Туре	Code	Computer Organization	L-T-P	Credits	Marks			
	CORE-5	Computer Organization	3-1-0	4	75			
Topic	Objective	of digita	l computer	s (CPU,				
	memory, I/O, software) and To have a better understanding and utilization of dig							
	computers. To be familiar with Assembly Language Programming.							
Pre	Prerequisites Basic analytical, logical, problem solving skills with basic knowledge and usage of computer							
		required for this course. Prior experience in Digital logic is beneficial.						
Lectu	re Scheme	heme Regular lectures (classroom/virtual class with computer/Smartphone) with use of ICT as and						
		when required, lectures areplanned to be interactive with focus on problem solving activities.						

#### **Evaluation Scheme**

	Internal Assessmen	Written Assessment	Total	
Assignment(s)	Unit Test	Mid-Term	End-Term	
		(Written)		
		15	60	75

# University Syllabus

Unit	Topics	Hours
No		
Unit-1	Basic Structure of Computers: Computer Types, Functional Units, Input Unit, Memory Unit, Arithmetic and Logic Unit, Output Unit, Control Unit, Basic Operational Concepts, Bus Structures, Software. Machine Instructions and Programs: Numbers, Arithmetic Operations, and Characters: Number Representation, Addition of Positive Numbers, Addition and Subtraction of Signed Numbers, Overflow of Integer Arithmetic, Floating-Point Numbers & Operations, Characters, Memory Locations and Addresses, Byte Addressability, Word Alignment, Accessing Numbers, Characters, and Character Strings, Memory Operations, Instructions and Instruction Sequencing, Register Transfer Notation, Basic Instruction Types, Instruction Execution and Straight-Line Sequencing, Branching, Condition Codes, Generating Memory Addresses, Addressing Modes, Implementation of Variables and Constants, Indirection and Pointers, Indexing and Arrays, Relative Addressing.	10
Unit-2	Basic Processing Unit: Register Transfers, Performance on Arithmetic or Logic Operation, fetching a Word from Memory, Storing a Word in Memory. Execution of a Complete Instruction, Branch Instruction, Multiple Bus Organization Hardwired Control, A Complete Processor. Microprogrammed Control: Microinstructions, Microprogram Sequencing, WideBranch Addressing, Microinstructions with Next- Address Field, Prefetching Microinstructions, Emulation. Cache Memories: Mapping Functions, Replacement Algorithms, Example of Mapping Technique. Performance Considerations: Interleaving, Hit Rate and Miss Penalty, Caches on Processor Chip, Other Enhancements, Virtual Memories: Address Translation.	10
Unit-3	Input/ Output Organization: Accessing I/O Devices, Interrupts, Interrupt Hardware, Enabling & Disabling Interrupts, Handling Multiple Devices, Controlling Device Requests, Exceptions. Direct Memory Access, Bus Arbitration, Buses, Synchronous Bus, Asynchronous Bus, Interface Circuits: Parallel Port, Serial Port, Standard I/O Interfaces, Peripheral Component Interconnect (PCI) Bus, SCSI Bus, Universal Serial Bus (USB)	10
Unit-4	Pipelining: Role of Cache Memory, Pipeline Performance, Data Hazards: Operand	10

Forwarding, Handling Data Hazards in Software, Side Effects. Instruction Hazards: Unconditional Branches, Conditional Branches and Branch Prediction. Influence on Instruction Sets: Addressing Modes, Condition Codes, Data path and Control Considerations. Superscalar Operation: Out-of-Order Execution, Execution Completion, Dispatch Operation, RISC & CISC Processors.

Total (Hours)

40

Text Books:

TB1: Carl Hamacher, Z. Vranesic, S. Zaky, Computer Organization, 5/Ed (TMH)

Reference Books:

RB1: *William Stallings*, Computer Organization and Architecture (Design for Performance), 9/Ed

RB2: S. Brown, & Z. Vranesic, Fundamentals of Digital Logic Design with VHDL, 2/Ed, McGraw-Hill.

Online Resources:

OR1:http://www.cse.iitm.ac.in/~vplab/courses/comp\_org.htm

OR2:https://nptel.ac.in/courses/106/106/106106092/

OR3:https://lecturenotes.in/notes/15742-note-for-computer-organistaion-co-by-jntu-

heroes?reading=true

OR4:https://www.youtube.com/watch?v=lir5Pz3kq0w&list=PLWPirh4EWFpF0FVeBgL75d1RlASn4sGoz OR5:https://www.youtube.com/watch?v=ktQDGH9\_PjQ

**Course Outcomes:** *At the end of this course, the students will be able to:* 

C01	Understand the architecture of modern computer, and also understanding of how the
	computer performs arithmetic operations on positive and negative numbers.
CO2	Apply knowledge of basic processing unit to control microinstructions and to different
	memory concepts.
CO3	Understand I/O organization to manage interrupt and use of interface circuits in computer
	systems.
C04	Analyze the pipelining performance and design a pipeline for consistent execution of
	instructions with minimum hazards

### **Program Outcomes Relevant to the Course:**

P01	<b>Computing Knowledge</b> : Apply the knowledge of mathematics, science, logic, computing fundamentals to address complex problems.
P02	<b>Problem Analysis:</b> Ability in identifying, formulating and analyzing problems to derive substantiated conclusions through the applications of complex solutions.
P03	<b>Design and Development</b> : Create solutions and system processes tailored to address complex IT challenges, leveraging both background knowledge and relevant tools.
PO4	<b>Investigation Techniques</b> : Employ computing knowledge and methodologies, such as experimental design, data analysis, interpretation and information synthesis to draw valid conclusions.
P05	Utilization of Modern Technology/Tools: Skillfully create, select and apply appropriate
	techniques, resources and computing tools while understanding their limitations.
P06	<b>Individual and Team Work:</b> Proficient in both independent and collaborative work across diverse environments, including leadership roles.

P07	Technocrat and Society: Utilize contextual knowledge to assess societal, legal and
	security issues relevant to professional practices.
P08	Effective Communication: Proficient in conveying complex ideas, writing reports,
	creating presentations and delivering messages to diverse audience.
P09	Ethics: Adhere to ethical principles and professional norms for conducting oneself in a
	professional context.
P010	Skill and Competency: Demonstrate the ability to analyze and apply the local and global
	impacts of project management, while consistently upgrading skill sets and navigating
	design various trade-offs.
P011	Lifelong Learning: Recognize the necessity and possess the readiness and capability to
	engage in independent and continuous learning within the evolving landscape of
	technology.

# Mapping of COs to POs: (1: Low, 2: Medium, 3: High)

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011
C01	3	2	3		2						2
CO2	3	3	3		3						3
CO3	3	3	3		3						3
CO4	3	3	2		3						3

Туре	Code		L-T-P	Credits	Marks					
Lecture	Unit No	Computer Organization	3-1-0	4	75					
No										
Lecture 1	1	Topic: Introduction to design and basic structur	e of comp	uter and	its types.					
		Details about its functional units.								
		<b>Ref:</b> TB1 (1.1, 1.2); RB1 (1.1, 1.2);OR1								
Lecture 2	1	Topic:Connection between processor and memory,	basic oper	ational co	ncept, Bus					
		structures, concept of system software.								
		<b>Ref:</b> TB1 (1.3, 1.4,1.5); RB1 (3.2, 3.4);OR1								
Lecture 3	1	Topic:Introduction to machine instruction, concept about number representation,								
		Addition of Positive Numbers, Addition of Signed Numbers.								
		Ref:TB1 (2.1, 2.1.1,2.1.2); RB1 (9.1-9.3,10.1);OR1	<b>Ref:</b> TB1 (2.1, 2.1.1,2.1.2); RB1 (9.1-9.3,10.1);OR1							
Lecture 4	1	Topic:Subtraction of signed numbers and overflow	Topic:Subtraction of signed numbers and overflow of integer arithmetic. Floating-							
		point numbers & operations, characters.	point numbers & operations, characters.							
		Ref:TB1 (2,1.3, 2.1.4,2.1.5); RB1 (10.1,10.4,10.5); OR2, OR3								
Lecture 5	1	Topic:Storing of data in memory locations and a	addresses,	byte add	ressability,					
		word alignment, accessing numbers, characters, an	d character	strings.						
		Ref:TB1 (2.2); RB1 (8.3); OR3, OR1								
Lecture 6	1	Topic: Memory Operations, Instructions and Sequencing of Instructions, Register								
		Transfer Notation, Basic Instruction Types.								
		Ref:TB1 (2.3,2.4.1,2.4.3);RB1 (12.1); OR4								
Lecture 7	1	Topic:Instruction execution and straight-line seque	ncing, conc	epts of br	anching.					
		Ref:TB1 (2.4.4,2.4.5); RB1 (12.2,12.4);OR5	ef:TB1 (2.4.4,2.4.5); RB1 (12.2,12.4);OR5							

Lecture 8	1	<b>Topic:</b> Condition codes, generating memory addresses, addressing modes. <b>Ref:</b> TB1 (2.4.6.2.4.7): RB1 (13.1): OR2
Lecture 9	1	<b>Topic:</b> Implementation of variables and constants, indirection and pointers
		<b>Ref:</b> TB1 (2.5.1,2.5.2); RB1 (13.2);OR1
Lecture 10	1	<b>Topic:</b> Concept of indexing and arrays, relative addressing.
		<b>Ref:</b> TB1 (2.5.3,2.5.4); RB1 (13.1); OR2
Lecture 11	2	Topic:Introduction to Basic Processing Unit, Concept of Register Transfers,
		Performance on Arithmetic or Logic Operation.
		<b>Ref:</b> TB1 (7.1,7.1.1,7.1.2); RB1 (17.7); OR2
Lecture 12	2	<b>Topic:</b> Process of fetching a word from memory and storing a word in memory.
		Basic idea about execution of a complete instruction, Branch instruction.
		<b>Ref:</b> TB1 (7.1.3,7.1.4,7.2);RB1 (12.4);OR1
Lecture 13	2	<b>Topic:</b> Multiple bus organization hardwired control, A complete processor.
		<b>Ref:</b> TB1 (7.3,7.4); RB1 (19.3); OR1
Lecture 14	2	<b>Topic:</b> Basic organization of Microprogrammed control unit, Microinstructions.
	2	Ref: IB1 (7.5,7.5.1); RB1 (20.1, 20.2) OR1
Lecture 15	2	<b>I opic:</b> Sequential execution of Microprogram, WideBranch addressing.
Locture 16	2	<b>Ref:</b> IBI (7.5.2,7.5.3); RBI (20.3); OR3, OR2
Lecture 16	Z	For the formation for the formation of t
		<b>Ref</b> TB1 $(754755756)$ · BB1 $(204)$ · OB4
Lecture 17	2	<b>Topic:</b> Introduction to Cache memories Manning functions replacement
	2	algorithms
		<b>Ref:</b> TB1 (5.5.1,5.5.2); RB1 (4.2); OR2
Lecture 18	2	<b>Topic:</b> Example of Mapping Technique. Performance Considerations, Interleaving.
		<b>Ref:</b> TB1 (5.5.3,5.5.4,5.6.1); RB1 (17.2); OR5
Lecture 19	2	Topic: Hit Rate and Miss Penalty, Caches on Processor Chip.
		<b>Ref:</b> TB1 (5.6.2,5.6.3); RB1 (4.4); OR5
Lecture 20	2	<b>Topic:</b> Other Enhancements, Virtual Memories: Address Translation.
		<b>Ref:</b> TB1 (5.6.4,5.7); RB1 (8.5); OR1
Lecture 21	3	<b>Topic:</b> Introduction to Input/ Output Organization, Accessing I/O Devices.
		<b>Ref:</b>   B1 (4.1); RB1 (7.3); OR2
Lecture 22	3	<b>Iopic:</b> The idea of Interrupts and the hardware & software needed to support them. Eachling & Disphiling Interrupts
		$\mathbf{Pof} = \mathbf{TP} \left\{ (A > A > 1   A > 2), \mathbf{PP} \left\{ (2 > 2), \mathbf{OP} \right\} \right\}$
Lecture 23	2	Topic: Handling Multiple Devices Controlling Device Requests
Lecture 25	5	<b>Ref</b> $(4 2 3 4 2 4)$ $(BB1 (3 3)) OB3 OB5$
Lecture 24	3	<b>Topic:</b> Exceptions, Direct Memory Access as an I/O mechanism for high speed
	Ū.	devices.
		<b>Ref:</b> TB1 (4.2.5,4.4); RB1 (7.5); OR1
Lecture 25	3	Topic:Bus Arbitration, Buses.
		<b>Ref:</b> TB1 (4.4.1,4.5); RB1 (3.4); OR5, OR2
Lecture 26	3	Topic:Data transfer over Synchronous & Asynchronous Bus.
		<b>Ref:</b> TB1 (4.5.1,,4.5.2); RB1 (3.4,3.5); OR4
Lecture 27	3	<b>Topic:</b> The design of I/O Interface Circuits, Parallel Port.
		<b>Ref:</b> TB1 (4.6,4.6.1); RB1 (3.5); OR1
Lecture 28	3	<b>Topic:</b> Serial Port, Standard I/O Interfaces.

		<b>Ref:</b> TB1 (4.6.2,4.7); RB1 (3.5); OR1
Lecture 29	3	Topic:Commercial bus standards, Peripheral Component Interconnect (PCI) Bus,.
		<b>Ref:</b> TB1 (4.7.1); RB1 (3.6); OR1
Lecture 30	3	Topic:SCSI Bus, Universal Serial Bus (USB).
		<b>Ref:</b> TB1 (4.7.2,4.7.3); RB1 (14.4); OR1
Lecture 31	4	<b>Topic:</b> Basic concept of Pipelining, Role of Cache Memory.
		<b>Ref:</b> TB1 (8.1,8.1.1); RB1 (17.1, 17.3) OR4
Lecture 32	4	<b>Topic:</b> Pipeline Performance, Various Data Hazards that cause performance
		degradation.
		<b>Ref:</b> TB1 (8.1.2,8.2); RB1 (18.1); OR3
Lecture 33	4	<b>Topic:</b> Operand Forwarding, Handling Data Hazards in Software.
		<b>Ref:</b> TB1 (8.2.1,8.2.2); RB1 (18.2); OR5
Lecture 34	4	Topic:Side Effects. Instruction Hazards, Unconditional Branches.
		<b>Ref:</b> TB1 (8.2.3,8.3,8.3.1); RB1 (14.4);OR2
Lecture 35	4	Topic:Conditional Branches and Branch Prediction.
		<b>Ref:</b> TB1 (8.3.2); RB1 (14.5); OR2
Lecture 36	4	<b>Topic:</b> Influence of pipelining on Instruction Sets, Addressing Modes.
		<b>Ref:</b> TB1 (8.4,8.4.1); RB1 (13.1); OR3
Lecture 37	4	Topic: Condition Codes, Data path and Control Considerations.
		<b>Ref:</b> TB1 (8.4.2,8.5); RB1 (12.5); OR4
Lecture 38	4	Topic: Superscalar Operation, Out-of-Order Execution.
		<b>Ref:</b> TB1 (8.6.1);RB1 (16.2); OR2
Lecture 39	4	Topic: Execution Completion, Dispatch Operation.
		<b>Ref:</b> TB1 (8.6.2,8.6.3); RB1 (16.3); OR5
Lecture 40	4	Topic: Basic concept of RISC & CISC Processors and its implementation.
		<b>Ref:</b> TB1 (1.6.5,11.1); RB1 (16.4,16.5)page no:545,568; OR1

# BCA-3<sup>rd</sup> Sem (2023)

SN	Code	Paper	Credit	No. of Classes	L-T-P	Marks MT-ET-PRTL-(T)	Faculty	Deadline
1	CC-6	Java programming	4+2	40+20	3-1-2	15-60-25-(100)	Mr. C. Sethi	

Туре	Code	lava programming	L-T-P	Credits	Marks			
	Core -6	Java programming	3-1-2	4 + 2	100			
Topic Objective		The objective of this course is to introduce fundamentals of Object Oriented Programming in						
		Java environment and develop a small application using java.						
Prerequisites		Basic concepts of OOP concepts.						
Lecture Scheme		Regular lectures (classroom/virtual class with computer/Smartphone) with use of ICT as and						
		when required, lectures are planned to be interactive with focus on application.						

### **Evaluation Scheme**

Mid-Term (Written)	End-Term	Practical	Total
15	60	25	100

# **University Syllabus**

Unit No	Topics	Hours		
Unit-1	Introduction to Java: Java History, Architecture and Features, Understanding the semantic and	10		
	syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables,			
	Constants, Keywords (super, this, final, abstract, static, extends, implements, interface), Data			
	Types, Wrapper class, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments,			
	Doing Basic Program Output, Decision Making Constructs (conditional statements andloops) and			
	Nesting, Java Methods (Defining, Scope, Passing and Returning Arguments, Type Conversion			
	and Type and Checking, Built-in Java Class Methods). Input through keyboard using Command			
	line Argument, the Scanner class, Buffered Reader class.			
Unit-2	Object-Oriented Programming Overview: Principles of Object-Oriented Programming, Defining	10		
	& Using Classes, Class Variables & Methods, Objects, Object Reference, Objects as parameters,			
	final classes, Garbage Collection. Constructor- types of constructor, this keyword, super			
	keyword. Method overloads and Constructor overloading. Aggregation vs Inheritance,			
	Inheritance: extends vsimplements, types of Inheritance, Interface, Up-Casting, Down-Casting,			
	Auto-Boxing, Enumerations, Polymorphism, Method Overriding and restrictions. Package: Pre-			
	defined packages and Custom packages.			
Unit-3	Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Referencing	10		
	Arrays Dynamically. Strings and I/O: Java Strings: The Java String class, Creating & Using String			
	Objects, Manipulating Strings, String Immutability& Equality, Passing Strings To & From			

	Methods, String Buffer Classes and StringBuilder Classes. IOpackage: Understanding Streams File class and its methods, Creating, Reading, Writing using classes: Byte and Character streams, File Output Stream, File Input Stream, File Writer, File Reader, Input Stream Reader, Print Stream, Print Writer. Compressing and Uncompressing File.	
Unit-4	Exception Handling, Threading, Networking and Database Connectivity: Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multithreading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resuming threads.Using java.net package, Overview of TCP/IP and Datagram programming. Accessing and Manipulating databases using JDBC.	10
	Total (Hours)	40

### **Text Books:**

TB1: E. Balagurusamy, "Programming with Java", TMH, 4/Ed,

#### **Reference Books:**

RB1: *Herbert Schildt*, "The Complete Reference to Java", TMH, 10/Ed.

### **Online Resources:**

- OR1: https://www.geeksforgeeks.org/java-programming-basics/
- OR2: https://www.tutorialspoint.com/java/index.htm
- OR3: https://www.javatpoint.com/java-io
- OR4: https://beginnersbook.com/2013/04/java-exception-handling/
- OR5: https://www.marcobehler.com/guides/jdbc

Туре	Code	LESSON PLAN	L-T-P	Credits	Marks
Lecture No	Unit No	Java programming	3-1-2	4	70
Lecture 1	1	What is language? What is program? Software, programmin programming. Java is what type of programming?	ng languages	, type of	
		<b>Ref:</b> TB1(1.2-1.3, pg1-3); OR1			
Lecture 2	1	Basic concept of oops, History of java programming.			
		<b>Ref:</b> TB1(2.1, pg10-11); OR1			
Lecture 3	1	Java Architecture and Features			
		<b>Ref:</b> TB1(2.2, pg11-14); OR1			
Lecture 4	1	Understanding the semantic and syntax differences betwee	en C++ and Ja	iva,	
		<b>Ref:</b> TB1(2.3, pg14-15); OR1			
Lecture 5	1	Compiling and Executing a Java Program			
		<b>Ref:</b> TB1(3.1, pg23-24); OR1			
Lecture 6	1	Variables, Constants, Keywords Data Types			
		<b>Ref:</b> TB1(4.1-4.4, pg46-49); OR1			
Lecture 7	1	Operators (Arithmetic, Logical and Bitwise) and Expressions	5		
		<b>Ref:</b> TB1(5.1-5.8, pg62-69); OR1			
Lecture 8	1	Comments, Doing Basic Program Output.			
		<b>Ref:</b> TB1(5.9, pg70); OR1			
Lecture 9	1	Decision Making Constructs (conditional statements and lo	ops) and Nes	ting	
		<b>Ref:</b> TB1(6.1-6.5, pg81-85); OR1			
Lecture 10	1	Java Methods (Defining, Scope, Passing and Returning Argu	ments, the S	canner cla	ISS,
		Buffered Reader class.			
		Ref: TB1(8.4,8.10, pg128,138); OR1			

Programming, Defining & Using Classes.       Ref: TB1(1.3-1.4, pg3-7); OR1       Lecture 12     2     Class Variables & Methods, Objects, Object       Ref: TB1(8.5-8.7, pg128-133); OR1	Lecture 11	2	Object-Oriented Programming Overview: Principles of Object-Oriented
Ref:     TB1(1.3-1.4, pg3-7); OR1       Lecture 12     2     Class Variables & Methods, Objects, Object       reference, Objects as parameters, Ref:     TB1(8.4.7, pg128.1.3); OR1       Lecture 13     2       final classes, Garbage Collection Ref:     TB1(8.1.4, pg124.1.45); OR2       Lecture 14     2     Constructor: types of constructor, this keyword, super keyword Ref:       Lecture 15     2     Method overloading and Constructor overloading Ref:       Lecture 16     2     Aggregation vs Inheritance; Inheritance: extends vs implements; types of Inheritance       Lecture 17     2     Interface, Up-Casting, Down-Casting, Auto-Boxing Ref:       Lecture 17     2     Interface, Up-Casting, Down-Casting, Auto-Boxing Ref:       Lecture 19     2     Method Overriding and restrictions. Package: Pre-defined Ref:       Ref:     TB1(1.5.1.1.9, B193-199): OR2       Lecture 20     2     packages and Custom packages Ref:       Ref:     TB1(1.5.1.9, B193-199): OR2       Lecture 21     3     Arrays: Creating & Using Arrays (D, 2D, 3D and Jagged Array). Array of Object, Ref:       Ref:     TB1(9.1.9, pg163-164); OR2     Lecture 23       1     Manipubuting Strirings. String Burmutability&			Programming, Defining & Using Classes.
Lecture 12   2   Class Variables & Methods, Object, Object     reference, Objects as parameters, Ref. TB1(8.15-8.7, pt28-133); OR1			<b>Ref:</b> TB1(1.3-1.4, pg3-7); OR1
reference, Objects as parameters, Ref: TB1(8.5-8.7, pg128-133); OR1       Lecture 13     2       final classes, Garbage Collection Ref: TB1(8.14, pg144-145); OR2       Lecture 14     2       Constructor: types of constructor overloading Ref: TB1(8.7, pg133); OR2       Lecture 15     2       Method overloading and Constructor overloading Ref: TB1(8.8, pg136); OR2       Lecture 16     2       Aggregation vs Inheritance; Inheritance: extends vs implements, types of Inheritance extends vs implements, types of Inheritance; Inheritance: extends vs       Lecture 17     2       Interface, Up-Casting, Down-Casting, Auto-Boxing       Ref: TB1(10.3.10.5, pg183-186); OR2       Lecture 18     2       Enumerations, Polymorphism, Ref: TB1(1.1.5.1.4, pg190-192); OR2       Lecture 20     2       Packages and Custom packages       Ref: TB1(1.5.1.1.9, pg133-158); OR2       Lecture 21     3       Arrays: Creating & Using Arrays (10, 20, 3D and Jagged Array), Array of Object, Ref: TB1(19.5, pg161-162); OR2       Lecture 22     3       Java Strings: The Java String Giass, Creating & Using String Dijects, Ref: TB1(1.9, pg163-164); OR2       Lecture 23     3       Manipulating Strings, String Immutability& Equality, Passing Strings To &	Lecture 12	2	Class Variables & Methods, Objects, Object
Ref:     TB1(8.5-8.7, pg128-133); OR1       Lecture 13     2       final classes, Garbage Collection Ref:     final classes, Garbage Collection Ref:       Lecture 14     2     Constructor- types of constructor, this keyword, super keyword Ref:       Lecture 15     2     Method overloading and Constructor overloading Ref:     TB1(8.7, pg133); OR2       Lecture 16     2     Aggregation vs Inheritance; Inheritance: extends vs implements, types of Inheritance       Lecture 17     2     Interface, Up-Casting, Down-Casting, Auto-Boxing Ref:     TB1(10.3-10.2, pg138-186); OR2       Lecture 18     2     Enumerations, Polymorphism, Ref:     TB1(9.8, pg17)-172); OR2       Lecture 19     2     Method Overriding and restrictions. Package: Pre-defined Ref:     TB1(9.1, pg17)-172); OR2       Lecture 21     3     Arrays Ornamically. Ref:     TB1(9.8, pg17)-172); OR2       Lecture 21     3     Java String String Vapmincally. Ref:     TB1(9.5, pg163-164); OR2       Lecture 23     Java String String Vapmincally. Ref:     TB1(9.5, pg163-164); OR2       Lecture 23     Java String Strin			reference, Objects as parameters,
Lecture 13   2     final classes, Garbage Collection     Ref: TB1(8.14, pg144-145); OR2     Lecture 14   2     Constructor types of constructor, this keyword, super keyword     Ref: TB1(8.7, pg133); OR2     Lecture 15   2     Method overloading and Constructor overloading     Ref: TB1(1.5, pg133); OR2     Lecture 16   2     Aggregation vs Inheritance; Inheritance: extends vs implements; types of Inheritance; Inheritance: extends vs     Implements; types of Inheritance; Inheritance; Inheritance     Ref: TB1(1.1-10.2, pg130-183); OR2     Lecture 17   2     Interface, Up-Casting, Down-Casting, Auto-Boxing     Ref: TB1(1.1-11.4, pg130-192); OR2     Lecture 13   2     Method Overriding and restrictions. Package: Pre-defined     Ref: TB1(1.1-11.4, pg130-192); OR2     Lecture 20   2     Packages and Custom packages     Ref: TB1(1.1-11.4, pg130-152); OR2     Lecture 21   3     Ararys: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Ref: TB1(3.1-61.2); OR2     Lecture 22   3     Lecture 23   3     Manipulating Strings, String Immutability& Equality, Passing Strings To & Fro			<b>Ref:</b> TB1(8.5-8.7, pg128-133); OR1
Image: Section of the section of th	Lecture 13	2	
Ref: TB1(8.14, pg144-145), OR2       Lecture 14     2     Constructor. types of constructor, this keyword, super keyword       Ref: TB1(8.7, pg133), OR2     Ref: TB1(8.8, pg135), OR2       Lecture 15     2     Method overloading and Constructor overloading       Ref: TB1(8.8, pg135), OR2     Ref: TB1(8.1, 10.2, pg180-183); OR2       Lecture 17     2     Interface, Up-Casting, Down-Casting, Auto-Boxing       Ref: TB1(10.3-10.2, pg180-183); OR2     Ref: TB1(10.3-10.5, pg183-186); OR2       Lecture 17     2     Interface, Up-Casting, Down-Casting, Auto-Boxing       Ref: TB1(10.3-10.5, pg183-186); OR2     Ref: TB1(10.3-10.5, pg183-186); OR2       Lecture 18     2     Enumerations, Polymorphism,       Ref: TB1(1.1-11.4, pg190-192); OR2     Ref: TB1(1.1.1.1, pg193-199); OR2       Lecture 20     2     packages and Custom packages       Ref: TB1(1.5.1.1.9, pg133-158); OR2     Ref: TB1(1.5.1.1.6.1, pg133-158); OR2       Lecture 21     3     Arrays: Creating & Using Arrays (1D, 2D, 3D and lagged Array), Array of Object, Ref: TB1(9.5, pg163-164); OR2       Lecture 23     1Java String: Difects, Ref: TB1(9.5, pg163-164); OR2       Lecture 24     3     String Buffer Classes and StringBuilder Classes       Ref: TB1(9.5, pg163-164); OR2 <td></td> <td></td> <td>final classes, Garbage Collection</td>			final classes, Garbage Collection
Lecture 14   2   Constructor-types of constructor, this keyword, super keyword     Ref: TB1(8.7, pg133); OR2   Method overloading and Constructor overloading     Lecture 15   2   Method overloading and Constructor overloading     Ref: TB1(8.8, pg136); OR2   implements, types of Inheritance: Inheritance: Inheritance: Ref. TB1(10.1-10.2, pg180-183); OR2     Lecture 16   2   Interface, Up-Casting, Abur-Desking, Abur-Desking     Ref: TB1(10.1-10.2, pg180-183); OR2   Ecture 17     Lecture 17   2   Interface, Up-Casting, Abur-Desking     Ref: TB1(10.3-10.5, pg183-186); OR2   Ecture 18     Lecture 19   2   Method Overriding and restrictions. Package: Pre-defined     Ref: TB1(11.1-11.4, pg190-192); OR2   Ecture 20   2     Lecture 21   3   Arrays: Creating & Using Arrays (10, 20, 30 and Jagged Array), Array of Object, Referencing Arrays Dynamically.     Ref: TB1(9.5, pg161-162); OR2   Ecture 22   3   Javas String: String Immutability& Equality, Passing Strings To & From Methods Ref: TB1(9.5, pg163-164); OR2     Lecture 23   3   Wars Strings. String Immutability& Equality, Passing Strings To & From Methods Ref: TB1(9.5, pg163-164); OR2     Lecture 24   3   Cirating, Reading, Writing using classes: Byte and Character streams Ref: TB1(10.1-16.3, pg294-297); OR3			<b>Ref:</b> TB1(8.14, pg144-145); OR2
Ref:     TB1(8.7, pg133); OR2       Lecture 15     2     Method overloading and Constructor overloading Ref:     TB1(8.8, pg136); OR2       Lecture 16     2     Aggregation vs Inheritance, Inheritance: extends vs implements, types of Inheritance       Lecture 17     2     Interface, Up-Casting, Down-Casting, Auto-Boxing Ref:     TB1(10.3-10.5, pg183-186); OR2       Lecture 18     2     Enumerations, Polymorphism, Ref:     TB1(10.3-10.5, pg183-186); OR2       Lecture 19     2     Method Overriding and restrictions. Package: Pre-defined Ref:     TB1(11.1-11.4, pg190-192); OR2       Lecture 20     2     packages and Custom packages Ref:     TB1(11.5-11.9, pg193-158); OR2       Lecture 21     3     Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Ref:       Ref:     TB1(10.5-10, pg153-158); OR2     Lecture 22       3     Java String: The Java String class, Creating & Using String Objects, Ref:     TB1(15.5, pg163-164); OR2       Lecture 23     Manipulating Strings, String Immutability& Equality, Passing Strings To & From Methods Ref:       Ref:     TB1(15.7, pg166); OR2     Lecture 24       3     Understanding Streams File class and Its methods, Ref:     TB1(16.1-16.3, pg204-297); OR3       Lecture 25	Lecture 14	2	Constructor- types of constructor, this keyword, super keyword
Lecture 15   2   Method overloading and Constructor overloading     Ref: TB1(6.8, pg136); OR2   Aggregation vs inheritance, Inheritance: extends vs implements, types of Inheritance     Ref: TB1(10.1-0.2, pg180.183); OR2     Lecture 17   2   Interface, Up-Casting, Down-Casting, Auto-Boxing     Ref: TB1(10.1-0.2, pg180.183); OR2   Ref. TB1(10.1-1.4, pg190.192); OR2     Lecture 18   2   Enumerations, Polymorphism,     Ref: TB1(11.1-1.4, pg190.192); OR2   Ref. TB1(11.1-1.4, pg190.192); OR2     Lecture 20   2   packages and Custom packages     Ref: TB1(11.1-1.4, pg190.192); OR2   Ref. TB1(11.1-1.4, pg190.192); OR2     Lecture 21   3   Arrays Cynamically,     Ref: TB1(9.5, pg153-158); OR2   Ref. TB1(9.5, pg163.164); OR2     Lecture 22   3   Java Strings: The Java String Class,     Creating & Using Xring Objects,   Ref: TB1(9.5, pg163.164); OR2     Lecture 23   Manipulating String, String Immutability& Equality, Passing Strings To & From Methods     Ref: TB1(9.7, pg166); OR2   Ref: TB1(9.7, pg166); OR2     Lecture 24   3   String Buffer Classes and StringBuilder Classes     Ref: TB1(16.1-6.16, pg2927-300); OR3   Ref. TB1(16.1-7.16.10, pg301.310); OR3     Lecture 26   3   <			<b>Ref:</b> TB1(8.7, pg133); OR2
Ref: TB1(8.8, pg136); OR2Lecture 162Aggregation vs Inheritance, Inheritance: extends vs implements, types of Inheritance Ref: TB1(10.1-10.2, pg180-183); OR2Lecture 172Interface, Up-Casting, Down-Casting, Auto-Boxing Ref: TB1(10.3-10.5, pg183-186); OR2Lecture 182Enumerations, Polymorphism, Ref: TB1(11.1-11.4, pg190-192); OR2Lecture 202Method Overriding and restrictions. Package: Pre-defined Ref: TB1(11.1.5-11.9, pg193-199); OR2Lecture 213Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Referencing Arrays Dynamically, Refer TB1(11.5-11.9, pg193-199); OR2Lecture 223Java String: The Java String class, Creating & Using String Objects, Ref: TB1(9.1-94, pg153-158); OR2Lecture 233Manipulating String Objects, Ref: TB1(9.5, pg163-164); OR2Lecture 243String Buffer Classes and StringBuilder Classes Ref: TB1(9.5, pg163-164); OR2Lecture 253Understanding Streams File class and its methods, Ref: TB1(16.1-16.3, pg294-297); OR3Lecture 263Creating, Reading, Writing using classes: Byte and Character streams Ref: TB1(16.1-16.3, pg297-300); OR3Lecture 283Input Stream Reader, Print Stream, File Writer, File Reader Ref: TB1(16.1-16.1, pg307-301); OR3Lecture 293Compressing and Uncompressing File. Ref: TB1(16.1-16.1, pg307-301); OR3Lecture 234Froor and exception, Fixeendo Fint Writer Ref: TB1(16.1-16.1, pg307-302); OR3Lecture 243Program copy the contents from one file to other files. Ref: TB1(16.1-16.1, pg307-302); OR3<	Lecture 15	2	Method overloading and Constructor overloading
Lecture 16   2   Aggregation vs Inheritance, Inheritance: extends vs implements, types of Inheritance: extends vs     Lecture 17   2   Interface, Up-Casting, Down-Casting, Auto-Boxing Ref: TB1(10.3-10.5, pg183-186); OR2     Lecture 18   2   Enumerations, Polymorphism, Ref: TB1(10.3-10.2, pg180-183); OR2     Lecture 19   2   Method Overriding and restrictions. Package: Pre-defined Ref: TB1(11.1-11.4, pg190-192); OR2     Lecture 20   2   packages and Custom packages Ref: TB1(11.1-11.4, pg190-192); OR2     Lecture 21   3   Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Referencing Arrays Dynamically. Ref: TB1(9.1-9.4, pg153-158); OR2     Lecture 22   3   Java String; The Java String (Lass, Creating & Using Arrays (Dacta); OR2     Lecture 23   3   Manipulating String (Date); OR2     Lecture 24   3   String Buffer Classes and StringBuilder Classes Ref: TB1(9.5, pg163-164); OR2     Lecture 23   3   Understanding Streams File class and its methods, Ref: TB1(16.1-16.3, pg294-297); OR3     Lecture 24   3   Creating, Reading, Writing using classes: Byte and Character streams Ref: TB1(16.1-16.10, pg301-304); OR3     Lecture 27   File Output Stream, File Input Stream, File Writer, File Reader Ref: TB1(16.1-16.10, pg301-304); OR3     Lecture 28   Input Stream Reader, Print Stream, File Writer, File Rea			<b>Ref:</b> TB1(8.8, pg136); OR2
implements, types of inheritance     Ref: TB1(10.10.2, pg180-183); OR2     Lecture 17   Interface, Up-Casting, Down-Casting, Auto-Boxing     Ref: TB1(10.3-10.5, pg183-186); OR2     Lecture 18   Enumerations, Polymorphism,     Ref: TB1(9.8, pg171-172); OR2     Lecture 19   Method Overriding and restrictions. Package: Pre-defined     Ref: TB1(11.1-11.4, pg190-192); OR2     Lecture 20   packages and Custom packages     Ref: TB1(9.1-9.4, pg133-199); OR2     Lecture 21   Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Referencing Arrays Dynamically.     Ref: TB1(9.1-9.4, pg153-158); OR2     Lecture 22   Java String: The Java String class, Creating & Using String Objects, Ref: TB1(9.5, pg161-162); OR2     Lecture 23   Manipulating Strings, String Immutability& Equality, Passing Strings To & From Methods Ref: TB1(9.7, pg166); OR2     Lecture 24   String Buffer Classes and StringBuilder Classes     Ref: TB1(1.5.1-16.3, pg294-297); OR3     Lecture 25   Understanding Streams File class and its methods, Ref: TB1(16.1-16.3, pg294-297); OR3     Lecture 26   Creating, Reading, Writing using classes: Byte and Character streams Ref: TB1(16.1-16.0, pg291-300); OR3     Lecture 27   File Output Stream, File Input Stream, File Writer, File Reader Ref: TB11(16.1-16.1, pg31-31.5); OR3	Lecture 16	2	Aggregation vs Inheritance, Inheritance: extends vs
Ref:1B1(10.1-10.2, pg180-183); OR2Lecture 172Interface, Up-Casting, Down-Casting, Auto-BoxingRef:TB1(10.3-10.5, pg183-186); OR2Lecture 182Enumerations, Polymorphism,Ref:TB1(9.8, pg171-172); OR2Lecture 192Method Overriding and restrictions. Package: Pre-definedRef:TB1(11.1-11.4, pg190-192); OR2Lecture 202packages and Custom packagesRef:TB1(11.1-11.9, pg193-199); OR2Lecture 213Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object,Ref:TB1(9.1-9.4, pg153-158); OR2Lecture 223Java Strings: The Java String Class, Creating & Using String String Class, Creating & Using String, String Immutability& Equality, Passing Strings To & From Methods Ref:Ref:TB1(9.5, pg163-162); OR2Lecture 233Manipulating Strings, String Immutability& Equality, Passing Strings To & From Methods Ref:Ref:TB1(9.7, pg166); OR2Lecture 253Understanding Streams File class and its methods, Ref:Ref:TB1(16.1-16.3, pg294-297); OR3Lecture 263Creating, Reading, Writing using classes: Byte and Character streams Ref:Ref:TB1(16.1-16.10, pg30-304); OR3Lecture 293Lecture 293Lecture 293Lecture 293Lecture 304Ref:Ref:TB1(16.1-16.10, pg30-31)-00; OR3Lecture 314Lecture 314 <t< td=""><td></td><td></td><td>implements, types of Inheritance</td></t<>			implements, types of Inheritance
Lecture 17   2   Interface, Up-Casting, Down-Casting, Auto-Boxing     Ref: TB1(10.3-10.5, pg183-136); OR2     Lecture 18   2   Enumerations, Polymorphism,     Ref: TB1(11.1-11.4, pg100-192); OR2     Lecture 20   2   packages and Custom packages     Ref: TB1(11.1-11.4, pg190-192); OR2     Lecture 21   3   Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Referencing Arrays Dynamically.     Ref: TB1(9.1-9.4, pg153-158); OR2   Lecture 22   3     Lecture 22   3   Java String String Objects, Creating & Using String Objects, Ref: TB1(9.5, pg161-162); OR2     Lecture 23   3   Manipulating Strings, String Immutability& Equality, Passing Strings To & From Methods Ref: TB1(9.5, pg163-164); OR2     Lecture 24   3   String Buffer Classes and StringBuilder Classes     Ref: TB1(16.1-16.3, pg29-297); OR3   Lecture 25     Lecture 25   Understanding Striams, File class and its methods, Ref: TB1(16.1-16.3, pg29-297); OR3     Lecture 26   Creating, Reading, Writing using classes: Byte and Character streams Ref: TB1(16.1-16.10, pg301-304); OR3     Lecture 27   3   File Output Stream, File Input Stream, File Nerther, File Reader Ref: TB1(16.1-16.10, pg301-304); OR3     Lecture 28   1   Input Stream, Reader, Print Stream, Print Writer Ref			<b>Ref:</b> TB1(10.1-10.2, pg180-183); OR2
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Lecture 18   2   Enumerations, Polymorphism, Ref: TB1(9.8, pg171-172); OR2     Lecture 19   2   Method Overriding and restrictions. Package: Pre-defined Ref: TB1(11.1-11.4, pg190-192); OR2     Lecture 20   2   packages and Custom packages Ref: TB1(11.5-11.9, pg193-199); OR2     Lecture 21   3   Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Referencing Arrays Dynamically. Refer TB1(9.1-9.4, pg153-158); OR2     Lecture 22   3   Java Strings: The Java String Class, Creating & Using String Objects, Ref: TB1(9.5, pg163-164); OR2     Lecture 23   Manipulating Strings, String Immutability& Equality, Passing Strings To & From Methods Ref: TB1(9.5, pg163-164); OR2     Lecture 24   String Buffer Classes and StringBuilder Classes Ref: TB1(9.7, pg166); OR2     Lecture 25   Understanding Streams File class and its methods, Ref: TB1(16.1-16.3, pg294-297); OR3     Lecture 26   Creating, Reading, Writing using classes: Byte and Character streams Ref: TB1(16.1-16.10, pg301-304); OR3     Lecture 27   File Output Stream, File Input Stream, File Writer, File Reader Ref: TB1(16.11-16.13, pg306-312); OR3     Lecture 28   Input Stream Reader, Print Stream, Print Writer Ref: TB1(16.13-16.14, pg313-315); OR3     Lecture 30   Program copy the contents from one file to other files. Ref: TB1(16.13-16.14, pg313-315); OR3     Lecture 31   Error and exception,Exception Handling mechanisim Ref: T	1	2	<b>Ref:</b> 1B1(10.3-10.5, pg183-186); UR2
Lecture 192Nethol Overriding and restrictions. Package: Pre-defined Ref: TB1(11.1-11.4, pg190-192); OR2Lecture 202packages and Custom packages Ref: TB1(11.5-11.9, pg193-199); OR2Lecture 213Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object, Referencing Arrays Dynamically. Ref: TB1(9.1-9.4, pg153-158); OR2Lecture 223Java Strings: The Java String class, Creating & Using String Objects, Ref: TB1(9.5, pg161-162); OR2Lecture 233Manipulating Strings, String Immutability& Equality, Passing Strings To & From Methods Ref: TB1(9.5, pg163-164); OR2Lecture 243String Buffer Classes and StringBuilder Classes Ref: TB1(9.7, pg166); OR2Lecture 253Understanding Streams File class and its methods, Ref: TB1(16.1-16.3, pg294-297); OR3Lecture 263Creating, Reading, Writing using classes: Byte and Character streams Ref: TB1(16.7-16.10, pg301-304); OR3Lecture 273File Output Stream, File Input Stream, File Writer, File Reader Ref: TB1(16.1-16.13, pg306-312); OR3Lecture 283Input Stream Reader, Print Stream, Print Writer Ref: TB1(16.13-16.14, pg313-315); OR3Lecture 293Compressing and Uncompressing File. Ref: TB1(16.15-16.16, pg317-320); OR3Lecture 314Error and exception Randbie interface. Ref: TB1(13.1-13.1, pg34-236); OR4Lecture 324Erroe and exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions Ref: TB1(13.4-13.5, pg27-241); OR4	Lecture 18	2	Enumerations, Polymorphism,
Lecture 19   2   Method Over Initial and restrictions. Package: Pre-defined     Ref: TB1(11.1-11.4, pg190-192); OR2     Lecture 20   2   packages and Custom packages     Ref: TB1(11.5-11.9, pg193-199); OR2     Lecture 21   3   Arrays: Creating & Using Arrays (1D, 2D, 3D and Jagged Array), Array of Object,     Referencing Arrays Dynamically.   Referencing Arrays Dynamically.     Ref: TB1(9.1-9.4, pg153-158); OR2     Lecture 22   3   Java Strings: The Java String Class,     Creating & Using String Objects,   Ref: TB1(9.5, pg161-162); OR2     Lecture 23   Manipulating Strings, String Immutability& Equality, Passing Strings To & From Methods     Ref: TB1(9.5, pg163-164); OR2   Ecture 24     Lecture 25   Understanding Streams File class and its methods,     Ref: TB1(15.1-16.3, pg294-297); OR3   Ecture 26     Lecture 26   Creating, Reading, Writing using classes: Byte and Character streams     Ref: TB1(16.1-16.6, pg297-300); OR3   Ecture 27     Lecture 28   Input Stream, File Input Stream, File Writer, File Reader     Ref: TB1(16.1-16.13, pg30-312); OR3   Ecture 29     Lecture 29   Compressing and Uncompressing File.     Ref: TB1(16.1-16.14, pg313-315); OR3   Ecture 31 <td< td=""><td>Locture 10</td><td>2</td><td>Kel: TB1(9.8, pg1/1-1/2); UR2</td></td<>	Locture 10	2	Kel: TB1(9.8, pg1/1-1/2); UR2
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Kei: TB1(13.1-13.1, pg234-236); OR4     Lecture 32   4   The Thread class and Runnable interface.     Ref: TB1(12.2,12.10, pg205,225); OR4     Lecture 33   4   Exception Handling, Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions     Ref: TB1(13.4-13.5, pg237-241); OR4	Lecture 31	4	Pof. TP1(12.1.12.1. pg224.226): OP4
Lecture 32   4   Intermediciass and Rumable interface.     Ref:   TB1(12.2,12.10, pg205,225); OR4     Lecture 33   4   Exception Handling, Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions     Ref:   TB1(13.4-13.5, pg237-241); OR4	Lecture 22	4	The Thread class and Runnable interface
Lecture 33   4   Exception Handling, Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions     Ref:   TB1(13.4-13.5, pg237-241); OR4		+	<b>Ref</b> · TB1(12.2.12.10, ng205.225)· $\cap \mathbb{R}^4$
Creating your own exceptions <b>Ref:</b> TB1(13.4-13.5, pg237-241): OR4	Lecture 33	4	Exception Handling, Exception types, uncaught exceptions, throw, built-in exceptions
<b>Ref:</b> TB1(13.4-13.5, pg237-241): OR4		'	Creating your own exceptions
			<b>Ref:</b> TB1(13.4-13.5, pg237-241); OR4

Lecture 34	4	Threading, creating single and multiple threads
		<b>Ref:</b> TB1(12.3-12.5, pg206-212); OR4
Lecture 35	4	Multi-threading: The Thread class and Runnable interface, Thread prioritization.
		<b>Ref:</b> TB1(12.6-12.8, pg214-218); OR4
Lecture 36	4	Thread prioritization, synchronization and communication.
		Ref: TB1(12.9, pg221); OR4
Lecture 37	4	suspending/resuming threads
		Ref: TB1(12.11, pg226); OR4
Lecture 38	4	Using java.net package.
		<b>Ref:</b> TB1(14.3-14.5, pg251-255); OR4
Lecture 39	4	Overview of TCP/IP and Datagram programming.
		<b>Ref:</b> TB1(14.6-14.10, pg255-260); OR4
Lecture 40	4	Accessing and manipulating databases using JDBC
		Ref: TB1(15.2-15.4, pg272-276); OR5

# Lesson Plan

Туре	Code		L-T-P	Credits	Marks
Lecture	Unit	Discrete Mathematical Structure	3-1-0	4	75
No	No				
Lecture 1	1	<b>Topic:</b> introduction to Logic			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 2	1	<b>Topic</b> : The foundations: Logic and proofs			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 3	1	<b>Topic:</b> Basic of propositional logic and proposition	al equivale	ences	
		<b>Ref:</b> TB1 ; TB2; OR1;OR2;OR3			
Lecture 4	1	<b>I opic:</b> Predicates and quantifiers ,Nested quantifier	ers.		
Locture	1	<b>Ker:</b> 1B1; 1B2; UR1;UR2			
Lecture 5	1				
Lecture 6	1	<b>Tonic</b> : Basic of sets Definition Types and operativ	on of sots		
Lecture 0	T	<b>Ref</b> TB1 · TB2· OB1·OB2	on or sets.		
Lecture 7	1	<b>Tonic</b> : Relations and functions types and definiti	ons		
Lecture /	1	<b>Ref:</b> TB1 : TB2: OR1:OR2	0115.		
Lecture 8	1	<b>Topic</b> Closures of Equivalence Relations			
20000000	_	<b>Ref:</b> TB1 : TB2: OR1:OR2			
Lecture 9	1	<b>Topic</b> : Partial ordering well ordering definition w	ith exampl	es.	
		<b>Ref:</b> TB1 ; TB2; OR1;OR2;OR3	r i r		
Lecture 10	1	Topic: ordering, Lattice, Sum of products and pro	duct of sun	s principle	e of
		Inclusions			
		and Exclusions.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2:OR3			
Lecture 11	2	<b>Topic:</b> The basic of counting, Fundamental princip	ple of count	ting(FPC)	
		<b>Ref:</b> TB1 ; TB2; OR2			
Lecture 12	2	<b>Topic:</b> Permutation: Definition ,Examples and nun	nericals reg	arding	
		permutations.			
L	2	<b>Ref:</b> IB1; IB2; UR1;UR2			
Lecture 13	Z	<b>I opic:</b> Combinations: Definition formula and num $\mathbf{p}_{of}$ , $\mathbf{TP1}$ , $\mathbf{TP2}$ , $\mathbf{OP1}$ , $\mathbf{OP2}$	erical rega	raing com	linations.
Locturo 14	2	<b>Tenic</b> The Digeophole principle			
Lecture 14	2				
Lecture 15	2	<b>Tonic:</b> Some basic numericals about Pigeonhole n	rincinle		
Lecture 15	4	<b>Ref:</b> TB1 : TB2: OR1:OR2	i incipic.		
Lecture 16	2	<b>Topic:</b> Recurrence Relation: Definition and types of	of recurren	ce relation	S.
	_	<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 17	2	<b>Topic:</b> properties of recurrence relations			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 18	2	Topic: Solving Recurrence relations			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 19	2	Topic: generating functions. Solving Recurrence u	sing gener	ating funct	ions.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 20	2	<b>Topic:</b> addition problems regarding recurrence re	elation.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 21	3	<b>Topic:</b> Introduction to graphs, graphs terminologi	ies		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2:OR3			

Lecture 22	3	<b>Topic:</b> Representation of graphs isomorphism
Lecture 23	3	<b>Topic:</b> connectivity of graphs. <b>Ref:</b> TB1 : TB2: OB1:OB2
Lecture 24	3	<b>Topic:</b> Euler and Hamiltonian Paths <b>Ref:</b> TB1 : TB2: OR1:OR2.
Lecture 25	3	<b>Topic</b> : Introduction to tree, definition with examples <b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 26	3	<b>Topic:</b> Introduction to tree traversal. <b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 27	3	<b>Topic</b> : spanning tree and tree search <b>Ref:</b> TB1 ; TB2; OR2
Lecture 28	3	<b>Topic</b> : spanning tree and tree search: Breadth first search, <b>Ref:</b> TB1 ; TB2; OR2;OR1
Lecture 29	3	<b>Topic:</b> spanning tree and tree search: Depth first search <b>Ref:</b> TB1 ; TB2; OR2
Lecture 30	3	<b>Topic:</b> introduction to cut-set, cut-vertex. Ref: TB1 ; TB2; OR2
Lecture 31	4	<b>Topic</b> : Introduction to modelling computation. <b>Ref:</b> TB1 ; TB2; OR2;OR3
Lecture 32	4	<b>Topic:</b> Finite State Machine, definition with examples <b>Ref:</b> TB1 ; TB2; OR2
Lecture 33	4	<b>Topic:</b> Finite-state machines with no output. <b>Ref:</b> TB1 ; TB2; OR2
Lecture 34	4	<b>Topic</b> : Deterministic Finite Automata (DFA) <b>Ref:</b> TB1 ; TB2; OR2
Lecture 35	4	<b>Topic:</b> Non Deterministic Finite Automata (DFA) <b>Ref:</b> TB1 ; TB2; OR2;OR3
Lecture 36	4	<b>Topic:</b> Grammars and Language <b>Ref:</b> TB1 ; TB2; OR2
Lecture 37	4	<b>Topic:</b> Language Recognition, Regular sets and regular Grammars. <b>Ref:</b> TB1 ; RB1; OR1
Lecture 38	4	<b>Topic</b> : A set of not recognized by a finite-state automata <b>Ref:</b> TB1 ; TB2; OR2,OR3
Lecture 39	4	<b>Topic:</b> Application of Pumping Lemma for Regular Language. <b>Ref:</b> TB1 ; TB2; OR2
Lecture 40	4	<b>Topic</b> : computing functions with turning machines. <b>Ref:</b> TB1 ; TB2; OR2;OR3

# **LESSON PLAN**

Туре	Code	PYTHON PROGRAMMING	L-T-P	Credits	Marks
CS	SEC-I		3-1-0	2	100
Topic (	Objective	To learn the basic of Python programming			
	To develop and create application using python code				
<b>Prerequisites</b> Basic knowledge about programming concept, flow chart, oops concept.			cept.		
<b>Lecture Scheme</b> Regular lectures (classroom /virtual class with Laptop/Desktop/Sma use of ICT, lectures are planned to be interactive with focus on pu		Smartphor	ie) with solving		
	activities.				

## **Evaluation Scheme**

Internal Assessment		Written Assessment	Total	
Assignment(s)	Unit Test	Mid-Term (Written)	End-Term	
0	0	20	80	100

### University Syllabus

Unit	Topics	Hours		
No				
Unit-1	Planning the Computer Program: Concept of problem solving, Problem	05		
	definition, Program design, Debugging, Types of errors in programming,			
	Documentation.			
Unit-2	Techniques of Problem Solving: Flowcharting, decision table, algorithms,	05		
	Structured programming concepts, Programming methodologies viz. top-down			
	and bottom-up programming.			
Unit-3	Overview of Programming: Structure of a Python Program, Elements of Python			
	Introduction to Python: Python Interpreter, Using Python as calculator, Python			
	shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators			
	(Arithmetic operator, Relational operator, Logical or Boolean operator,			
	Assignment, Operator, Ternary operator, Bit wise operator, Increment or			
	Decrement operator)			
Unit-4	Creating Python Programs: Input and Output Statements, Control statements	05		
	(Branching, Looping, Conditional Statement, Exit function, Difference between			
	break, continue and pass.), Defining Functions, default arguments.			
	Total (Hours)	20		

Text Books:

1. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012

Туре	Code		L-T-P	Credits	Mark		
		LESSON PLAN			S		
Lecture No	Unit No	PYTHON PROGRAMMING	3-1-0	2	100		
Lecture 1	1	<b>Topic:</b> Planning the Computer Program: Concept of problem solving					
Lecture 2	1	<b>Topic:</b> Problem definition		/ /			
Lactura 3	1	<b>Ref:</b> https://www.geekstorgeeks.org/python-program <b>Topic:</b> Program design	iming-langi	lage/			
	1	<b>Ref:</b> https://www.geeksforgeeks.org/python-program	ıming-langı	lage/			
Lecture 4	1	<b>Ref:</b> https://www.geeksforgeeks.org/python-program	nming-lang	uage/			
Lecture 5	1	<b>Topic:</b> Types of errors in programming, Documentation <b>Ref:</b> https://www.geeksforgeeks.org/python-program	on. 1ming-langi	lage/			
Lecture 6	2	<b>Topic:</b> Techniques of Problem Solving: Flowcharting <b>Ref:</b> https://www.geeksforgeeks.org/python-program	ıming-langı	12ge/			
Lecture 7	2	<b>Topic:</b> Decision table		/			
Locturo O	2	<b>Ref:</b> https://www.geekstorgeeks.org/python-program <b>Topic:</b> algorithms	iming-langi	lage/			
Lecture o	2	<b>Ref:</b> https://www.geeksforgeeks.org/python-program	nming-langu	lage/			
Lecture 9	2	<b>Ref:</b> https://www.geeksforgeeks.org/python-program	nming-lang	uage/			
Lecture 10	2	<b>Topic:</b> Programming methodologies viz. top-down and <b>Ref:</b> https://www.geeksforgeeks.org/python-program	d bottom-uj 1ming-langi	o programn 1age/	ning.		
Lecture	3	<b>Topic:</b> Overview of Programming: Structure of a P	ython Prog	gram, Elem	ents of		
11		<b>Ref:</b> https://www.geeksforgeeks.org/python-program	nming-lang	lage/			
Lecture	3	<b>Topic:</b> Introduction to Python: Python Interpreter, Using Python as calculator					
12	5	<b>Ref:</b> https://www.geeksforgeeks.org/python-program	nming-lang	uage/			
Lecture	3	<b>Topic:</b> Python shell, Indentation. Atoms, Identifiers and keywords, Literals					
Lecture	2	<b>Topic:</b> Strings					
14	3	Ref: https://www.geeksforgeeks.org/python-program	nming-langu	uage/			
		Topic: Operators (Arithmetic operator, Relational	operator, L	ogical or E	Boolean		
Lecture	3	operator, Assignment, Operator, Ternary operator, Bi	t wise oper	ator, Increr	nent or		
15		Decrement operator)	ming long	1000/			
Locturo		<b>Kel:</b> https://www.geekslorgeeks.org/python-program	iming-lang	lage/			
16	4	<b>Ref:</b> https://www.geeksforgeeks.org/python-program	uning_lang				
Lecture		<b>Tonic:</b> Control statements (Branching Looning Condi	tional State	ment)			
17	4	<b>Ref:</b> https://www.geeksforgeeks.org/nython-program	iming-langi	lage/			
		<b>Topic:</b> Control statements (Exit function, Difference b	etween bre	ak, continu	e and		
18	4	pass.)	_				
		<b>Ref:</b> https://www.geeksforgeeks.org/python-program	ıming-langı	lage/			
Lecture	4	<b>Topic:</b> Defining Functions <b>Ref:</b> https://www.geeksforgeeks.org/pythop-program	iming-lang	120e/			
Lecture		<b>Tonic</b> . Default arguments		145C/			
<u>2</u> 0	4	<b>Ref:</b> https://www.geeksforgeeks.org/python-program	ıming-langı	lage/			

## LESSON PLAN(THEORY)

Target No. Of Lectures: <u>40</u>

## Lectures actually conducted: <u>40</u>

Course-Sem-Year-Paper Code-Paper Name	BCA-3 <sup>rd</sup> Sem-2 <sup>nd</sup> Year CC
Subject Credit	4
Name of the Faculty	Smita Dey

Туре	Code		L-T-P	Credits	Marks
Lecture	Unit	Discrete mathematical structures	3-1-0	4	80
No	No				
Lecture 1	1	Topic: Financial accounting – Nature and Scope			
Lecture 2	1	Topic: Objectives of Finanancial Accounting			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 3	1	<b>Topic:</b> Accounting v/s Bookkeeping			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2;OR3			
Lecture 4	1	<b>Topic:</b> Users of Accounting information&Limitation	of Financia	l Accounti	ng
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 5	1	Topic: Accounting concept, Principles and convention	ons		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 6	1	Topic : Accounting Standard Concept			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 7	1	<b>Topic</b> :Accounting Standard – Objective ,benefit			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 8	1	Topic: Accounting Standard in India			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 9	1	Topic : Accounting Policies			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2;OR3			
Lecture 10	1	<b>Topic:</b> Accounting as a measurement discipline.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2:OR3			
Lecture 11	2	Topic:Valuation Principles			
		<b>Ref:</b> TB1 ; TB2; OR2			
Lecture 12	2	Topic: Accounting estimates.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 13	2	Topic:voucher system ,Accounting Process			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 14	2	Topic: Journals Principle of journel			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2.			
Lecture 15	2	Topic:Subsidiary Book			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 16	2	Topic: Rules of Ledger . Preparation of ledger from j	ounel		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 17	2	Topic:Preparation of Cashbook			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 18	2	Topic:Bank Reconciliation Statement			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			

Lecture 19	2	Topic:Preparation of Trail Balance
		Ref:TB1 ; TB2; OR1;OR2
Lecture 20	2	Topic: Trail Balance – Total method.
		Ref:TB1 ; TB2; OR1;OR2
Lecture 21	3	Topic:Trail Balance- Balance method
		Ref:TB1 ; TB2; OR1;OR2:OR3
Lecture 22	3	Topic: Trail balance- Compound Method
		Ref:TB1 ; TB2; OR1;OR2
Lecture 23	3	<b>Topic:</b> Preparation of Trading Accounting.
		Ref:TB1 ; TB2; OR1;OR2
Lecture 24	3	Topic:Preparation Of Profit and Loss Accounting
		<b>Ref:</b> TB1 ; TB2; OR1;OR2,
Lecture 25	3	Topic: Balance Sheet of Sole Proprietary business
		Ref:TB1 ; TB2; OR1;OR2
Lecture 26	3	Topic:Preparation of Final Accounts.
		Ref:TB1 ; TB2; OR1;OR2
Lecture 27	3	Topic: Important provision of companies Act 1956
		Ref:TB1 ; TB2; OR2
Lecture 28	3	Topic:Understanding of Final accounts of a Company,
		Ref:TB1 ; TB2; OR2;OR1
Lecture 29	3	Topic:Computers and Financial application
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 30	3	Topic: Accounting software packages
		Ref:TB1 ; TB2; OR2
Lecture 31	4	Topic: Computerized Accounting System
		Ref:TB1 ; TB2; OR2;OR3
Lecture 32	4	Topic:Sailent features of Computerized Accounting system
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 33	4	<b>Topic:</b> Computerized accounting – Significance
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 34	4	Topic:Concept of grouping of accounts
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 35	4	Topic: Codificationof accounts
		Ref:TB1 ; TB2; OR2;OR3
Lecture 36	4	Topic:Maintaining the hierarchy of ledger
		Ref:TB1 ; TB2; OR2
Lecture 37	4	Topic: Generating Accounting Reports
		<b>Ref:</b> TB1 ; RB1; OR1
Lecture 38	4	Topic: What is Flow chart ?
		<b>Ref:</b> TB1 ; TB2; OR2,OR3
Lecture 39	4	Topic: Difference between Manual Accounting System and Computerized
		Accounting
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 40	4	Topic: Advantages and Disadvantages of Computerized Accounting
		<b>Ref:</b> TB1 ; TB2; OR2;OR3

## LESSON PLAN(THEORY)

Target No. Of Lectures: <u>40</u>

## Lectures actually conducted: <u>40</u>

Course-Sem-Year-Paper Code-Paper Name	BCA-3 <sup>rd</sup> Sem-2 <sup>nd</sup> Year CC-7-
Subject Credit	4
Name of the Faculty	Siva Ranjan Pradhan/ Tejaswini Pradhan

Туре	Code		L-T-P	Credits	Marks
Lecture	Unit	Discrete mathematical structures	3-1-0	4	75
No	No				
Lecture 1	1	Topic:introduction to Logic			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 2	1	Topic: The foundations: Logic and proofs			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 3	1	Topic: Basic of propositional logic and propositional	lequivalen	ces	
		Ref:TB1 ; TB2; OR1;OR2;OR3			
Lecture 4	1	Topic:Predicates and quantifiers ,Nested quantifier	ſS.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 5	1	<b>Topic:</b> Rules inference, Mathematical Induction.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 6	1	Topic :Basic of sets,Defination ,Types and operation	n of sets.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 7	1	Topic :Relations and functions, types and defination	ns.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 8	1	TopicClosures of Equivalence Relations			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 9	1	Topic : Partial ordering well ordering definition with	n examples.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2;OR3			
Lecture 10	1	Topic:ordering, Lattice, Sum of products and produ	ict of sums	principle o	of
		Inclusions			
		and Exclusions.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2:OR3			
Lecture 11	2	Topic: The basic of counting, Fundamental principle	of counting	g(FPC)	
		<b>Ref:</b> TB1 ; TB2; OR2			
Lecture 12	2	Topic:Permutation:Defination ,Examples and nume	ericals rega	rding perm	nutations.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 13	2	Topic:Combinations:Defination formula and numer	rical regard	ing combii	nations.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 14	2	Topic:ThePigeonhole principle			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2.			
Lecture 15	2	Topic:Some basicnumericals about Pigeonhole prin	nciple.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 16	2	Topic:Recurrence Relation:Defination and types of	recurrence	relations.	
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 17	2	Topic:properties of recurrence relations			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			

Lecture 18	2	<b>Topic:</b> Solving Recurrence relations
	_	Ket: IB1; IB2; UR1; UR2
Lecture 19	2	<b>Topic:</b> generating functions. Solving Recurrence using generating functions. <b>Ref</b> :TB1 · TB2 · OB1·OB2
Locture 20	2	Topics addition problems regarding resurrence relation
Lecture 20	2	<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 21	3	<b>Topic:</b> Introduction to graphs, graphs terminologies
	_	Ref:TB1 ; TB2; OR1;OR2:OR3
Lecture 22	3	Topic:Representation of graphs isomerphisim
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 23	3	Topic:connectivity of graphs.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 24	3	Topic:Euler and Hamiltonian Paths
		<b>Ref:</b> TB1 : TB2: OR1:OR2.
Lecture 25	3	<b>Topic</b> : Introduction to tree definition with examples
Leeture 25	5	Ref:TB1 · TB2· OR1·OR2
Lecture 26	3	Topic: Introduction to tree traversal
Lecture 20	5	
Locture 27	2	Topic: spanning tree and tree sparsh
Lecture 27	5	
1 a atuma 20	2	Rel: IB1; IB2; UR2
Lecture 28	3	<b>I opic</b> : spanning tree and tree search: Breadth first search,
		Ref: IB1; IB2; OR2;OR1
Lecture 29	3	<b>Topic:</b> spanning tree and tree search: Depth first search
		Ref:TB1 ; TB2; OR2
Lecture 30	3	Topic: introduction to cut-set, cut-vertex.
		Ref:TB1 ; TB2; OR2
Lecture 31	4	<b>Topic</b> : Introduction to modelling computation.
		<b>Ref:</b> TB1 ; TB2; OR2;OR3
Lecture 32	4	Topic:Finite State Machine, definition with examples
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 33	4	<b>Topic:</b> Finite-state machines with no output.
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 34	4	Topic: Deterministic Finite Automata (DFA)
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 35	4	Topic:Non Deterministic Finite Automata (DFA)
		<b>Ref:</b> TB1 : TB2: OR2:OR3
Lecture 36	4	Topic: Grammars and Language
	•	<b>Bef</b> ·TB1 · TB2· OB2
Lecture 37	Λ	Topic: Language Recognition Regular sets and regular Grammars
Lecture 57	7	
Locture 29	Δ	<b>Tenie:</b> A set of not recognized by a finite state automa
Lecture 38	4	
Leature 20	4	Tenin Application of Dumping Lommo for Deputer Longraph
Lecture 39	4	<b>IOPIC:</b> Application of Pumping Lemma for Regular Language.
	-	Ket: IB1; IB2; UR2
Lecture 40	4	Topic: computing functions with turning machines.
		Ret:TB1 ; TB2; OR2;OR3

## LESSON PLAN(THEORY)

Target No. Of Lectures: <u>40</u>

## Lectures actually conducted: 40

Course-Sem-Year-Paper Code-Paper Name	BCA-3 <sup>rd</sup> Sem-2 <sup>nd</sup> Year CC-7-DISCRETE		
	MATHEMATICAL STRUCTURE		
Subject Credit	4		
Name of the Faculty	Siva Ranjan Pradhan/ Tejaswini Pradhan		

Туре	Code		L-T-P	Credits	Marks
Lecture	Unit	Discrete mathematical structures	3-1-0	4	75
No	No				
Lecture 1	1	Topic:introduction to Logic			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 2	1	Topic: The foundations: Logic and proofs			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 3	1	Topic:Basic of propositional logic and propositional	equivalence	ces	
		<b>Ref:</b> TB1 ; TB2; OR1;OR2;OR3			
Lecture 4	1	Topic: Predicates and quantifiers , Nested quantifier	s.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 5	1	Topic: Rules inference, Mathematical Induction.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 6	1	Topic :Basic of sets,Defination ,Types and operation	n of sets.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 7	1	Topic :Relations and functions, types and defination	ns.		
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 8	1	TopicClosures of Equivalence Relations			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 9	1	Topic : Partial ordering well ordering definition with examples.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2;OR3			
Lecture 10	1	Topic:ordering, Lattice, Sum of products and produ	ct of sums	principle o	of
		Inclusions			
		and Exclusions.			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2:OR3			
Lecture 11	2	<b>Topic:</b> The basic of counting,Fundamental principle	of counting	g(FPC)	
		<b>Ref:</b> TB1 ; TB2; OR2			
Lecture 12	2	Topic:Permutation:Defination ,Examples and nume	ericals regar	ding perm	nutations.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 13	2	Topic:Combinations:Defination formula and numer	ical regard	ng combii	nations.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2			
Lecture 14	2	Topic:ThePigeonhole principle			
		<b>Ref:</b> TB1 ; TB2; OR1;OR2.			
Lecture 15	2	Topic: Some basic numericals about Pigeonhole principle.			

		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 16	2	<b>Topic:</b> Recurrence Relation:Defination and types of recurrence relations.
		Ref:TB1 ; TB2; OR1;OR2
Lecture 17	2	Topic: properties of recurrence relations
		Ref:TB1 ; TB2; OR1;OR2
Lecture 18	2	Topic:Solving Recurrence relations
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 19	2	<b>Topic:</b> generating functions. Solving Recurrence using generating functions.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 20	2	Topic:addition problems regarding recurrence relation.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 21	3	<b>Topic:</b> Introduction to graphs, graphs terminologies
		Ref:TB1 ; TB2; OR1;OR2:OR3
Lecture 22	3	Topic: Representation of graphs isomerphisim
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 23	3	Topic:connectivity of graphs.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 24	3	Topic: Euler and Hamiltonian Paths
		<b>Ref:</b> TB1 ; TB2; OR1;OR2,
Lecture 25	3	<b>Topic</b> : Introduction to tree, definition with examples
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 26	3	Topic:Introduction to tree traversal.
		<b>Ref:</b> TB1 ; TB2; OR1;OR2
Lecture 27	3	Topic: spanning tree and tree search
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 28	3	<b>Topic</b> : spanning tree and tree search: Breadth first search,
		<b>Ref:</b> TB1 ; TB2; OR2;OR1
Lecture 29	3	Topic:spanning tree and tree search: Depth first search
		<b>Ref:</b> TB1 ; TB2; OR2
Lecture 30	3	Topic:introduction to cut-set,cut-vertex.
		Ref:TB1 ; TB2; OR2
Lecture 31	4	Topic: Introduction to modelling computation.
		Ref:TB1 ; TB2; OR2;OR3
Lecture 32	4	Topic: Finite State Machine, definition with examples
		Ref:TB1 ; TB2; OR2
Lecture 33	4	<b>Topic:</b> Finite-state machines with no output.
		Ref:TB1 ; TB2; OR2
Lecture 34	4	Topic: Deterministic Finite Automata (DFA)
		Ref:TB1 ; TB2; OR2
Lecture 35	4	Topic:Non Deterministic Finite Automata (DFA)
		Ref:TB1 ; TB2; OR2;OR3
Lecture 36	4	Topic: Grammars and Language
		Ref:TB1 ; TB2; OR2
Lecture 37	4	<b>Topic:</b> Language Recognition,Regular sets and regular Grammars.
		Ref:TB1 ; RB1; OR1
Lecture 38	4	<b>Topic</b> : A set of not recognized by a finite-state automa
		Ref:TB1 ; TB2; OR2,OR3
Lecture 39	4	<b>Topic:</b> Application of Pumping Lemma for Regular Language.
		Ref:TB1 ; TB2; OR2
Lecture 40	4	<b>Topic</b> : computing functions with turning machines.
		<b>Ref:</b> TB1 ; TB2; OR2;OR3