking, Train / Bus reservation, Time table schedule, Cloud based projects, Robotic programming, Mobile Applications or any other software automation system that is need of the hour. Hardware projects related to IOT, robotics programming involving Python, Raspberry PI etc., may also be encouraged.

Course Assessment and Evaluation Scheme for Project work

<table>
<tr><th></th><th colspan="2">What</th><th>To whom</th><th>When/Where (Frequency in the course)</th><th>Max Marks</th><th>Evidence Collected</th><th>Course out comes</th></tr>
<tr><td rowspan="3">Direct Assessment met</td><td rowspan="2">CIE</td><td rowspan="2">IA</td><td rowspan="3">Students</td><td>CIE
(At the end of 6th semester)</td><td>25</td><td>1. Project Synopsis.
2. Plan & Schedule
3. Industrial visit report</td><td>CO1, CO2, CO3,CO4,CO5</td></tr>
<tr><td>SEE
End of the course</td><td>50</td><td>1. Project Report.
2. Presentation hand outs.
3. Project Model</td><td>CO1, CO2, CO3,CO4,CO5</td></tr>
<tr><td>SEE</td><td>End Exam</td><td>End of the course</td><td colspan="3">Project report and project model / Study report</td></tr>
<tr><td>Assessment</td><td colspan="2">Student Feedback on course</td><td>Students</td><td>Middle of the course</td><td colspan="2">Feedback forms</td><td>CO1Delivery of course</td></tr>
</table>

	End of Course Survey		End of the course	Questionnaires	CO1 to CO5 Effectiveness of Delivery of instructions & Assessment Methods

*__CIE__ – Continuous Internal Evaluation *__SEE__ – Semester End Examination

Project report

The Project Report should consist of following items.

1. The project report must contain the following:

- Introduction
- Objectives
- Tools/Environment Used
- Analysis Document (This should include SRS in proper structure based on Software Engineering concepts, E-R diagrams/Class diagrams/any related diagrams (if the former are not applicable), Data flow diagrams/other similar diagrams (if the former is not applicable), Data dictionary)
- Design Document (Modularization details, Data integrity & constraints including database design, Procedural design, User interface design)
- Program code (Complete code (well indented)/Detailed specification instead of code*, Comments & Description. The program code should always be developed in such a way that it includes complete error handling, passing of parameters as required, placement of procedure/function statements as needed.)
- Testing (Test case designs are to be included separately for Unit testing, Integration testing, System testing; Reports of the outcome of Unit testing, Integration testing, System testing are to be included separately. Also, details of debugging and code improvement are to be included.)
- Input and Output Screens
- Implementation of Security for the Software developed (In case, you have set up a User Name and Password for your software, you should ensure the security of User Name and Password during transmission to server)
- Limitations of the Project
- Future Application of the Project
- References and Bibliography

2. Project reports should be typed neatly in Times New Roman letters with font size 14 for titles and 12 for text on both sides of the paper with 1.5 line spacing on a A4 size paper (210 x 297 mm). The margins should be: Left - 1.5", Right - 1", Top and Bottom - 0.75".

3. The total number of reports (**Soft bound**) to be prepared are

- One copy to the department /library
- One copy to the concerned guide(s)
- One copy to the candidate.

2. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.

4. Every copy of the report must contain

- Inner title page (White)
- Outer title page with a plastic cover
- Candidate declaration and Certificate in the format enclosed both from the institution and the organization where the project is carried out.
- An abstract not exceeding 100 words, indicating salient features of the work.

5. The organization of the report should be as follows

1. Inner title page 2. Table of Contents 3. Candidate Declaration……i 4. Project guide Certificate…….ii 5. Certificate……...iii 6. Acknowledgments……..iv 7. List of table & figures (optional)……v 8. Abstract……...vi 9. Chapter 1……..1 to n ….. ….. References / Bibliography	Usually numbered in roman

Chapters(to be numbered in Arabic) containing Introduction-, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.

The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.

The **chapter must be left or right justified** (**font size** 16). Followed by the **title of chapter centred** (**font size 18**), **section/subsection numbers along with their headings must be left justified** with **section number and its heading in font size** 16 and **subsection and its heading in font size** 14. The **body or the text** of the report should have font size 12.

The figures and tables must be numbered chapter wise

The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.

Reference or Bibliography: The references should be **numbered serially** in the order of their occurrence in the text and their numbers should be indicated within square

brackets for e.g. [3]. The section on references should list them in serial order in the following format.

1. For textbooks –
2. For papers – Y
3. Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g.

- **V = IZ** ..... **(3.2)**

All equation numbers should be right justified.

CIE ASSESSMENT FOR FINAL REVIEW (VI Semester)

SN	Particulars	Marks
1	Log of Activity (Plan & Schedule)	05
2	Report	10
3	Presentation	10
	Total	25

Project Review Committee should consists of

1. Head of the Department
2. Two Staff members of the Department
3. Course Co-ordinator
4. Representative from Innovation Club of the Polytechnics/Engineering faculty/ Industry Institute Interaction Cell.

All students of 6th Semester should compulsorily attend each Review Proceedings of the meeting should be maintained in the department and shown during I.A. Verification.

STAGES OF PROJECT REVIEW IN 6TH SEMESTER

Review	Activity
I Review	Presentation on (a)data collected, (b) processing of Data (c) Experimental work conducted , (d) Finalization of contents of the project
II Review	Presentation on (a) Results,(b) Discussion of Results (c) Conclusions Submission of Draft copy of Project Report
III Review	Final Project Presentation and submission of Project Report

SCHEME OF EVALUATION (SEE)

SN	Particulars	**Marks**
1	Presentation	20
2	Demonstration	20
3	Viva-Voce	10
	TOTAL	**50**

MODEL OF RUBRICS FOR ASSESSING REVIEWS OF PROJECT FOR CIE

Student name	Reg. no	Dimension	Scale					Students Score				
			Unsatisfactory	Developing	**satisfactory**	Good	Exemplary	1	2	3	4	5
		Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic					
		Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles					
		Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.					
		Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount					
							Grand Average/Total					

APPENDIX 1 (Cover page)

(A typical Specimen of Cover Page)<Font Style Times New Roman – Bold>

TITLE OF PROJECT REPORT

<Font Size 18><1.5 line spacing>

A PROJECT REPORT

<Font Size 14>

Submitted by

<Font Size 14><Italic>

NAME OF THE CANDIDATE(S)

<Font Size 16>

in partial fulfillment for the award of the diploma

of

<Font Size 14><1.5 line spacing><Italic>

DIPLOMA IN PROGRAMME

<Font Size 16>

IN

DEPARTMENT OF ENGINEERING

<Font Size 14>

LOGO

NAME OF THE COLLEGE

<Font Size 14>

DEPARTMENT OF TECHNICAL EDUCATION

BENGALURU-560001

<Font Size 16><1.5 line spacing>

Year of submission: (MONTH & YEAR)

<Font Size 14>

APPENDIX 2 (Title page)

(A typical Specimen of Title Page) <Font Style Times New Roman – Bold>

A Project Report
on

<TITLE OF THE PROJECT WORK>

Submitted for partial fulfilment of the requirements for the award of the
of

DIPLOMA IN COMPUTER SCIENCE AND ENGINEERING

BY
BATCH
<Mr. / Ms. Name of the Student (Reg No.)>
<Mr. / Ms. Name of the Student (Reg No.)>
<Mr. / Ms. Name of the Student (Reg No.)>
<Mr. / Ms. Name of the Student (Reg No.)>
<Mr. / Ms. Name of the Student (Reg No.)>

Under the guidance of

<Name of the Staff>
Lecturer
Department of

Department of
<<NAME OF INSTITUTE>>
<<ADDRESS OF INSTITUTE>>

APPENDIX 3 (Candidate declaration)

CANDIDATE'S DECLARATION

I, _____ the student of Diploma in Computer Science and Engineering Department bearing Register Number _____of _____ Polytechnic, hereby declare that, I owe full responsibility for the information, results and conclusions provided in this project work titled "_____" submitted to **Board of Technical Examinations, Government of Karnataka** for the award of ***Diploma in Computer Science and Engineering***. To the best of my knowledge, this project work has not been submitted in part or full elsewhere in any other institution/organization for the award of any certificate/diploma/degree. I have completely taken care in acknowledging the contribution of others in this academic work. I further declare that in case of any violation of intellectual property rights and particulars declared, found at any stage, I, as the candidate will be solely responsible for the same.

Date:

Place: **Signature of candidate**

Name: _____

Reg No: _____

APPENDIX 4 (Project Guide Certificate)

(A typical specimen of Bonafide Certificate)
<Font Style Times New Roman>

Name of the institute
<Font Style Times New Roman – size -18>

Department
<Font Style Times New Roman – size -16>

BONAFIDE CERTIFICATE

<Font Style Times New Roman – size -16>

<Font Style Times New Roman – size -14>

Certified that this project report **"_____TITLE OF THE PROJECT _____"**is the bonafide work of "**_____NAME OF THE CANDIDATE(S)_____" bearing Register Nos "_____"** of this institution who carried out the project work under my supervision.

<<Signature of the Project Guide>>

SIGNATURE

<<Name>>

Guide

<<Department>>
<<Full address of the Dept & College >>

<<Signature of the Head of Department>>

SIGNATURE

<<Name>>

Head of Department
<<Academic Designation>>
<<Full address of the Dept & College

APPENDIX 5 (Certificate)

DEPARTMENT OF TECHNICAL EDUCATION

NAME OF THE INSTITUTION

Address with pin code

Department of _____

CERTIFICATE

Certified that this project report entitled **"**_____**"**which is being submitted by Mr./Ms._____, Reg. No_____, a bonafide student of _____in partial fulfilment for the award of **Diploma in _____Engineering** during the year _____is record of students own work carried out under my/our guidance. It is certified that all corrections/suggestions indicated for internal Assessment have been incorporated in the Report and one copy of it being deposited in the polytechnic library.

The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said diploma.

It is further understood that by this certificate the undersigned do not endorse or approve any statement made, opinion expressed or conclusion drawn there in but approve the project only for the purpose for which it is submitted.

(Name) Guide(s)	(Name) Head of Department	(Name) Principal

Name and signature Examiner

1 _____

2 _____

APPENDIX-6 (PROJECT-TIME LINE)

SL.No	Task	Responsibility	V Semester				VI Semester						
			1 to 2	3	4 to 6	7 to 14	1	2 to 3	4	5 to 10	11 to 12	13	14
1	Seminar regarding Project work	HOD / coordinator											
2	Batch formation &Guide allocation	HOD											
3	Identification of project	Students / Guide											
4	Project synopsis Submission	Students											
5	Finalizations of Project	Students / Guide											
6	Literature survey	Students / Guide											
7	Identification of facility to do PW	Guide											
8	Study & design of system and Phase 1 presentation	Students / Guide											
9	Results discussion / performance testing	Students											
10	Review of Project work by guide	Students											
11	Project report submission and Phase 2 presentation	Students / Guide											