

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

WORK INTEGRATED LEARNING PROGRAMMES

COURSE HANDOUT

Part A: Content Design

Course Title	SOFTWARE TESTING METHODOLOGIES
Course No(s)	SS ZG552/SE ZG552
Credit Units	4
Course Author	
Version No	
Date	

Course Objectives

No	Objective
CO1	The course aims at providing a sound conceptual foundation in the area of Software Testing Methodologies with emphasis on concepts and techniques for testing and analysis of software
CO2	The testing of software, at a unit, subsystem and system level. Various test techniques: specification based testing and code based testing. Techniques and methods for software test generation and validation.
CO3	The Software Analysis: Static and Dynamic. Test adequacy. Testing Object Oriented Software. The types of software testing: Regression and interoperability. The software test processes and management

Text Book(s)

T1	Software Testing – A Craftsman’s Approach, Fourth Edition, Paul C Jorgenson, CRC Press
T2	Foundations of Software Testing, Second Edition, Aditya P Mathur, Pearson

Reference Book(s) & other resources

R1	The Art of Software Testing, Third Edition, Glenford J. Myers, Tom Badget, Corey Sandler,
R2	Software Testing and Quality Assurance – Theory and Practice, Kshirasagar Naik, Priyadarshi Tripathy, Wiley, 2013
R3	Testing Object Oriented Systems: Models, Patterns and Tools, Robert V Binder, Addison Wesley
R4	Guide to Software Engineering Body of Knowledge, Version 3, IEEE

Content Structure

Module 1: Introduction to Software Testing & Techniques

Topic No.	Topic Title	Reference
1.1	Introduction to Software Testing	Lecture Notes

1.2	Overview of the Course	Lecture Notes
1.3	Software Testing Techniques	T1 Chapter 1 & T2 Chapter 1
1.4	Software Testing – Quality Attributes, Types and Levels	T1 Chapter 1 & T2 Chapter 1

Module 2: Mathematics & Formal Methods

Topic No.	Topic Title	Reference
2.1	Permutations and Combinations	Lecture Notes & Slides
2.2	Propositional Logic	T1 3.4
2.3	Discrete Math	T1 Chapter 3
2.4	Graph Theory	T1 Chapter 4

Module 3: Specification Based Testing

Topic No.	Topic Title	Reference
3.1	Specification Based Testing – Overview	Lecture Notes
3.2	Equivalence Class	T1 Chapter 6
3.3	Boundary Value Analysis	T1 Chapter 5
3.4	Example & Case Study	Lecture Notes, T1 Chapter 6 & 5

Module 4: Specification Based Testing

Topic No.	Topic Title	Reference
4.1	Domain Testing	T2 Chapter 3
4.2	Combinatorial	Lecture Notes
4.3	Decision Table Based Testing	T1 Chapter 7
4.4	Example & Case Study	T1 Chapter 7 & Lecture Notes

Module 5: Code Based Testing

Topic No.	Topic Title	Reference
5.1	Code Based Testing – Overview	Lecture Notes
5.2	Path Testing	T1 Chapter 8
5.3	Examples	T1 Chapter 8

Module 6: Code Based Testing

Topic No.	Topic Title	Reference
6.1	Data Flow Testing	T1 Chapter 9
6.2	Path Based Testing – Metric	T1 Chapter 8 & Lecture Notes
6.3	Examples	T1 Chapter 9 & T1 Chapter 8

Module 7: Model Based Testing

Topic No.	Topic Title	Reference
7.1	Model Based Testing – Introduction & Overview	T1 Chapter 12
7.2	Finite State Machines & Fault Model	T2 Chapter 5

7.3	Examples	T1 Chapter 17
7.4	Case Study	Lectures Notes & T1 Chapter 17

Module 8: Model Based Testing

Topic No.	Topic Title	Reference
8.1	Model Based Testing – Systems	T1 Chapter 17
8.2	Model Based Testing – System of Systems	T1 Chapter 17 & T2 Chapter 5
8.3	Example	T1 Chapter 17 & Lecture Notes
8.4	Cases Study	T1 Chapter 17 & Lecture Notes

Module 9: Object Oriented Testing

Topic No.	Topic Title	Reference
9.1	OO Software & OO Software test – Introduction & Overview	Lecture Notes & T1 Chapter 15
9.2	Issues in Testing OO Software	T1 Chapter 15
9.3	OO Unit Testing	T1 Chapter 15
9.4	Examples	T1 Chapter 15 & Lecture Notes

Module 10: Object Oriented Testing

Topic No.	Topic Title	Reference
10.1	OO Integration Testing	T1 Chapter 15
10.2	OO System Testing	T1 Chapter 15
10.3	OO – GUI Testing	T1 Chapter 15 & Lecture Notes
10.4	Examples & Cases	T1 Chapter 15 & Lecture Notes

Module 11: Integration Testing

Topic No.	Topic Title	Reference
11.1	Integration Testing – Introduction, Overview & Issues	T1 Chapter 13
11.2	Integration Testing – Types & Strategies	T1 Chapter 13
11.3	Examples	T1 Chapter 13
11.4	Cases	T1 Chapter 13 & Lecture Notes

Module 12: System Testing

Topic No.	Topic Title	Reference
12.1	System Testing – Introduction, Overview & Issues	T1 Chapter 14
12.2	Systems Testing – Types, Techniques & Strategies	T1 Chapter 14
12.3	Examples	T1 Chapter 14 & Lecture Notes

Module 13: Life-Cycle Based Testing

Topic No.	Topic Title	Reference
13.1	Life-Cycle Based Testing – Overview and Perspective	T1 Chapter 11
13.2	Life-Cycles – Water fall, Iterative, and Agile	T1 Chapter 11

13.3	Implications and issues, Strategies & Models	T1 Chapter 11
13.4	Example and Case	Lecture Notes

Module 14: Test Adequacy and Enhancement

Topic No.	Topic Title	Reference
14.1	Test Adequacy – Need & Overview	T2 Chapter 7
14.2	Test Adequacy Assessment – Data Flow	T2 Chapter 7
14.3	Test Adequacy Assessment – Control Flow	T2 Chapter 7
14.4	Examples & Cases	T2 Chapter 7 & Lecture Notes

Module 15: Regression Testing

Topic No.	Topic Title	Reference
15.1	Need, Motivation & Techniques	T2 Chapter 9
15.2	Regression Testing – Test Selection (Execution Trace)	T2 Chapter 9
15.3	Regression Testing – Test Selection (Dynamic Slicing)	T2 Chapter 9

Module 16: Test Case Minimization, Prioritization & Optimization

Topic No.	Topic Title	Reference
16.1	Minimization, Prioritization & Optimization Techniques	T2 Chapter 9
16.2	Test Selection Algorithms	T2 Chapter 9
16.3	Examples	T2 Chapter 9

Module 17: Testing Non-functional Requirements

Topic No.	Topic Title	Reference
17.1	Reliability Analysis	T2 Chapter 9, R1
17.2	Fault Tolerance	T2 Chapter 9, R1
17.3	Examples	T2 Chapter 9, R1

Learning Outcomes:

No	Learning Outcomes
LO1	Introduce the course and course handout. Bring a perspective of need and motivation for this course. Provide an overview of the course, quality attributes, levels and types of Testing
LO2	Provide a base to the software testing techniques in form of mathematics and formal methods. Review topics of permutation/combination, discrete mathematics and graph theory. Focus is on the relevance to software testing.
LO3	Bring an approach to look at the system from specification perspective. Learn the relevant techniques for testing specifications – Equivalence Class, Boundary Value Analysis, Combinatorial, Decision Tables and Domain Testing
LO4	Take a code level approach to testing and assuring quality. Learn the relevant techniques for testing code – Path Based Testing and Data Flow Testing

LO5	Introduce Model Based Testing. Various Model for Software testing, their choice and techniques. Learn Finite State Machine, Petri Nets and State Charts. Learn to use these to derive testing cases
LO6	Understand the issues in OO Software Testing. Learn techniques and sublets of Unit, Integration and Systems Testing of OO Software. GUI Testing for OO Software
LO7	Overview and need for Integration and Systems Testing of Software. Learn the techniques of Integration and Systems Testing
LO8	Provide an overview from a life-cycle perspective of Software and Software Products. Agile Testing and Agile Model-Driven Development. Role of Test engineers in life-cycle-based testing
LO9	Learn the need for test adequacy and need for enhancement of test cases. Various techniques and criteria for measuring of test adequacy (data and control flow). Using the criteria to enhance test cases.
LO10	Explore and understand the need for minimization and prioritization. Review the regression test problem. Selection of test cases for regression.

Part B: Contact Session Plan

Academic Term	Second Semester 2022-2023
Course Title	Software Testing Methodologies
Course No	SS ZG552/SE ZG552
Lead Instructor	Harsh Tarneja

Glossary of Terms

- Contact Hour (CH) stands for a hour long live session with students conducted either in a physical classroom or enabled through technology. In this model of instruction, instructor led sessions will be for 22 CH.
 - Pre CH = Self Learning done prior to a given contact hour
 - During CH = Content to be discussed during the contact hour by the course instructor
 - Post CH = Self Learning done post the contact hour
- Contact Hour (CS) stands for a two-hour long live session with students conducted either in a physical classroom or enabled through technology. In this model of instruction, instructor led sessions will be for 11 CS.
 - Pre CS = Self Learning done prior to a given contact session
 - During CS = Content to be discussed during the contact session by the course instructor
 - Post CS = Self Learning done post the contact session
- RL stands for Recorded Lecture or Recorded Lesson. It is presented to the student through an online portal. A given RL unfolds as a sequences of video segments interleaved with exercises
- SS stands for Self-Study to be done as a study of relevant sections from textbooks and reference books. It could also include study of external resources.
- LE stands for Lab Exercises
- HW stands for Home Work.
- M stands for module. Module is a standalone quantum of designed content. A typical course is delivered using a string of modules. M2 means module 2.

Teaching Methodology (Flipped Learning Model)

The pedagogy for this course is centered around flipped learning model in which the traditional class-room instruction is replaced with recorded lectures to be watched at home as per the student's convenience and the erstwhile home-working or tutorials become the focus of classroom contact sessions. Students are expected to finish the home works on time.

Contact Session Plan

- Each Module (M#) covers an independent topic and module may encompass more than one Recorded Lecture (RL).
- **Contact Sessions (2hrs each week)** are scheduled alternate weeks after the student watches all Recorded Lectures (RLs) of the specified Modules (listed below) during the previous week
- In the flipped learning model, Contact Sessions are meant for in-classroom discussions on cases, tutorials/exercises or responding to student's questions/clarification--- may encompass more than one Module/RLs/CS topic.
- Contact Session topics listed in course structure (numbered CSx.y) may cover several RLs; and as per the pace of instructor/students' learning, the instructor may take up more than one CS topic during each of the below sessions.

Detailed Structure

Introductory Video/Document: << *Introducing the faculty, overview of the course, structure and organization of topics, guidance for navigating the content, and expectations from students*>>

- Each of the sub-modules of **Recorded Lectures** (RLx.y) shall delivered via **30 – 60mins videos** followed by:
- **Contact session** (CSx.y) of 2Hr each for illustrating the concepts discussed in the videos with exercises, tutorials and discussion on case-problems (wherever appropriate); contact sessions (CS) may cover more than one recorded-lecture (RL) videos.

Course Contents

Contact Hour 1

Time	Type	Description	Content Reference
Pre CH	RL1.1	Introduction to Software Testing	Lecture Notes & Slides
	RL1.2	Overview of the Course	Lecture Notes & Slides
	RL1.3	Software Testing Techniques	T1 Chapter 1 & T2 Chapter 1
	RL1.4	Software Testing – Quality Attributes, Types and Levels	T1 Chapter 1 & T2 Chapter 1
During CH	CH1	CH1.1 = Specification-Based Versus Code Based Testing debate CH1.2 = Fault Taxonomies CH1.3 = Requirements, Behaviour & Correctness CH1.4 = Correctness Versus Reliability CH1.5=Test Metrics	T1 1.4.3 T1 1.5 T2 1.3 T2 1.4 T2 1.6
Post CH	SS1	SS1.1 Quality Attributes SS1.2 Test Techniques	
	HW1	None	
	LE1	None	
	QZ1	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 2

Time	Type	Description	Content Reference
Pre CH	RL2.1	Permutations and Combinations	Lecture notes & Slides
	RL2.2	Propositional Logic	T1 3.4
	RL2.3	Discrete Math	T1 Chapter 3
During CH	CH2	CH2.1 = Examples for Permutations & Combinations CH2.2 = Examples for Propositional Logic CH2.3 = Examples on Set Theory CH2.4 = Probability Theory	T1 Chapter 3 (Develop examples to understand the theory and its application from Software Testing Perspective)
Post CH	SS2	SS2.1 Map Test Technique and Math Concepts SS2.2 Study of Chapter 3	
	HW2	None	
	LE2	None	
	QZ2	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 3

Time	Type	Description	Content Reference
Pre CH	RL2.4	Graph Theory	T1 Chapter 4
During CH	CH3	CH3.1 = Graphs for testing – FSM CH3.2 = Graphs for testing – Petri Nets CH3.3 = Graphs for testing – EDPN CH3.4 = Graphs for testing – StateCharts	T1 4.3.2 T1 4.3.3 T1 4.3.4 T1 4.3.5
Post CH	SS3	SS2.2 Study of Chapter 4	
	HW3	None	
	LE3	None	
	QZ3	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 4

Time	Type	Description	Content Reference
Pre CH	RL3.1	Specification Based Testing – Overview	Lecture Notes & T1 1.4.3
	RL3.2	Equivalence Class	T1 Chapter 6

	RL3.3	Boundary Value Analysis	T1 Chapter 5
	RL3.4	Example & Case Study	Lecture Notes, T1 Chapter 6 & 5
During CH	CH4	CH4.1 = Discuss examples from the text CH4.2 = Discuss and solve two examples from day to day software	T1 Chapter 5 & 6
Post CH	SS4	SS3.1 EC & BVA for a program SS3.2 Analyse, Compare & Contrast the techniques	
	HW4	None	
	LE4	None	
	QZ4	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 5

Time	Type	Description	Content Reference
Pre CH	RL4.1	Domain Testing	T2 Chapter 3
	RL4.2	Combinatorial	Lecture Notes
	RL4.3	Decision Table Based Testing	T1 Chapter 7
	RL4.4	Example & Case Study	T1 Chapter 7 & Lecture Notes
During CH	CH5	CH5.1 = Discuss examples from the text CH5.2 = Discuss and solve two examples from day to day software	
Post CH	SS4	SS4.1 = Elements of being systematic SS4.2 = Compare & Contrast the test techniques	
	HW5	None	
	LE5	None	
	QZ5	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 6

Time	Type	Description	Content Reference
Pre CH	RL5.1	Code Based Testing – Overview	Lecture Notes
	RL5.2	Path Testing	T1 Chapter 8

	RL5.3	Examples	T1 Chapter 8
During CH	CH6	CH6.1 = Compound conditions CH6.2 = Discussion on examples	T1 8.3.3 T1 8.3.4 or faculty discretion
Post CH	SS5	SS5.1 Design of unit test cases SS5.2 Explore the tools for testing and metrics	
	HW6	None	
	LE6	None	
	QZ6	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 7

Time	Type	Description	Content Reference
Pre CH	RL6.1	Data Flow Testing	T1 Chapter 9
	RL6.2	Path Based Testing – Metric	T1 Chapter 8 & Lecture Notes
	RL6.3	Examples	T1 Chapter 9 & T1 Chapter 8
During CH	CH7	CH7.1 = Discuss Coverage Metrics with examples CH7.2 = Slice based testing	T1 9.1.7 T1 9.2
Post CH	SS6	At faculty discretion	
	HW7	None	
	LE7	None	
	QZ7	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 8

Time	Type	Description	Content Reference
Pre CH	RL7.1	Model Based Testing – Introduction & Overview	T1 Chapter 12
	RL7.2	Finite State Machines & Fault Model	T2 Chapter 5
	RL7.3	Examples	T1 Chapter 17
	RL7.4	Case Study	Lectures Notes & T1 Chapter 17
During CH	CH8	CH8.1 = Discuss Patterson Lattice CH8.2 = Discuss an Example for FSM	T1 12.2 Faculty discretion

		CH8.3 = CH8.4 =	
Post CH	SS7	SS7.1 Compare & Contrast FSM, State Charts & Petri Nets SS7.2 Using the FSM Model	
	HW8	None	
	LE8	None	
	QZ8	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 9

Time	Type	Description	Content Reference
Pre CH	RL8.1	Model Based Testing – Systems	T1 Chapter 17
	RL8.2	Model Based Testing – System of Systems	T1 Chapter 17 & T2 Chapter 5
	RL8.3	Example	T1 Chapter 17 & Lecture Notes
	RL8.4	Cases Study	T1 Chapter 17 & Lecture Notes
During CH	CH9	CH9.1 = Explain and discuss Systems of systems Types CH9.2 = Examples of Systems of Systems	T1 17.2
Post CH	SS8	SS8.1 Explore Systems of Systems around us	
	HW9	None	
	LE9	None	
	QZ9	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 10 (Review Session)

Time	Type	Description	Content Reference
Pre CH	All QR videos	QR1 to QR8	These are all Quick Review Sessions
During CH	CH10	CH10.1 = Review of Modules 1 to 8 CH10.2 = Problem solving and Q&A	
Post CH	SS10	At the faculty discretion	
	HW10	None	

	LE10	None	
	QZ10	At the faculty discretion	
Lab Reference			

Contact Hour 11

Time	Type	Description	Content Reference
Pre CH	RL9.1	OO Software & OO Software test – Introduction & Overview	Lecture Notes & T1 Chapter 15
	RL9.2	Issues in Testing OO Software	T1 Chapter 15
	RL9.3	OO Unit Testing	T1 Chapter 15
	RL9.4	Examples	T1 Chapter 15 & Lecture Notes
During CH	CH11	CH11.1 = Discuss implications of Composition & Encapsulation on from Test Perspective CH11.2 = Discuss implications of Inheritance & Polymorphism from Test Perspective	T1 15.1.2 T1 15.3.4 Addition info at Faculty discretion
Post CH	SS9	SS9.1 OO Test methods for a program SS9.2 Review of a OO Framework (Qt/GTK) and OO Testing	
	HW11	None	
	LE11	None	
	QZ11	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 12

Time	Type	Description	Content Reference
Pre CH	RL10.1	OO Integration Testing	T1 Chapter 15
	RL10.2	OO System Testing	T1 Chapter 15
	RL10.3	OO – GUI Testing	T1 Chapter 15 & Lecture Notes
	RL10.4	Examples & Cases	T1 Chapter 15 & Lecture Notes
During CH	CH12	CH12.1 = Discuss Framework for OO integration testing CH12.2 = Discuss Use Case based System Testing for OO software (Currency converter	T1 15.4.3 T1 15.5.1

		program)	
Post CH	SS10	At Faculty discretion	
	HW12	None	
	LE12	None	
	QZ12	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 13

Time	Type	Description	Content Reference
Pre CH	RL11.1	Integration Testing – Introduction, Overview & Issues	T1 Chapter 13
	RL11.2	Integration Testing – Types & Strategies	T1 Chapter 13
	RL11.3	Examples	T1 Chapter 13
	RL11.4	Cases	T1 Chapter 13 & Lecture Notes
During CH	CH13	CH13.1 = Examples of Call Graph Based Integration CH13.2 = Examples of Path Based Integration	T1 13.2 T1 13.3
Post CH	SS13	SS11.1 Integration strategies for a GUI program	
	HW13	None	
	LE13	None	
	QZ13	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 14

Time	Type	Description	Content Reference
Pre CH	RL12.1	System Testing – Introduction, Overview & Issues	T1 Chapter 14
	RL12.2	Systems Testing – Types, Techniques & Strategies	T1 Chapter 14
	RL12.3	Examples	T1 Chapter 14 & Lecture Notes
During CH	CH14	CH14.1 = Coverage Metrics for System Testing	T1 14.7 T1 14.9

		CH14.2 = Non Functional System Testing CH14.3 = CH14.4 =	
Post CH	SS12	At faculty discretion	
	HW14	None	
	LE14	None	
	QZ14	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 15

Time	Type	Description	Content Reference
Pre CH	RL13.1	Life-Cycle Based Testing – Overview and Perspective	T1 Chapter 11
	RL13.2	Life-Cycles – Water fall, Iterative, and Agile	T1 Chapter 11
	RL13.3	Implications and issues, Strategies & Models	T1 Chapter 11
	RL13.4	Example and Case	Lecture Notes
During CH	CH15	CH15.1 = Discuss Agile methods and processes for Test Engineers (TDD, XP, Scrum) CH15.2 = CH15.3 = CH15.4 =	Take up an exercise in class for team understanding with use of a sport or a team game
Post CH	SS13	SS13.1 Agile Methodologies – Mechanisms and Tools	
	HW15	None	
	LE15	None	
	QZ15	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 16

Time	Type	Description	Content Reference
Pre CH	RL14.1	Test Adequacy – Need & Overview	T2 Chapter 7
	RL14.2	Test Adequacy Assessment – Data Flow	T2 Chapter 7
During CH	CH16	CH16.1 = Concepts, Adequacy criteria for data flow – focus on examples	T2 7.3/7.4
Post CH	SS14	At faculty discretion	

	HW16	None	
	LE16	None	
	QZ16	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 17

Time	Type	Description	Content Reference
Pre CH	RL14.3	Test Adequacy Assessment – Control Flow	T2 Chapter 7
	RL14.4	Examples & Cases	T2 Chapter 7 & Lecture Notes
During CH	CH17	CH17.1 = Concepts, Adequacy criteria for control flow – focus on examples	T2 7.2
Post CH	SS17	At faculty discretion	
	HW17	None	
	LE17	None	
	QZ17	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 18

Time	Type	Description	Content Reference
Pre CH	RL15.1	Need, Motivation & Techniques	T2 Chapter 9
	RL15.2	Regression Testing – Test Selection (Execution Trace)	T2 Chapter 9
	RL15.3	Regression Testing – Test Selection (Dynamic Slicing)	T2 Chapter 9
During CH	CH19	CH19.1 = Execution Trace Example CH19.2 = Dynamic Slicing example	T2 9.5 T2 9.6
Post CH	SS15	SS15.1 Compare and Contrast Execution Trace & Dynamic Slicing	
	HW19	None	
	LE19	None	
	QZ18	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 19

Time	Type	Description	Content Reference
Pre CH	RL16.1	Minimization, Prioritization & Optimization Techniques	T2 Chapter 9
	RL16.2	Test Selection Algorithms	T2 Chapter 9
	RL16.3	Examples	T2 Chapter 9
During CH	CH19	CH19.1 = Pairwise – OATS as a reduction technique CH19.2 = Latin Squares	T2 6.6 & 6.8 T2 6.4
Post CH	SS16	SS16.1 Compare and Contrast use of combinatorial techniques for test reduction	
	HW19	None	
	LE19	None	
	QZ19	Suitable quiz may be designed for the topics covered	
Lab Reference			

Contact Hour 20

Time	Type	Description	Content Reference
Pre CH	All QR videos	QR9 to QR16	These are all Quick Review Sessions
During CH	CH20	CH20.1 = Review of Modules 9 to 16 CH20.2 = Problem solving and Q&A	
Post CH	SS20	At the faculty discretion	
	HW20	None	
	LE20	None	
	QZ20	At the faculty discretion	
Lab Reference			

Contact Hour 21, 22: Review

Evaluation Scheme:

Legend: EC = Evaluation Component; AN = After Noon Session; FN = Fore Noon Session

No	Name	Type	Duration	Weight	Day, Date, Session, Time
EC-1	Quiz-1		*	5%	February 13-23, 2023
	Quiz-2		*	5%	March 20-30, 2023
	Quiz-3		*	5%	April 20-30, 2023
EC-2	Mid-Semester Test	Open Book	2 hours	35%	Sunday, 12/03/2023 (FN)
EC-3	Comprehensive Exam	Open Book	2 ½ hours	50%	Sunday, 21/05/2023 (FN)

Note - Evaluation components can be tailored depending on the proposed model.

Important Information:

Syllabus for Mid-Semester Test (Open Book): Topics in CS 1-5.

Syllabus for Comprehensive Exam (Open Book): All topics given in plan of study

Evaluation Guidelines:

1. For Closed Book tests: No books or reference material of any kind will be permitted. Laptops/Mobiles of any kind are not allowed. Exchange of any material is not allowed.
2. For Open Book exams: Use of prescribed and reference text books, in original (not photocopies) is permitted. Class notes/slides as reference material in filed or bound form is permitted. However, loose sheets of paper will not be allowed. Use of calculators is permitted in all exams. Laptops/Mobiles of any kind are not allowed. Exchange of any material is not allowed.
3. If a student is unable to appear for the Regular Test/Exam due to genuine exigencies, the student should follow the procedure to apply for the Make-Up Test/Exam. The genuineness of the reason for absence in the Regular Exam shall be assessed prior to giving permission to appear for the Make-up Exam. Make-Up Test/Exam will be conducted only at selected exam centres on the dates to be announced later.

It shall be the responsibility of the individual student to be regular in maintaining the self-study schedule as given in the course handout, attend the lectures, and take all the prescribed evaluation components such as Assignment/Quiz, Mid-Semester Test and Comprehensive Exam according to the evaluation scheme provided in the handout.