

# **AL-AMEEN ENGINEERING COLLEGE**

# (Autonomous)

Accredited by NAAC with "A" Grade :: Accredited by NBA (Affiliated to Anna University, Chennai & Approved by AICTE, New Delhi) Karundevanpalayam, Nanjai Uthukkuli Post, Erode – 638 104, Tamilnadu, INDIA.

# CURRICULUM & SYLLABI SEMESTERS – I to VIII (Regulations 2023)

# CHOICE BASED CREDIT SYSTEM B.Tech. Information Technology

Applicable to the Students admitted to B.E. / B.Tech. Programmes from the AY 2023-24 onwards

# KNOWLEDGE LEVELS (BLOOM'S TAXONOMY)

Notation	Knowledge Levels
K1	Remembering
К2	Understanding
К3	Applying
K4	Analysing
K5	Evaluating
K6	Creating

## **INSTITUTION VISION**

To be a multi-disciplinary institute of academic excellence in Engineering, Technology and allied fields for uplifting the under-privileged and rural; inculcating brotherhood and positivism among its students.

## **INSTITUTION MISSION**

To groom confident, wholesome students with social consciousness and values, by endeavoring experiences for the ever-changing world of work.

## **DEPARTMENT VISION**

The department of Information Technology aspires to become a school of excellence in providing quality education, constructive research and professional opportunities in Information Technology.

DEPARTMENT MISSION								
M1	To provide academic programs that engage, enlighten and empower the students to							
	learn technology through practice, service and outreach.							
M2	To educate the students about social responsibilities and entrepreneurship.							
M3	To encourage research through continuous improvement in infrastructure, curriculum and faculty development in collaboration with industry and institutions.							

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

PEO 1	Graduates will have progressive learning and successful career in Information, Communication Technologies and their applications.
PEO 2	Graduates will be leaders in their chosen field.
PEO 3	Graduates will utilize the acquired technical skills and knowledge for the benefit of society.

	PROGRAM OUTCOMES (POs)
PO 1	<b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	<b>Problem Analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	<b>Design/Development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	<b>Conduct Investigations of Complex Problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	<b>Modern Tool Usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	<b>Environment and Sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

	PROGRAM SPECIFIC OUTCOMES (PSOs)
PSO 1	Technical Skills: Apply the fundamental knowledge to develop computer based solutions in the areas related to information management and networking.
PSO 2	Leadership Skills: Demonstrate professionalism and ethics in managing academic/ non-academic activities as a team and an individual.

# CURRICULUM

## **SEMESTER I**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С	
		THEORY COU	RSES							
1	23MA1T1	Calculus & Differential Equations	BS	40	60	3	1	0	4	
	THEORY COURSES WITH LABORATORY COMPONENTS									
2	23EN1LT2	Communicative English	HS	50	50	3	0	2	4	
3	23PH1LT3	Engineering Physics	BS	50	50	3	1	2	5	
4	23CY1LT4	Engineering Chemistry	BS	50	50	3	1	2	5	
5	23CS1LT5	Problem Solving and C programming	ES	50	50	3	0	4	5	
		MANDATORY C	OURS	Е						
6		Universal Human Values 1 - Induction Programme	MC	-	-	-	-	-	-	
7	23HS1T6	Heritage of Tamil	MC	100	-	1	0	0	1	
		Total				16	3	10	24	

# **SEMESTER II**

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	Т	Р	С
THEORY COURSES									
1	23EN2T1	Technical English	HS	40	60	3	0	0	3
2	23HS2T2	Environmental Sciences	MC	100	-	3	0	0	0
3	23HS2T3	Tamils And Technology	MC	100	-	1	0	0	1
4	23MA2T4	Algebra and Number Theory	BS	40	60	3	1	0	4
	THEO	RY COURSES WITH LA	BORATOF	RY CO	MPON	IEN.	ГS		
5	23CS2LT1	Python Programming	ES	50	50	3	0	4	5
6	23EE2LT2	Basics of Electrical and Electronics Engineering	ES	50	50	3	0	4	5
		Total				16	1	8	18

# **SEMESTER III**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С	
	THEORY COURSES									
1	23HS3T1	Constitution of India	MC	100	-	3	0	0	0	
2	23MA3T2	Probability and Queuing Theory	BS	40	60	3	1	0	4	
3	23CSCT4	Computer Organization and Architecture	PC	40	60	3	0	0	3	
4	23CS3T3	User Interface Design	PC	40	60	3	1	0	4	
	THEORY	Y COURSES WITH LABO	RATO	RY CC	OMPO	NEN	ГS			
5	23CS3LT1	Object Oriented Programming with Java	PC	50	50	2	0	4	4	
6	23CS3LT2	Data Structures & Algorithms	PC	50	50	2	0	4	4	
		LABORATORY C	OURS	ES						
7	23EN3L1	Inter Personal Communication Skills Laboratory - I	HS	60	40	0	0	3	1.5	
		Total				16	2	11	20.5	

# **SEMESTER IV**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С
THEORY COURSES									
1	23HS4T1	Universal Human Values 2: Understanding Harmony	HS	100	-	2	1	0	3
2	23CS4T2	Software Engineering	PC	40	60	3	0	0	3
3	23IT4T3	Web Technology	PC	40	60	3	1	0	4
4		Open Elective – I	OE	40	60	3	0	0	3
5		Database Management Systems	PC	40	60	3	0	0	3
	THEOR	Y COURSES WITH LABO	RATO	RY C	OMPO	NEN	TS		
6	23CS4LT2	Operating Systems	PC	50	50	2	0	4	4
		LABORATORY C	COURS	SES					
7		Database Management Systems Laboratory	PC	50	50	0	0	2	1
8	23EN4L1	Interpersonal Communication Skills laboratory –II	HS	60	40	0	0	3	1.5
	Total						2	9	22.5

# **SEMESTER V**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С	
THEORY COURSES										
1		Principles of Compiler Design	PC	40	60	3	1	0	4	
2		Professional Ethics	PE	40	60	3	0	0	3	
3		Professional Elective - I	OE	40	60	3	0	0	3	
4		Open Elective – II	PC	40	60	3	0	0	3	
5		Computer Networks	PC	40	60	3	0	0	3	
THEORY COURSES WITH LABORATORY COMPONENTS										
6		Mobile Application and Development	PC	50	50	2	0	4	4	
		LABORATORY	COUF	RSE						
7		Compiler Design Laboratory	PC	60	40	0	0	2	1	
8		Computer Networks Laboratory	PC	60	40	0	0	2	1	
		MANDATORY	COUR	SE						
8		Soft Skills – I	EEC	100	-	2	1	0	0	
	Total							8	22	

# **SEMESTER VI**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С
THEORY COURSES									
1		Artificial Intelligence	PC	40	60	3	1	0	4
2		Cryptography and Network Security	PC	40	60	3	0	0	3
3		Internet of Things	PC	40	60	3	0	0	3
4		Professional Elective – II	PE	40	60	3	0	0	3
5		Open Elective - III	OE	40	60	3	0	0	3
	THEO	RY COURSES WITH LAB	ORAT	ORY (	COMP	ONE	NTS		
6		Professional Elective - III	PE	50	50	2	0	4	4
		LABORATORY	COUI	RSE					
7		Internet of Things Laboratory	PC	60	40	0	0	2	1
		MANDATORY	COUR	SE					
9		Soft Skills – II	MC	100	-	2	1	0	0
		Total				19	2	6	21

# **SEMESTER VII**

SI. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С	
	THEORY COURSES									
1		Software Project Management	PC	40	60	3	0	0	3	
THEORY COURSE WITH LABORATORY COMPONENTS										
2		Professional Elective - IV	PE	50	50	2	0	4	4	
3		Machine Learning Techniques	PC	50	50	2	0	4	4	
4		Big Data Analytics	PC	50	50	2	0	4	4	
5		Professional Elective - V	PE	50	50	2	0	4	4	
	LABORATORY COURSE									
6		Project Work Phase-I	EEC	100	-	0	0	10	3	
		Total				11	0	26	22	

## **SEMESTER VIII**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С	
LABORATORY COURSES										
1		Project Work Phase-II	EEC	60	40	0	0	24	12	
2		Industrial Training / Internship	EEC	100	-	4	1			
Total						0	0	24	13	

**Total Credits: 163** 

# HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT (HS)

S. No.	<b>Course Code</b>	Course Title	L	Т	Р	С
1	23EN1LT2	Communicative English	3	0	2	4
2	23EN2T1	Technical English	3	0	0	3
3	23EN3L1	Inter Personal Communication Skills Laboratory -I	0	0	3	1.5
4	23EN4L1	Inter Personal Communication Skills Laboratory –II	0	0	3	1.5
5	23HS4T1	Universal Human value 2:Understanding Harmony	2	1	0	3
6		Professional Ethics	3	0	0	3

#### BASIC SCIENCES (BS)

Sl.No.	<b>Course Code</b>	Course Title	L	Т	Р	С
1	23MA1T1	Calculus & Differential Equations	3	1	0	4
2	23PH1LT3	Engineering Physics	3	1	2	5
3	23CY1LT4	Engineering Chemistry	3	1	2	5
4	23MA2T4	Algebra & Number Theory	3	1	0	4
5	23MA3T2	Probability and Queuing Theory	3	1	0	4

#### ENGINEERING SCIENCES (ES)

SI.No.	Course Code	Course Title	L	Т	Р	С
1	23CS1LT5	Problem solving and C Programming	3	0	4	5
2	23CS2LT1	Python Programming	3	0	4	5
3	23EE2LT2	Basics of Electrical and Electronics Engineering	3	0	4	5
4	23EC3T4	Digital Principles and System Design	3	0	0	3

# **PROFESSIONAL CORE (PC)**

Sl.No.	<b>Course Code</b>	Course Title	L	Т	Р	С
1	23CS3T3	User Interface Design	3	1	0	4
2	23CS3LT1	Object Oriented Programming With java	2	0	4	4
3	23CS3LT2	Data Structures and Algorithms	2	0	4	4
4	23CS4T2	Software Engineering	3	0	0	3
5	23CSCT4	Computer Organization and Architecture	3	0	0	3
6	23CS4LT1	Database Management Systems	2	0	4	4
7	23CS4LT2	Operating Systems	2	0	4	4
8	23CS4LT3	Internet Programming	2	0	4	4
9		Internet of Things	2	0	4	4
10		Computer Network	2	0	4	4
11		Mobile Computing	2	0	4	4
12		Artificial Intelligence	3	1	0	4
13		Compiler Design	2	0	4	4
14		Object Oriented Analysis & Design	2	0	4	4
15		Machine Learning	3	0	0	3
16		Cryptography & Network Security	2	0	4	4
17		Cloud Computing	2	0	4	4

# **PROFESSIONAL ELECTIVES (PE)**

PE No.	Course Code	Course Title	L	Т	Р	С			
Semester – V (Elective I)									
PEI-1		Exploratory DataAnalysis	3	0	0	3			
PEI-2		Business Analytics	3	0	0	3			
PEI-3		Data Warehousing	3	0	0	3			
PEI-4		Software Defined Networks	3	0	0	3			
PEI-5		Ethical Hacking	3	0	0	3			
Semester – VI (Elective II)									
PEII-1		Digital and Mobile Forensics	3	0	0	3			
PEII-2		Augmented Reality/Virtual Reality	3	0	0	3			
PEII-3		Digital marketing	3	0	0	3			
PEII-4		Knowledge Engineering	3	0	0	3			
PEII-5		Optimization Techniques	3	0	0	3			
		Semester – VI (Elective III)							
PEIII-1		Image and Video Analytics	2	0	4	4			
PEIII-2		Computer Vision	2	0	4	4			
PEIII-3		Big Data Analytics	2	0	4	4			
PEIII-4		Cloud Services Management	2	0	4	4			
PEIII-5		Security and Privacy in Cloud	2	0	4	4			

Semester – VII (Elective IV)								
PEIV-1	Storage Technologies	2	0	4	4			
PEIV-2	Cyber Security and Privacy	2	0	4	4			
PEIV-3	Modern Cryptography	2	0	4	4			
PEIV-4	Crypto currency and Block chain Technologies	2	0	4	4			
PEIV-5	Multimedia Data Compression and Storage	2	0	4	4			
Semester – VII (Elective V)								
PEV-1	UI and UX Design	2	0	4	4			
PEV-2	Video Creation and Editing	2	0	4	4			
PEV-3	Text and Speech Analysis	2	0	4	4			
PEV-4	Neural Networks and Deep Learning	2	0	4	4			
PEV-5	Game Theory	2	0	4	4			

## EMPLOYABILITY ENHANCEMENT COURSES (EEC) PRACTICAL COURSES AND PROJECT WORK

Sl. No.	<b>Course Code</b>	Course Title	L	Т	Р	С
1		Soft skills- I	2	1	0	0
2		Soft skills- II	2	1	0	0
3		Project Work Phase - I	0	0	10	3
4		Project Work Phase - II	0	0	24	12
5		Industrial Training / Internship	4 Weeks			1

# MANDATORY COURSES (MC)

SI.No.	<b>Course Code</b>	Course Title	L	Т	Р	С
1		Universal Human Values 1 - Induction Programme	-	-	-	-
2	23HS1T6	Heritage of Tamil	1	0	0	1
3	23HS2T2	Environmental Sciences	3	0	0	0
4	23HS2T3	Tamil And Technology	1	0	0	1
5	23HS3T1	Constitution of India	3	0	0	0

# VALUE ADDED COURSE (VAC)

S.No.	Course Code	Course Title	Credit
1		J2EE	3
2		Php, Mysql	2
3		Android Application Development	2
4		Arduino	3
5		Hardware And Network Trouble Shooting	2
6		Ethical Hacking	3
7		Web Designing	2

# VERTICAL COURSE

VC No.	<b>Course Code</b>	<b>Course Title</b>	L	Т	Р	С		
VERTICAL I – Java FULL Stack								
VCI-I		Java Programming	3	0	0	3		
VCI-II		Web Technology using JavaScript	2	0	4	4		
VCI-III		Database Management with MySQL	3	0	0	3		
VCI-IV		React JS Framework	2	0	4	4		
VCI-V		Advanced JAVA with RestAPI	2	0	4	4		
		VERTICAL II - MERNStack						
VCII-I		Logical Programming Mastery with Java	2	0	4	4		
VCII-II		NoSQL with Mongo Database	3	0	0	3		
VCII-III		Web Technology using JavaScript	2	0	4	4		
VCII-IV		Node JS & Express Framework	3	0	0	3		
VCII-V		React JS Framework	2	0	4	4		

# **OPEN ELECTIVE COURSES OFFERED TO OTHER DEPARTMENTS (OE)**

Sl.No.	Course Code	Course Title	L	Т	Р	С
1		Fundamentals of Databases	3	0	0	3
2		Python Programming and Frameworks	3	0	0	3
3		Data Structures	3	0	0	3
4		Computational Science for Engineers	3	0	0	3
5		Java Programming	3	0	0	3
6		Web Engineering	3	0	0	3
7		Fundamentals of Blockchain	3	0	0	3
8		Introduction to Artificial Intelligence	3	0	0	3
9		Fundamentals of Internet of Things	3	0	0	3
10		Cloud Technology	3	0	0	3

Subject	AICTE suggested breakdown of credits	Total number of credits	Curriculum Content (% of total number of credits of the program)
Humanities and Social Sciences including Management (HS)	16	16	9.6
Basic Sciences (BS)	23	22	13.2
Engineering Sciences (ES)	29	18	10.8
Professional Core (PC)	59	65	39.1
Program Electives (PE)	12	18	10.8
Open Electives (OE)	9	9	5.4
Employability Enhancement Courses (EEC) – Practical Courses and Project Work	15	16	9.6
Mandatory Courses (MC)	0	2	1.2
Total	163	166	100.00

## CURRICULUM BREAKDOWN STRUCTURE

CREDIT	SUMMARY
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SI No	Subject Area	credits per Semester								Total	AICTE	
51. 110.		Ι	II	ш	IV	V	VI	VII	VIII	Credits	Credits	
1	HS	4	3	1.5	4.5	3				16	16	
2	BS	14	4	4						22	23	
3	ES	5	10	3						18	29	
4	РС			12	18	12	12	11		65	59	
5	PE					3	7	8		18	12	
6	OE				3	3	3			9	9	
7	EEC							3	13	16	15	
8	MC	1	1							2	0	
TOTAL		24	18	20.5	25.5	21	22	22	13	166	163	

HS – Humanities and Social Sciences including Management

**BS** – Basic Sciences

 $\mathbf{ES}$  – Engineering Sciences

PC – Professional Core

 $\label{eq:period} PE-Professional \ Electives$ 

**OE** – Open Electives

**EEC** – Employability Enhancement Courses

MC – Mandatory Courses

# **SEMESTER I**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С	
THEORY COURSES										
1	23MA1T1	Calculus & Differential EquationsBS4060					1	0	4	
THEORY COURSES WITH LABORATORY COMPONENTS										
2	23EN1LT2	Communicative English	50	50	3	0	2	4		
3	23PH1LT3	Engineering Physics	BS	50	50	3	1	2	5	
4	23CY1LT4	Engineering Chemistry	BS	50	50	3	1	2	5	
5	23CS1LT5	Problem Solving and C programming	ES	50	50	3	0	4	5	
		MANDATORY C	OURS	E						
6		Universal Human Values 1 - Induction Programme	MC	-	-	-	-	-	-	
7	23HS1T6	Heritage of Tamil	100	-	1	0	0	1		
		Total				16	3	10	24	

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
Ι	B.E. / B.Tech., Common to all	23MA1T1	CALCULUS AND DIFFERENTIAL EQUATIONS	3	1	0	4

## PRE-REQUISITES NIL

	COURSE OBJECTIVES								
1	To classify the concept of matrices to solve engineering problems.								
2	To make use of the concepts of differentiation for problems under multivariable functions.								
3	To identify suitable integral techniques to find area and volume.								
4	To interpret the concepts of vector point functions and related identities for solving problems under vector calculus.								
5	To solve linear differential equations and apply for physical situations.								

## COURSE CONTENT

Unit – I	MATRICES	9 + 3							
Eigen values and Eigen vectors – properties (without proof) – Cayley Hamilton theorem (Without proof) –Diagonalization using orthogonal transformation.									
Unit – II	t – II FUNCTIONS OF SEVERAL VARIABLES								
Partial derivatives – Total derivative – Jacobians - Taylor's series expansion – Extreme values of functions of two variables – Lagrange's multipliers method.									
Unit – III	MULTIPLE INTEGRALS	9 + 3							
Double integrals – Change of order of integration – Triple integrals – Applications in area and volumes.									
Unit – IV	Unit - IV LINE AND SURFACE INTEGRALS 9 + 3								
Gradient, Divergence and curl– Directional Derivative – Irrotational and solenoidal vector fields – Green's theorem – Green's theorem in a plane – Gauss divergence theorem – Stokes theorem (excluding proof).									
Unit - V	ORDINARY DIFFERENTIAL EQUATION	9 + 3							
Second and higher order linear differential equations with Constant coefficients – Variable coefficients – Euler Cauchy equation – Legendre's equation – Method of variation of Parameters – Simple Applications.									

Lecture: 45 PeriodsTutorial: 15 PeriodsTotal: 60 Periods

TE	XT BOOKS							
1	Jain R.K and Iyengar S.R.K, "Advanced Engineering Mathematics", 5 <sup>rd</sup> Edition, Narosa Publishing House, New Delhi, Reprint 2019.							
2	Ramana B.V., "Higher Engineering Mathematics", Tata Mcgraw Hill Publishing Company, New Delhi, 2017.							
3	Kreyszig E., "Advanced Engineering Mathematics", 10th Edition, John Wiley Sons, 2012.(E-BOOK).							
4	Glyn James., "Advanced Modern Engineering Mathematics", Pearson Education Limited, 2018.							
5	N P Bali, Manish Goyal, "A Text Book of Engineering Mathematics", 9rd Edition, Laxmi Publication Private Limited, 2010.							

вс	BOOK REFERENCES								
1	K.K.Vadivelu, "Engineering Mathematics – I", VRP Publishers Pvt Ltd, New Edition -2017-18, Chennai.								
2	Prof. A. Chandrasekar – "Engineering Mathematics – I" , Vishnu prints Media , New Edition -2017-18, Chennai.								
3	Dr.S.Chitra, Dr.S.Isaiyarasi- "Engineering Mathematics – I",Sri Krishna Hitech Publishing Company Pvt Ltd, Revised Edition 2018-19, Chennai								
4	Dr.S.Vallinayagam, Dr.S.Annadurai, Dr. T.Kalyani, "Engineering Mathematics – I", Airwalk Publications, Third Edition – 2019, Chennai.								
5	Prof. A. Chandrasekar – "Engineering Mathematics – II", Vishnu prints Media, Revised Edition -2019-20, Chennai.								

E-I	E-RESOURCES							
1	https://www.slideshare.net/mailrenuka/matrices-and-application-of- matrices							
2	https://youtu.be/wtuq1oSButE							
3	https://www.slideshare.net/abhinavsomani3/applications-of-maths-in-our- daily-life-41607055							

COURSE OUTCOMES (CO)									
After Successful completion of the course, the students should be able to									
CO1	Classify the concept of matrices to solve engineering problems.	К3	1						
CO2	Make use of the concepts of differentiation for problems under multivariable functions.	K2	2						
CO3	Identify suitable integral techniques to find area and volume.	К3	3						
CO4	Interpret the concepts of vector point functions and related identities for solving problems under vector calculus.	К3	4						
CO5	Solve linear differential equations and apply for physical situations.	К3	5						
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - (	Creating						

CO WISE DIRECT ASSESSMENT PATTERN											
	Accorcomonto		Maxi	mum M	larks		Total	Ma	Marks		
	Assessments			CO2	CO3	<b>CO4</b>	CO5	Marks	ersion		
		Part A	8	8	4			20			
	CATI	Part B	32	32	16			80			
		Total (a)	40	40	20			100	200	<u>CIA:</u> 40	
		Part A			4	8	8	20	<b>30</b>		
CIA	CAT II	Part B			16	32	32	80	40 to <b>10</b>		
		Total (b)			20	40	40	100			
	Other Assessment	Total (c)	8	8	8	8	8	40			
		Part A	4	4	4	4	4	20			
ESE	End Semester Examinations	Part B	16	16	16	16	16	80	100 to	ESE:	
	- Theory	Total (d)	20	20	20	20	20	100	60	60	
Tota	l Marks (a + b +	c + d)	68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
Ι	B.E. / B.Tech., Common to all	23EN1LT2	COMMUNICATIVE ENGLISH	3	0	2	4

PRE-REQUISITES

NIL

#### **COURSE OBJECTIVES**

1	To Infer the communication skills with error-free strategies.
2	To Construct the effectiveness of soft skills.
3	To Classify the stress and intonation in public speaking.
4	To Enhance in reading and writing skills.
5	To Take part in Public speaking

## THEORY COURSE CONTENT

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#### LANGUAGE INTROSPECTION

**GRAMMAR COMPONENTS:** Vocabulary Building - Word Formation – Prefixes and Suffixes-'Wh' questions and Yes or No questions.

**LINGUISTIC FUNCTIONS:** Short comprehension Passages –Skimming and Scanning-Developing hints

## Unit – II SOFT SKILLS

**GRAMMAR COMPONENTS:** Sentence structures- Punctuation – Kinds of sentences - Subject-verb Agreement.

**LINGUISTIC FUNCTIONS:** Introducing and Sharing Information from Newspaper including Dialogues and Conversations– Short Narrative Descriptions – Paragraph Writing – Greeting-Jumbled Sentences

## Unit – III CAREER GUIDANCE

**GRAMMAR COMPONENTS:** Single-word substitutes – Pronouns – Degrees of Comparison

**LINGUISTIC FUNCTIONS:** Reading Comprehension – Verbal and Non-verbal Communication –Public Speaking - Describing and Classification of Different Kinds of Innovation – Narration Act. (Language through Literature)- Negotiation Skills.

## Unit – IV TECHNICAL WRITING

**GRAMMAR COMPONENTS:** Articles-Modal Verbs – Uses of Prepositions (of Time, Place, Direction and Spatial Relations)

**LINGUISTIC FUNCTIONS:** Preparing Instructions and Manuals - Reporting Events and Research – Writing Recommendations – Interpreting Diagrammatic Representations, esp.

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Bar Graphs and Pie Charts.

Unit - V	BUSINE	SS (	CORRESPONDENCE			9
GRAMMAR Antonyms- D LINGUISTIC Business Pro	COMPONEN Different Tens C FUNCTIO posals – Role	TS: se Fo NS: e pla	Numerical Adjectives – orms of Verbs. Writing short Essays y – Narrating Incidents	Phrases - Dialo - Exterr	and Clauses- Synonyr gue Writing- Technic npore and persuasive s	ns and al and speech-
Conversations - Telephonic Conversations.						
Lecture: 4	5 Periods		Tutorial: -		Theory Total: 45 F	Periods

LABORATORY COURSE CONTENT					
Ex.No.		Experiment / Exerci	se	со	
1	Self-introduction an	d introducing others		CO2	
2	Negotiation Skills C			CO3	
3	Public Speaking			CO3	
4	Body Language			CO3	
5	Narrating incidents C		CO3		
6	Telephonic Converse	ation		CO5	
7	Representations			CO4	
8	Technical Proposals			CO5	
Pract	Practical: 30 Periods Laboratory Total: 30 Periods				

TE	XT BOOKS
1	Communicative English I Paperback – 1 January 2020 by Dr. A. Ganesan (Author), P. Lovely Vinoliya Paul (Author).
2	Teaching Communicative English By Dr.N.BadhriPh.D(Eng.).,Ph.D(Edn.)., 2021.
3	Developing English Language Skills-I: (NEP 2020 for the University of Delhi) by Pooja Khanna.
4	Technical English – I by Prof.RavindraNath Tiwari,2020.
5	Technical English 1 Paperback – 15 December 2019 by Prof.RavindraNath Tiwari (Author).

RE	FERENCE BOOKS
1	Communicative English I Paperback – 1 January 2020by Dr.A.Ganesan (Author), P.LovelyVinoliya Paul (Author)
2	Teaching Communicative English By Dr.N.BadhriPh.D(Eng.).,Ph.D(Edn.)., 2021.
3	Communicative English By S. KannanPadmasani , 2019.
4	Technical English 1 Paperback – 15 December 2019 by Prof. RavindraNath Tiwari (Author).
5	Developing English Language Skills-I: (NEP 2020 for the University of Delhi) by Pooja Khanna.
6	Technical English – I by Prof. RavindraNath Tiwari,2020.
E-I	RESOURCES

1	https://youtu.be/x60GHpQ8gJk?list=PLWPirh4EWFpFIElSxplDlEhRDZHkBD
2	https://youtu.be/BO7j-X87rM8
3	https://youtu.be/cyXADWE7KPo

	COURSE OUTCOMES (CO)						
After S able to	After Successful completion of the course, the students should be able to <b>RBT Level Leve Leve Level Level Level Leve </b>						
C01	Infer the communication skills with error-free strategies.	K2	1	1			
CO2	Construct the effectiveness of soft skills.	К3	2	6, 8			
CO3	Classify the stress and intonation in public speaking.	K4	3	4, 7			
CO4	Enhance in reading and writing skills.	К3	4	5			
C05	Take part in Public speaking.	K4	5	3			
RBT Le	evels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K	5 – Evalua	ting; K6 - Cre	ating			

**B.TECH.IT** 

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Semester	Programme	Course Code	Course Name	L	т	Ρ	С
Ι	B.E. / B.Tech., Common to all	23PH1LT3	ENGINEERING PHYSICS	3	1	2	5

PRE-REQUISITES
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#### **COURSE OBJECTIVES**

1	To apply fundamental concepts and techniques of crystals.
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- **2** To develop the extensive properties of solid materials.
- **3** To show the principles of thermodynamics and relate with real time applications.
- **4** To analyze the properties of the Laser beam
- **5** To explain the advanced technical methods by assessing the fibre optics.

## THEORY COURSE CONTENT

#### Unit – I CRYSTAL PHYSICS

Unit cell-Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - growth of single crystals: solution and melt growth techniques.

#### Unit – II PROPERTIES OF MATTER

Hooke's Law - Stress-Strain Diagram - Elastic moduli - Poisson's Ratio - Expression for bending moment of beam and depression of Cantilever - Expression for Young's modulus by Non-uniform bending and its experimental determination.

#### Unit – III THERMAL PHYSICS

Transfer of heat energy - thermal conduction, convection and radiation – heat conductions in solids – thermal conductivity - Lee's disc method - theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.

## Unit – IV LASER TECHNOLOGY

Laser characteristics -Spontaneous emission and stimulated emission-Einstein's coefficients-Pumping methods- Components of a laser -CO2 laser-Solid state laser(Nd:YAG)-Semiconductor diode lasers –Application of laser in science and technology.

#### Unit - V FIBER OPTICS

Fiber optical communication system – Structure of an optical fiber- Numerical aperture and acceptance angle- Classification of optical fibers (Materials, modes and refractive index profile)- Displacement and temperature sensor- Medical Endoscopy.

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Lecture: 30 Periods

Tutorial: -

Theory Total: 30 Periods

**B.TECH.IT** 

LABORATORY COURSE CONTENT					
Ex.No.		Experiment / Exerci	se	СО	
1	Determination of yo	oung's modulus by non- unifo	rm bending.	CO2	
2	Determination of yo	oung's modulus by uniform be	ending.	CO2	
3	Torsional pendulun modulus.	n - determination of mom	ent of inertia and rigidity	CO2	
4	Determination of velocity of sound and compressibility of liquid – Ultrasonic Interferometer.		CO1		
5	Determination of W	avelength, and particle size u	ising Laser.	CO4	
6	Determination of band gap of a semiconductor.			CO3	
7	Air wedge – determ	ination of thickness of a thin	wire.	CO5	
8	Determination of a fiber.	cceptance angle and nume	rical aperture of an optical	CO5	
Pract	ical: 30 Periods		Laboratory Total: 30 Per	iods	

## **TEXT BOOKS**

1	Avadhanulu M N, Kshirsagar P G and Arun Murthy TVS, "A Text book of Engineering Physics", 2 <sup>nd</sup> Edition, S Chand Publishing, New Delhi, 2022
2	Dr.P.Mani "A Text book of Engineering Physics",Dhanam Publications.,Chennai.,2022.
3	Dr.G.Senthilkumar " Engineering Physics-1" Revised & Animated Version, VRB Publishers Pvt.Ltd.,2017
4	Dr.R.Suresh "A Text book of Engineering Physics", 2 <sup>nd</sup> Edition, Sri Krishna Hi- tech Publishing Pvt, Ltd., Chennai, 2019.
5	Dr.M.Arumugam "A Text book of Engineering Physics", Anuradha Publications.,Chennai,2020.

# **REFERENCE BOOKS**

1	Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015
2	Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
3	Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning, 2010.
4	Tipler, P.A. & Mosca, G. "Physics for Scientists and Engineers with Modern.

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1	https://	/nptel.ac.in	/courses/	/115/105	/115105099/
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- 2 https://nptel.ac.in/courses/115/106/115106061/
- 3 https://www.youtube.com/watch?v=\_JOchLyNO\_w

4 https://www.journals.elsevier.com > Journals

5 https://nptel.ac.in/courses/118/104/118104008/

	COURSE OUTCOMES (CO)						
After S able to	uccessful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.			
CO1	Apply the fundamental concepts and techniques for synthesizing crystals.	K3	1	4			
CO2	Develop the extensive properties of solid materials to use it in material fabrication field.	K3	2	1,2,3			
CO3	Clarifying the principles of thermodynamics and apply it in real systems.	K2	3	6			
CO4	Analyze the properties of the Laser beam and apply it in industrial and medical field.	K4	4	5			
CO5	Explain the advanced technical methods by assessing the fiber optics.	K2	5	7,8			
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K	5 – Evalua	ting; K6 - Cro	eating			

Semester	Programme	Course Code	Course Name	L	т	Ρ	с
Ι	B.E. / B.Tech., Common to all	23CY1LT4	ENGINEERING CHEMISTRY	3	1	2	5

## PRE-REQUISITES NIL

	COURSE OBJECTIVES
1	To recognize water hardness, its treatments and solutions for boiler-related issues.
2	To explain the types of fuels, properties and their applications.
3	To describe the working principles and their applications of energy storage devices.
4	To apply various spectroscopic techniques for the identification and analysis of chemical compounds.
5	To understand the properties and applications of polymers, plastics, and nanomaterials for industrial and engineering uses.

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## Unit – I WATER CHEMISTRY

Hardness of water – Types – Units – Boiler troubles (Scale and Sludge, Priming and Foaming and Caustic Embrittlement) – Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and Calgon conditioning) and External treatment (Ion exchange process and Zeolite process) – Desalination of brackish water – Reverse Osmosis.

## Unit – II FUELS

Fuels: Introduction - Classification of fuels – Coal – Analysis of coal (Proximate and Ultimate Analysis) - Carbonization - Manufacture of metallurgical coke (Otto Hoffmann method) - Petroleum – Bergius Process - Knocking - Octane number - Diesel oil - Cetane number - Natural gas - Compressed natural gas (CNG) - Liquefied petroleum gases (LPG) - Power alcohol.

## Unit – III BATTERIES AND FUEL CELLS

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Batteries - Types of batteries – primary battery - dry cell. Secondary battery - lead acid battery, Nickel- Cadmium battery - Lithium Batteries - Fuel cells – Hydrogen -Oxygen fuel cell. - Solar energy conversion - solar cells – Application.

## Unit – IV SPECTROSCOPY

Introduction – Laws of spectroscopy - Block diagram, Instrumentation, Working and application of Visible spectroscopy and Ultra Violet spectroscopy – Infrared spectroscopy – Flame photometry – Atomic adsorption spectroscopy.

Unit - V ENGINEERING MATERIALS				9 + 3	
Polymor	Types of polymorization	Droparation	proportion	uses of Nylon (6	

Polymer – Types of polymerization – Preparation, properties, uses of Nylon (6,6), Poly Vinyl Chloride (PVC). Plastics – Types - Rubbers – SBR – Nanomaterials – Synthesis and its

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applications of Nanomaterials. Abrasives – Classification, Properties - Manufacture of SiC.						
Lectur	e: 45 Periods	Tutorial: 15 Periods	Total: 45 Periods			
	L	ABORATORY COURSE CON	NTENT			
Ex.No.		Experiment / Exercis	se	СО		
1	Estimation of total hardness in water by EDTA method.					
2	Determination of viscosity coefficient of a given oil/polymer / using Ostwald viscometer.					
3	Estimation of ferrous ammonium sulphate (FAS) using potassium dichromate solution potentiometrically.					
4	Estimation of sodium	n / potassium present in wate	er using photometer.	4		
5	Synthesis of polyme	r (phenol formaldehyde or u	rea formaldehyde resins).	5		
6	Coductometric estim mixture.	ation of strong acid and wea	k acid from a given	3		
7	7 Determination of chloride content of water sample by Argentometric method.			1		
8	Determination of stre	ength of given hydrochloric a	acid using PH meter.	3		
Pract	ical: 30 Periods		Laboratory Total: 30 Per	iods		
TEXT B	DOKS					
1 P. C Rai	C. Jain and Monica Publishing Company	Jain, "Engineering Chem y (P) Ltd, New Delhi, 2018	istry", 17th Edition, Dhan 3.	pat		
2 Mic 200	<sup>2</sup> Michael.J.Hollas, "Modern spectroscopy", 4th Edition, John Wiley & Sons, Ltd. 2004.					
3 Rot Yor	<sup>3</sup> Robert O. Ebewele, "Polymer science and technology", CRC press LLC, New York, 2000.					
4 S.S Univ	S.S Dara and S.S. Umare ` A Textbook of Engineering Chemistry for Anna University', S.Chand Publication, 2020.					
5 Shik Can	5 Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.					
REFEREI						
1 <sup>°</sup> Eng Com	ineering Chemistry pany, 2021	″ by Dr.A.Ravikrishna, S	ri Krishna Hi Tech Publis	hing		
2 <sup>"Exp</sup> Publi	eriments In Engine shing House. 2016	eering Chemistry" – Pay	al B Joshi, I.K. Internat	ional		
3 Grou Kum	p Theory and Spect ar Alka L Gupta and	roscopy by Pragati Praka Mukeshkumar ,2021	shan Alka L Gupta and Mu	kesh		
				ı		

4	Anil Kumar P.V Polymer Chemistry, First Edition -2021
5	Agarwal Shikha, Engineering Chemistry, Cambridge University Publications 2015.
E-	RESOURCES
1	https://sctevtodisha.nic.in/wp-content/uploads/2021/istry-1ST-YEAR-LM.pdf
2	https://www.youtube.com/watch?v=Fyq4Q5yWDDU&list927gXIsyj9cmxam-b
3	https://www.youtube.com/watch?v=nh2xbyOaERw
4	https://archive.nptel.ac.in/courses/104/106/104106122/
5	https://nptel.ac.in/courses/118104008

COURSE OUTCOMES (CO)								
After Successful completion of the course, the students should be able to			Theory Unit	Lab Ex.				
CO1	Recognize water hardness, its treatments and solutions for boiler-related issues.	K2	I	1,5,7				
CO2	Explain the types of fuels, properties and their applications.	K2	II	-				
СО3	Describe the working principles and their applications of energy storage devices.	K2	III	3,6,8				
CO4	Apply various spectroscopic techniques for the identification and analysis of chemical compounds.	К3	IV	4				
CO5	Understand the properties and applications of polymers, plastics, and nanomaterials for industrial and engineering uses.	K2	V	2				
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating								

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
Ι	B.E. / B.Tech., Common to all	23CS1LT5	PROBLEM SOLVING AND C PROGRAMMING	З	0	4	5

PRE-REQUISITES NIL

## **COURSE OBJECTIVES**

1	To understand the syntax, semantics and structure of C.	
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**2** To apply the decision and control statements.

**3** To Analyse and apply the arrays and string functions.

**4** To develop the programs using various functions.

**5** To apply the file management and memory allocation.

## THEORY COURSE CONTENT

#### Unit – I PROBLEM SOLVING AND C PROGRAMMING BASICS 9 General Problem Solving: Algorithms, Flowcharts and Pseudo-codes, implementation of algorithms Basics of C Programming : Introduction to C - Structure of C program - Programming Rules - Compilation - Errors - C Declarations: Tokens - keywords - identifiers - constants - data types - variable declaration and initialization - type conversion - constant and volatile variables - operators and expressions Unit – II DECISION CONTROL STATEMENTS 9 Managing Input and Output operations, Decision Control Statements: Decision control statements, Selection/conditional branching Statements: if, if-else, nested if, if-elif-else statements. Basic loop Structures/Iterative statements: while loop, for loop, selecting appropriate loop. Nested loops break and continue statements. **ARRAYS AND STRINGS** 9 Unit – III Introduction to Array - Definition - Array initialization - Characteristics - One Dimensional Array - Array operations -Two dimensional arrays -Strings and String handling functions. Unit – IV **FUNCTIONS** g Functions: Basics - definition - Elements of User defined Functions - return statement, Function types, Parameter Passing Techniques, Function returning more values - Passing Array to Functions - Recursion - Storage classes. Unit - V POINTERS AND FILE MANAGEMENT 9

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Pointer concepts - Pointers & Arrays, Structure concepts - Defining, Declaring, Accessing Member Variables, Structure within Structure - Union - File Management in C- Dynamic Memory allocation

Lecture: 45 Periods

**Tutorial: 0 Periods** 

**Total: 45 Periods** 

	LABORATORY COURSE CONTENT								
Ex.No.		Experiment / Exerci	se	СО					
1	Draw the flowchart a) Simple interest c b) Greatest among c) Find the sum of c	for the following using Rapto alculation three numbers ligits of a number	r tool.	C01					
2	Programs for demonstrating the use of different types of operators like arithmetic, logical, relational and ternary operators (Sequential and Selection structures)								
3	Programs for demonstrating repetitive control statements like 'for', 'while' and 'do-while' (Iterative structure).								
4	Programs for demonstrating one-dimensional and two-dimensional numeric array.								
5	Programs to demonstrate modular programming concepts using functions.								
6	Programs to implement various character and string operations with and without built-in library functions.								
7	Programs to demonstrate the use of pointers.								
8	Programs to illustrate the use of user-defined data types.								
9	Programs to implement various file management								
10	10 Program Using Dynamic memory allocation functions.								
Pract	ical: 60 Periods		Laboratory Total: 60 Per	iods					

TE	XT BOOKS
1	Ashok N. Kamthane, "Programming in C", 2nd Edition, Pearson Education, 2013.
2	Sumitabha Das, "Computer Fundamentals and C Programming", 1st Edition, McGraw Hill, 2018.
3	Yashavant Kanetkar, "Let us C", 16th Edition, BPB Publications, 2018.

RE	FERENCE BOOKS
1	R. G. Dromey, "How to Solve it by Computer", Pearson Education India; 1st edition, ISBN10: 8131705625, ISBN-13: 978-8131705629.
2	Maureen Spankle, "Problem Solving and Programming Concepts", Pearson; 9th edition, India, ISBN10: 9780132492645, ISBN-13: 978- 013249264.

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3	ReemaThareja., "Programming in C ", 2nd Edition, Oxford University Press, New Delhi, 2018.
4	Balagurusamy E., "Programming in ANSI C", 7th Edition, Mc Graw Hill Education, 2017.
	•

	E-	RESOURCES
	1	https://onlinecourses.nptel.ac.in/noc24_cs42/preview
	2	https://www.w3resource.com/c-programming-exercises/
ſ	3	https://www.codechef.com/learn/course/c

	COURSE OUTCOMES (CO)			
After S able to	Successful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.
CO1	Understand the syntax, semantics and structure of C.	K3	1	1,2
CO2	Apply the decision and control statements.	K3	2	3
CO3	Analyse and apply the arrays and string functions.	K4	3	4
CO4	Develop the programs using various functions.	K3	4	5,6,8
C05	Apply the file management and memory allocation.	K3	5	7,9,10
RBT Le	evels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing;	K5 – Eval	uating; K6 - C	creating

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
I	B.E. / B.Tech., Common to all	23HS1T6	HERITAGE OF TAMIL	1	0	0	1

PRE-REQUISITES NIL

	COURSE OBJECTIVES
1	To understand the extensive literature of Tamil and its classical nature.
2	To summarize the heritage of sculpture, painting and musical instruments of ancient people.
3	To recognize the folk and material arts of Tamil people.
4	To describe the thinai concepts trade and victory of chozha dynasty.
5	To categorize the contribution of tamils in Indian freedom struggle, self-esteem movement and siddha medicine.

# COURSE CONTENT

## **Unit – I** LANGUAGE AND LITERATURE

Language Families in India – Dravidan Languages – Tamil as a Classical Language – Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature-Management Principles in Thirukural – Tamil Epics and Impact of Buddhism and Jainism in Tamil Land – Bakthi Literature Azhwars and Nayanmars – Forms of Minor Poetry – Development of Modern Literature in Tamil- Constribution of Bharathiyar and Bharathidhasan.

**Unit – II** HERITAGE – ROCK ART PAINTINGS TO MODENT ART-SCULPTURE

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Hero stone to modern sculpture – Bronze icons – Tribes and their handicrafts – Art of Temple car making – Massive Terracotta sculptures, Villages deities, Thiruvalluvar Statue at Kanyakumari, Making of Musical instruments – Mirudhangam , Parai, Veenai , Yazh and Nadhaswaram – Role of Temples in Social and Economic Life of Tamils.

## **Unit – III** FOLK AND MARTIAL ARTS

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance – Sports and Games of Tamils.

# **Unit – IV** THINAI CONCEPT OF TAMILS

Flora and Fauna of Tamils & Aham and Puram concept from Tholkappiyam and Sangam Literature – Aram concept of Tamils – Education And Literacy during Sangam Age – Ancient Cities and Ports of Sangam Age – Export and Import during Sangam Age – Overseas Conquest of Cholas.

Unit - V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND

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## INDIAN CULTURE

Contribution of Tamils to Indian Freedom Struggle – The Cultural Influence of Tamils over the other parts of India – Self –Respect movement – Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions and Manuscripts – Print History of Tamil Books .

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Lecture	TOL	-ei 10	us

Tutorial: 0 Periods

Total: 15 Periods

BOC	DK REFERENCES
1	Social Life of Tamils(Dr.K.K.Pillai) A joint publication of TNTB and ESC and RMRL – (in print)
2	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) Published by International Institute of Tamil Studies.
3	The Contribution of the Tamils to Indian Culture ( Dr.M.Valarmathi ) Published by International Institute of Tamil Studies.
4 8	கீழடி வைகை நதி கரையில் சங்க கால நகர நாகரிகம் தொல்லியல் துறை வெளியீடு.
5	கணினித் தமிழ் – முனைவர். இல. சுந்தரம் (விகடன் பிரசுரம்).

# COURSE OUTCOMES (CO)

Afte	RBT Level	Unit			
CO1	Understand the extensive literature of Tamil and its classical nature.	K2	1		
CO2	Summarize the heritage of sculpture, painting and musical instruments of ancient people.	К2	2		
CO3	Recognize the folk and material arts of Tamil people.	K2	3		
CO4	Describe the thinai concepts trade and victory of chozha dynasty.	K2	4		
CO5	CO5 Categorize the contribution of tamils in Indian freedom struggle, self- esteem movement and siddha medicine.				
RB	T Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluar	ting; K6 - Cr	eating		

# CO WISE DIRECT ASSESSMENT PATTERN

Assessments			Maximum Marks					Total	Marka	
			<b>CO1</b>	CO2	CO3	CO4	CO5	Marks	Conv	ersion
CIA		Part A	8	8	4			20		
30 + 10 = 40	CATI	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
		Part A			4	8	8	20	<b>30</b>	CIA:
		Part B			16	32	32	80		40
	0,11 11	Total (b)			20	40	40	100		
As	Other ssessme nt	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
	End	Part A	4	4	4	4	4	20		
ESE	emester	Part B	16	16	16	16	16	80	100	ESE:
60 <b>E</b> x	caminati ons – Theory	Total (d)	20	20	20	20	20	100	to <b>60</b>	60
			68	68	68	68	68	340	1	00
INDIRECT A	cou	RSE EN	ID SUR	VEY						

# **SEMESTER II**

Sl. No.	Course Code	<b>Course Title</b>	Catego ry	CIA	ESE	L	Т	Р	С				
	THEORY COURSES												
1	23EN2T1	Technical English	HS	40	60	3	0	0	3				
2	23HS2T2	Environmental Sciences	MC	100	-	3	0	0	0				
3	23HS2T3	Tamils And Technology	MC	100	-	1	0	0	1				
4	23MA2T4	Algebra and Number Theory	BS	40	60	3	1	0	4				
THEORY COURSES WITH LABORATORY COMPONENTS													
5	23CS2LT1	Python Programming	ES	50	50	3	0	4	5				
6	23EE2LT2	Basics of Electrical and Electronics Engineering	ES	50	50	3	0	4	5				
		Total				16	1	8	18				

Semester	Programme	Course Course Name		L	т	Ρ	с
II	B.E. / B.Tech., Common to all	23EN2T1	TECHNICAL ENGLISH	3	0	0	3

## PRE-REQUISITES COMMUNICATIVE ENGLISH

#### COURSE OBJECTIVES

1	To improve personality Interactions.
2	To build self-confidence.
3	To improve social communication skills.
4	To show true personality for strong interactions
5	To speak confidently in any situation.

## **COURSE CONTENT**

# **Unit – I** LANGUAGE SKILLS

**GRAMMAR COMPONENTS:** Mixed Tenses • Homophones • Homonyms • Words often Confused • Pairs of Words• Texting and SMS language

**LINGUISTIC FUNCTIONS:** Professional emails, Email etiquette •Paragraph Construction • Introduction to Presentation • Communication •Note Making • Reading advertisements.

## **Unit – II** TECHNICAL LEADERSHIP

**GRAMMAR COMPONENTS:** Abbreviations and Acronyms •Concord • Collocations – Fixed and Semi Fixed Expressions.

**LINGUISTIC FUNCTIONS:** Letters / emails of complaint •Telephoning Skills• Leadership and Team Management • Qualities of a Good Leader • Leadership Styles • Decision Making • Problem Solving • Technical Report Writing.

## **Unit – III** BUSINESS COMMUNICATION

**GRAMMAR COMPONENTS:** Direct Indirect Speech • Active Passive Voice • Conditional Sentences

**LINGUISTIC FUNCTIONS:** Group Discussions • Letter to the Editor • Checklists • Reading Comprehension Memo • Notices/Circulars Agenda and Minutes of a Meeting.

**Unit – IV** EXCEL IN INTERVIEWS

**GRAMMAR COMPONENTS:** Misspelled words • Spot the errors • Vocabulary Development • Guessing Meanings of Words.

**LINGUISTIC FUNCTIONS:** •Recommendations Interviews: Types of Interviews • Preparing Resumes & CV • Covering Letter • Brainstorming.

**Unit - V** PRESENTATION SKILLS

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**B.TECH.IT** 

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**B.TECH.IT** 

**LINGUISTIC FUNCTIONS:** Mock Presentation • Job / Internship application – Cover letter & Resume • Casual Conversation • Participating in a Group Discussion • Speeches for special Occasions.

Lecture: 45 Periods	Tutorial: 0 Periods	Total: 45 Periods
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TE	EXT BOOKS
1	CommunicativeEnglishI Paperback-1January2020by Dr.A.Ganesan (Author), P.LovelyVinoliya Paul (Author).
2	Teaching Communicative English By Dr.N.BadhriPh.D(Eng.).,Ph.D(Edn.)., 2021.
3	Developing English Language Skills-I: (NEP 2020 for the University of Delhi) by Pooja Khanna.
4	Technical English – I by Prof.RavindraNath Tiwari,2020.
5	Technical English 1 Paperback – 15 December 2019 by Prof.RavindraNath Tiwari (Author).

## **BOOK REFERENCES**

1	Teaching Communicative English By Dr.N.BadhriPh.D(Eng.).,Ph.D(Edn.)., 2021.							
2	Communicative English By S. KannanPadmasani , 2019.							
3	Technical English – II by Prof. RavindraNath Tiwari,2020.							
4	CommunicationSkills(Sem-2)Edition/Reprint: 2022Author(s): NeelkamalJhalniPublisher: JHUNJHUNUWALAProduct ID: 526288							
5	English ISBN: 9789385879036Edition/Reprint: 2023Author(s): Pooja KhannaPublisher: VIKASH PUB HOUSE PVT LTDProduct ID: 625971							

E-	RESOURCES
1	https://youtu.be/RkOb-IjkBbw
2	https://youtu.be/8SyZWgzLQSo
3	https://youtu.be/0E9deF06NUU
4	https://youtu.be/CAU2zx2Ri_M?si=jWLm7ZGegmKw08Ii
5	https://youtube.com/playlist?list=PLyViUDdoFYKypuYyhNF2ZC9xEUE8zDmzx&si =uYKTb1eZGCWwDVon

COURSE OUTCOMES (CO)									
Afte	RBT Level	Unit							
CO1	Learn about personality development to enhance interactions.	K2	1						
CO2	Improve skills by cultivating self-confidence.	K4	2						
CO3	Increase social abilities by mastering communication.	K2	3						
<b>CO</b> 4	Reveal true personality for stronger interactions.	K6	4						
CO5	Develop the ability to speak confidently in any situation	K6	5						
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating									

CO WISE DIRECT ASSESSMENT PATTERN											
	Accoccmonto		Maximum Marks					Marks			
Assessments			CO1	CO1 CO2 CO3 CO4 CO5				Marks	Conv	Conversion	
		Part A	8	8	4			20			
	CATI	Part B	32	32	16			80			
		Total (a)	40	40	20			100	200		
	CAT II	Part A			4	8	8	20	<b>30</b>	<u>CIA:</u> 40	
CIA		Part B			16	32	32	80			
		Total (b)			20	40	40	100			
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>		
		Part A	4	4	4	4	4	20			
FSF	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:	
102	– Theory	Total (d)	20	20	20	20	20	100	60	60	
Tota	l Marks (a + b +	c + d)	68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

**B.TECH.IT** 

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
II	B.E. / B.Tech., Common to all	23HS2T2	ENVIRONMENTAL SCIENCES	3	0	0	0

PRE-REQUISITES NIL

20	D		$\mathbf{n}$	•	-			
		$\sim$	U	-			<u>.</u>	2

2	To explain the s	significance of	<sup>i</sup> biodiversity	and	conservation	methods.
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- **3** To summarize various types of environmental pollution and propose effective control measures.
- **4** To develop solutions for managing natural resources sustainably and mitigating overexploitation issues.
- **5** To understand the sustainable practices, regulatory framework, including environmental laws and ethics.

# COURSE CONTENT

## Unit – I ENVIRONMENT AND ECOSYSTEMS

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs – Introduction, types, characteristic features, structure and function of the forest ecosystem and aquatic ecosystems (ponds, river and marine).

Activity: Study of the ecosystem structure in Cauvery River.

## Unit – II BIODIVERSITY

Introduction to biodiversity - definition: genetic, species and ecosystem diversity - values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - India as a mega-diversity nation - hot-spots of biodiversity - threats to biodiversity - endangered and endemic species of India - In-situ and ex- situ conservation of biodiversity.

Activity: Study of common plants, insects, birds.

## Unit – III ENVIRONMENTAL POLLUTION

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Thermal pollution (d) Noise pollution – solid waste management: causes, effects and control measures of municipal solid wastes – Hazardous and biomedical waste management – pollution case studies.

Activity: Study of air and water pollution in industry

Unit – IV NATURAL RESOURCES

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Forest resources: over-exploitation, deforestation, – Water resources: Rain water harvesting - watershed management - utilization of surface and ground water, conflicts over water, dams-benefits and problems Food resources: effects of modern agriculture, fertilizer - pesticide problems - Principles of Green Chemistry- Case studies

Activity: Tree plantation and maintenance within the campus

## Unit - V SUSTAINABILITY AND POPULATION

9

From unsustainable to sustainable development – Environmental Impact Assessment (EIA) –environmental ethics: Issues and possible solutions – climate change, acid rain, ozone layer depletion, and case studies – Environment Protection Act 1986 – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Environment and Human Health – Value Education – HIV / AIDS – Women and Child Welfare.

Activity: Small group meetings about environment and human health in local area peoples and making poster and short films about HIV / AIDS – women and child welfare.

Lecture: 45 Periods

**Total: 40 Periods** 

TE	EXT BOOKS
1	Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science", Pearson International Edition, December 2006.
2	R. Rajagopalan, "Fundamentals of Environmental Studies", OUP India, 2015.
3	Rajagopalan, R, `Environmental Studies-From Crisis to Cure', Oxford University Press, 2015.
4	Daniel B. Botkin and Edward A. Keller,"Environmental Science: Earth as a Living Planet", Wiley, 2005.
5	Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill Education, New Delhi, 2014.

## **REFERENCE BOOKS**

1	Erach Bharucha, "Environmental Studies for Undergraduate Courses", Third Edition, Orient Blackswan Pvt Ltd (8 March 2021).
2	Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill Education, New Delhi, 2017.
3	E-book: The Sustainable Use of Natural Resources: The Governance Challenge Jennifer Bansard Mika Schröder April 2021.
4	E-book: The Climate Solution: India's Climate-Change Crisis and What We Can Do about it, Mridula Ramesh May 2018.
5	E-book : Biodiversity with Practical Paperback August 2022by Dr. Kalyan Das

# **B.TECH.IT**

# E-RESOURCES

1	https://www.youtube.com/watch?v=LjFt7rlCU84&t=6s
2	https://archive.nptel.ac.in/courses/120/108/120108004/
3	https://archive.nptel.ac.in/courses/120/108/120108002/
4	https://archive.nptel.ac.in/courses/103/107/103107215/
5	https://archive.nptel.ac.in/courses/127/106/127106004/

	COURSE OUTCOMES (CO)						
After Successful completion of the course, the students should be able to Level							
CO1	Describe the components of different ecosystems and their interdependencies.	K2	1				
CO2	Explain the significance of biodiversity and conservation methods.	K2	2				
CO3	Summarize various types of environmental pollution and propose effective control measures.	К2	3				
CO4	Develop solutions for managing natural resources sustainably and mitigating over-exploitation issues.	К3	4				
CO5	Understand the sustainable practices, regulatory framework, including environmental laws and ethics.	K2	5				
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - (	Creating				

Semester	Program	ıme	Course Code	Course Name	L	т	Ρ	С
II	B.E. / B.T Common	ech., to all	23HS2T3	TAMILS AND TECHNOLOGY	1	0	0	1
PRE-REOI	ITSITES	NTI						

CO		1.1.	 $\mathbf{V} - \mathbf{C}$
	UKS		VES

1	To understand the weaving ceramic technology of ancient Tamil people nature.					
2	To understand the construction technology, building materials in Sangam period and case studies.					
3	To infe evidenc	r the metal process, coin and beads manufacturing with relevant arch re.	eological			
4	To reali	ze the agriculture methods, irrigation technology and pearl driving.				
5	To unde	erstand the knowledge of scientific tamil and tamil computing.				
		COURSE CONTENT				
Un	it – I	WEAVING AND CERAMIC TECHNOLOGY	3			
Wea (BR\	Weaving Industry during Sangam Age-Ceramic technology-Black and Red Ware Potteries (BRW)-Graffiti on Potteries.					
Un	it – II	DESIGN AND CONSTRUCTION TECHNOLOGY	3			
Desi Sang Cons of ( Mee arch	Designing and Structural construction House & Designs in household materials during Sangam Age-Building materials and Hero stones of Sangam Age-Details of Stage Constructions in Silappathikaram-Sculptures and Temples of Mamallapuram-Great Temples of Cholas and other worship places-Temples of Nayaka Period-Type study (Madurai Meenakshi Temple)-Thirumalai Nayakar Mahal-Chetti Nadu Houses,Indo-Saracenic architecture at Madras during British Period.					
Uni	t – III	MANUFACTURING TECHNOLOGY	3			
Art of Ship Building-Metallurgical studies-Iron industry- Iron smelting steel- Copper and gold-Coins are source of history- Minting of Coins-Beads making- industries Stone beads-Glass beads- Terracotta beads- Shell beats/bone beats- Archeological evidences-Gem stone types described in Silapathigaram.						
Uni	it – IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3			
Dam	.Tank.	ponds, sluice. Significance of Kumizhi Thoompu of Chola Period.	Animal			

Dam ,Tank, ponds, sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry- Wells designed for cattle use- Agriculture and Agro Processing- Knowledge of Sea- Fisheries-Pearl- Conche diving-Ancient Knowledge of Ocean- Knowledge Specific Society.

Unit - V SCIENTIFIC TAMIL & TAMIL COMPUTING	
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Development of Scientific Tamil- Tamil computing- Digitalization of Tamil Books-Development of Tamil Software- Tamil Virtual Academy- Tamil Digital Library- Online Tamil Dictionaries- Sorkuvai Project.

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R2023 -	<b>CURRICULUM</b>	& SYLLABI
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Lecture: 15 Periods

Tutorial: 0 Periods

Total: 15 Periods

BO	BOOK REFERENCES				
1	Social Life of Tamils (Dr.K.K.Pillai) A joint publication of TNTB and ESC and RMRL – (in print).				
2	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) Published by International Institute of Tamil Studies.				
3	கீழடி வைகை நதி கரையில் சங்க கால நகர நாகரிகம் தொல்லியல் துறை வெளியீடு <b>.</b>				
4	தமிழக வரலாறு –மக்களும் பண்பாடும் கேகே பிள்ளை (வெளியீடு : தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).				
5	கணினித் தமிழ் – முனைவர். இல. சுந்தரம் <b>(</b> விகடன் பிரசுரம் <b>).</b>				

COURSE OUTCOMES (CO)					
After Successful completion of the course, the students should be able to			Unit		
CO1	Understand the weaving ceramic technology of ancient Tamil people nature.	К2	1		
CO2	Understand the construction technology, building materials in Sangam period and case studies.	К2	2		
СО3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence.	К2	3		
<b>CO4</b>	Realize the agriculture methods, irrigation technology and pearl driving.	К2	4		
CO5	Understand the knowledge of scientific tamil and tamil computing.	K2	5		
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating					

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
II	B.E - CSE &B.Tech – IT & AIDS	23CS2LT1	PYTHON PROGRAMMING	3	0	4	5

## **PRE-REQUISITES** PROBLEM SOLVING AND C PROGRAMMING

	COURSE OBJECTIVES
1	To describe the syntax and semantics of python
2	To clarify the need for working with the strings
3	To apply most appropriate programming constructs and features to solve the problems with list, tuples and dictionaries.
4	To explain the programming skills for the use of the arrays, functions and files.
5	To develop a python programs using modules and frameworks.

# THEORYCOURSE CONTENT

# INTRODUCTION TO PYTHON

Introduction to python: Features - Execution of python program – Flavors of Python – Comments - Data Types: Built-in data types– Sequences – Set - Literals– Operators – Input and Output Statements - Control Statements : if – if-else –if-else-if – while-For –Nested loops – the else suite - Break – Continue - pass - assert – return.

## Unit –II STRINGS

Unit –I

Strings and Characters: Creating – Length – Indexing – Slicing – Repeating – Concatenation – Comparing - Removing Spaces - Finding Sub Strings - Counting Substrings in a String - Strings are Immutable - Replacing a String with another String - Splitting and Joining Strings - Changing Case of a String - Checking Starting and Ending of a String - Formatting the Strings.

#### Unit –III LISTS, TUPLES AND DICTIONARIES

Lists: Creating Lists – Updating - Concatenation - Repetition - Methods – Sorting. Tuples: Creating - Accessing – Operations – Functions - Nested Tuples - Inserting Elements, Modifying Elements, Deleting Elements from a tuples. Dictionaries: Operations – Methods - Using for Loop with Dictionaries – Sorting the Elements of a Dictionary using Lambdas.

## **Unit – IV** ARRAYS ,FUNCTIONS AND FILES

Arrays: One Dimensional arrays - Multi Dimensional arrays - Functions: Defining – Calling – Returning - Pass by Object Reference – Formal, Actual, Positional, Keyword, Default & Variable Length Arguments - Local and Global Variables - Recursive Functions - Lambdas - Function Decorators. Files -Types of Files - Opening & Closing a File - Working with Text Files Containing Strings - Working with Binary Files..

# Unit - V MODULES AND FRAMEWORKS

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Modules: Importing module –Features – Built in functions. - Python Environment and Frameworks: NumPy: NumPy Arrays – Computation on NumPy Arrays – Aggregation – Sorting Arrays – Structured

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**B.TECH.IT** 

Arrays.

Lecture: 45 Periods

Tutorial: 0 Periods

Total: 45 Periods

	LABORATORYCOURSE CONTENT				
Ex.No.		Experiment / Exerci	se	СО	
1	Programs for demons	trating the use of different types	of operators.	CO1	
2	Programs for demons	trating control statements.		CO1	
3	Programs to impleme	nt various string operations.		CO2	
4	Programs to impleme	nt various string operations.		CO3	
5	Programs to demonstr	rate concepts using functions.		CO4	
6	Implement user define	ed functions using python.		CO4	
7	Programs to impleme	nt applications using File handli	ng.	C05	
8	Programs to demonstr	rate modules.	<u> </u>	CO4	
9	Create programs to so	olve problems using various data	a structures in python.	CO5	
10	Perform data manipul	ation using NumPy.		CO5	
Pract	ical: 60 Periods		Laboratory Total: 60 Pe	riods	

# TEXT BOOKS

1.	Head-First Python, 2nd edition Paul Barry (O'Reilly, 2016)
2	Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly
۷.	Publishers, 2016.
3.	Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and
	Programming", 1st Edition, BCS Learning & Development Limited, 2017.
4.	G Venkatesh and MadhavanMukund, "Computational Thinking: A Primer for Programmers and
	Data Scientists", 1st Edition, Notion Press, 2021.

RE	FERENCE BOOKS
1	Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2	John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021.
3	Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
4	Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.

E-	E-RESOURCES				
1	https://www.learnpython.org/				
2	https://www.w3schools.com/python/				
3	https://www.programiz.com/python-programming				
4	https://www.geeksforgeeks.org/best-python-books/				

	COURSE OUTCOMES (CO)					
After S able to	Successful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.		
CO1	Describe the syntax and semantics of python	К3	1	1,2		
CO2	Clarify the need for working with the strings	K3	2	3		
СО3	Apply most appropriate programming constructs and features to solve the problems with list, tuples and dictionaries.	K4	3	4		
CO4	Explain the programming skills for the use of the arrays, functions and files.	К3	4	5,6,8		
C05	Develop a python programs using modules and frameworks.	К3	5	7,9,10		
RBT Le	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating					

Semester	Programme	Course Code	Course Name		т	Ρ	С
II	B.E. CSE, B.Tech IT, B.Tech AI&DS	23EE2LT2	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	З	0	4	5

PRE-REQUISITES --

	COURSE OBJECTIVES
1	To apply the knowledge of basic circuital laws; analyze the DC and AC circuits using mesh and nodal analysis.
2	To illustrate the knowledge in constructional details and working principles of DC and AC machines.
3	To analyze the characteristics of different electronic devices such as Diodes and Transistors.
4	To demonstrate the various number systems and simplify the logical expressions using Boolean functions.
5	To build the concepts of Fundamentals of Electrical and Electronic Instruments.

# THEORYCOURSE CONTENT

Unit –I	ELECTRICAL CIRCUITS     6						
DC Circuits: Analysis, M Waveforms Balanced Cir	C Circuits: Ohm's Law - Kirchhoff's Laws –Independent and Dependent Sources – Nodal analysis, Mesh analysis with Independent sources only (Steady state) AC Circuits: Vaveforms – Average and RMS Value - Power and Power factor – Single and Three Phase Balanced Circuits.						
Unit –II		ELECTRICAL MA	ACHINES	5	6		
Constructior Phase Trans	Construction, Working Principle and Applications of DC Generators, DC Motors, Single Phase Induction Motor.						
Unit –III		ANALOG ELECT	RONICS	5	6		
Introduction wave Recti Characterist	ntroduction - Characteristics of PN Junction Diode and Zener Diode – Half wave and Full vave Rectifiers –Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics.						
Unit –IV		DIGITAL ELECT	RONICS		6		
Binary Num sequential C	Binary Number System – Boolean Algebra theorems– Digital circuits - Introduction to sequential Circuits– Flip-Flops – Registers and Counters – A/D and D/A Conversion.						
Unit - V	Unit - VMEASUREMENTS AND INSTRUMENTATION6						
Functional e Moving Coil	functional elements of an instrument - Standards and Calibration - Operating Principle of for the formation of the formation						
Lecture: 30 Periods Tutorial: 0 Periods Theory Total: 30 Periods					0 Periods		

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	LABORATORYCOURSE CONTENT					
Ex.No.		Experiment / Exe	rcise	со		
1	Experimental verif	ication of Ohm's law.		C01		
2	Experimental verif	ication of Kirchhoff's Voltag	ge and Current laws.	C01		
3	Open circuit and L	oad characteristics of DC S	hunt generator.	C01		
4	Load test on DC S	hunt motor.		CO2		
5	Load test on DC Series motor.					
6	Open circuit and Short circuit tests on single phase transformer.					
7	Load test on single-phase induction motor.					
8	Characteristics of Semiconductor diode and Zener diode. CO					
9	Measurement of ripple factor in Half wave and full wave rectifiers. CO3					
10	Characteristics of a NPN Transistor under CE, CC and CB configurations.					
11	Study of logic gate	es AND, OR, NOT and EX-C	R gates.	CO4		
12	Implementation of Boolean Functions, Adder/ Subtractor circuits.			CO4		
13	Measurement of energy using single phase energy meter.			C05		
14	Study of DC and A	nd AC motor starters.				
15	Study of Load test	test on DC Compound motor. CO				
Practical: 60 Periods Laboratory Total: 60 Period			ods			

# **TEXT BOOKS**

1	A.K.Shawney, —A Course in Electrical and Electronics Measurements & Instrumentation∥, DhanpatRai& Co. 2020.
2	Balbir Kumar, Shail.B.Jain, —Electronic Devices and Circuits PHI learning private limited, 2nd edition 2014.
3	M. Morris Mano, 'Digital Design with an introduction to the VHDL', Pearson Education, 2013.

REF	EREN	ICE B	OOKS	

1	Joseph A. Edminister, MahmoodNahri, -Electric circuits , Schaum's series,
	Tata McGraw-Hill, New Delhi, 2001.

2 D.P. Kothari and I.J. Nagrath, \_Electric Machines', McGraw Hill Publishing Company Ltd, 2002.

# **E-RESOURCES**

2 https://www.youtube.com/watch?v=UIAZh4Vw81s

3 https://www.youtube.com/@abuhajara

4 https://www.youtube.com/playlist?list=PLWv9VM947MKi\_7yJ0\_FCfzTBXpQU-Qd3K

## 5 https://www.youtube.com/channel/UCTJn6buigC961hns17ELXAQ

COURSE OUTCOMES (CO)								
After S able to	successful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.				
CO1	Apply the knowledge of basic circuital laws; analyze the DC and AC circuits using mesh and nodal analysis.	K3	1	CO1				
CO2	Illustrate the knowledge in constructional details and working principles of DC and AC machines.	K2	2	CO2				
CO3	Analyze the characteristics of different electronic devices such as Diodes and Transistors.	K4	3	CO3				
CO4	Demonstrate the various number systems and simplify the logical expressions using Boolean functions.	K2	4	CO4				
CO5	Build the concepts of Fundamentals of Electrical and Electronic Instruments	K3	5	CO5				
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K	5 – Evalua	ting; K6 - Cre	ating				

# **SEMESTER III**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С
THEORY COURSES									
1	23HS3T1	Constitution of India	MC	100	-	3	0	0	0
2	23MA3T2	Probability and Queuing Theory	BS	40	60	3	1	0	4
3	23CSCT4	Computer Organization and Architecture	PC	40	60	3	0	0	3
4	23CS3T3User Interface DesignPC4060		60	3	1	0	4		
	THEOR	Y COURSES WITH LABOI	RATO	RY CC	OMPO	NEN	ГS		
5	23CS3LT1	Object Oriented Programming with Java	PC	50	50	2	0	4	4
6	23CS3LT2	Data Structures & Algorithms	PC	50	50	2	0	4	4
		LABORATORY C	OURS	ES					
7	723EN3L1Inter Personal Communication SkillsHS6040Laboratory - I		40	0	0	3	1.5		
		Total				16	2	11	20.5

Sem	Programme	Course Code	Course Name	L	т	Ρ	С
III	B.E. CSE & B.Tech. IT	23HS3T1	CONSTITUTION OF INDIA	3	0	0	0

PRE-REQUISITES NIL

	COURSE OBJECTIVES
1	Understand and abide the rules of the Indian constitution.
2	Understand the functions of Central government.
3	Understand the function of state government.
4	Understand the various constitutional functions and laws.
5	Understand the different culture among the people of India

#### COURSE CONTENT INTRODUCTION

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Role of the Election Commission.

Topic - 2

Topic - 1

#### STRUCTURE AND FUNCTION OF CENTRAL AND STATE GOVERNMENT

Union Government – Structures of the Union Government and Functions – President – Vice President– Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review. State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

Topic - 3

#### CONSTITUTION FUNCTIONS OF INDIA AND INDIAN SOCIETY

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Indian Federal System – Central – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India. Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections

Topic - 4

**POLICIES AND ACTS – GENERAL** 

Insurance and Bonding – Laws Governing Sale, Purchase and use of Urban and Rural Land – Land Revenue Codes – Tax Laws – Income Tax, Sales Tax, Excise and Custom duties and their Influence on Construction Cost – Legal Requirements for Planning – Property Law– Agency Law – Local

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9

Government Laws for Approval.

 Topic - 5
 POLICIES AND ACTS ON INFRASTRUCTURE DEVELOPMENT

A Historical Review of the Government Policies on Infrastructure – Current Public Policies on Transportations – Power and telecom Sector – Plans for Infrastructure Development – Legal framework for Regulating Private Participation in Roads and Highways – Ports and Airport and Telecom.

Lecture: 45 Periods Tutorial: 0	Periods Total: 45 Periods
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RE	REFERENCE BOOKS				
1	Durga Das Basu, "Introduction to the Constitution of India", Prentice Hall of India, New Delhi,2018.				
2	R.C.Agarwal, "Indian Political System", S.Chand and Company, New Delhi, 2004				
3	Maciver and Page, "Society: An Introduction Analysis", Mac Milan India Ltd., New Delhi,2007				
4	K.L.Sharma, "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi,2006.				

E-I	E-RESOURCES			
1	https://nptel.ac.in/courses/106/105/106105034/			
2	https://www.youtube.com/watch?v=6XTYoZymbwE			
3	https://www.youtube.com/watch?v=MP6VlAE_7WY			

COURSE OUTCOMES (CO)	

After Successful completion of the course, the students should be able to			Unit
C01	Understand and abide the rules of the Indian constitution.	К2	1
CO2	Understand the functions of Central government.	К2	2
CO3	Understand the function of state government.	К2	3
CO4	Understand the various constitutional functions and laws.	К2	4
<b>CO5</b> Understand the different culture among the people of India		К2	5
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 – (	Creating

Semester	Programme	Course Code	Course Name		т	Ρ	С
III	B.E.CSE & B.Tech. IT	23MA3T2	PROBABILITY AND QUEUEING THEORY	3	1	0	4

# PRE-REQUISITES NIL

	COURSE OBJECTIVES
1	To Relate and apply the concept of probability and random variables and predict probabilities of events in models following normal distribution.
2	To Interpret discrete and continuous probability distributions including requirements, mean and variance for making decisions
3	To Compute correlation between variables, and predict unknown values using regression.
4	To Classify different types of random processes and use it to find whether it is SSS or WSS.
5	To Analyse the situation and select an appropriate queuing model techniques for solving problems based on Little's formula.

		COURSE CONT	ENT			
Topic - 1		PROBABIL	TY			9 + 3
Probability-Ax and continuous	tioms of probabili s random variables	ty –Conditional probabilit – Moments – Moment gen	y-Total pr erating fur	obability octions	-Baye's theorem	- Discrete
Topic - 2		<b>DISTRIBUTION FU</b>	INCTION	<b>S</b>		9+3
Binomial di distribution-A	stribution-Poisson oplications.	distribution-Exponential	distribu	tion-Uni	form distributio	on-Normal
Topic - 3	TW	O-DIMENSIONAL RAN	DOM VA	RIABL	ES	9 + 3
Joint distribut regression.	ions – Marginal	and conditional distributi	ons – Co	variance	e – Correlation a	and linear
Topic - 4		RANDOM PRO	CESSES			9+3
Classification	- Stationary proces	ss – Markov chain – Bernov	ılli and Po	isson pro	ocess.	
Topic - 5		QUEUEING M	ODELS			9+3
Markovian queues – Birth and death processes – Single and multiple server queueing models – Little's formula with finite waiting rooms.						
Lecture:	60 Periods				Total: 60 P	eriods

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# **BOOK REFERENCES**

1	Miller. S.L. and Childers. D.G., —"Probability and Random Processes with Applications to Signal Processing and Communications ", Academic Press, 2013.
2	Peebles, P.Z., "Probability, Random Variables and Random Signal Principles ", Tata McGraw Hill, 4 <sup>th</sup> Edition, New Delhi, 2011.
3	Oliver . C. Lbe., "Fundamentals of applied probability and random processes" Academic Press, 2007.
4	Donald Gross, John F. Shortle, James M .Thomson, Carl M. Haris.,"Fundamentals of Queueing theory",4 <sup>th</sup> Edition, Wiley India Pvt Ltd,2013.

E-	E-RESOURCES			
1	https://youtu.be/InVTILPF2e8			
2	https://youtu.be/8963i2DnFiQ			
3	https://youtu.be/HfAXKnibhKw			

	COURSE OUTCOMES (CO)				
After	Successful completion of the course, the students should be able to	RBT Level	Unit		
CO1	Relate and apply the concept of probability and random variables and predict probabilities of events in models following normal distribution.	K2	1		
CO2	Interpret discrete and continuous probability distributions including requirements, mean and variance for making decisions	K2	2		
СО3	Compute correlation between variables, and predict unknown values using regression.	K3	3		
CO4	Classify different types of random processes and use it to find whether it is SSS or WSS.	K2	4		
CO5	Analyse the situation and select an appropriate queuing model techniques for solving problems based on Little's formula.	K4	5		
RBT Le	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating				

	CO WISE DIRECT ASSESSMENT PATTERN									
Assessments			Maximum Marks				Total	Marks		
			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
	CATI	Total (a)	40	40	20			100	200	
		Part A			4	8	8	20	<b>30</b>	CIA:
CIA		Part B			16	32	32	80	40 to <b>10</b>	40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
		Part A	4	4	4	4	4	20		
ESE	End Semester Examinations	Part B	16	16	16	16	16	80	100 to	<u>ESE:</u>
LOL	- Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

**B.TECH.IT** 

Sem	Programme	Course Code	Course Name	L	т	Ρ	С
III	B.E. CSE & B.Tech. IT	23CSCT4	COMPUTER ORGANIZATION AND ARCHITECTURE	3	0	0	3

### **PRE-REQUISITES** FUNDAMENTALS OF COMPUTING PROGRAMMING

	COURSE OBJECTIVES
1	
2	
3	
4	
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COL	JRSE	CON	TEN	Т

# BASIC STRUCTURE OF COMPUTERS

Functional Units — Basic Operational Concepts — Performance — Instructions: Language of the Computer — Operations, Operands — Instruction representation — Logical operations — decision making — MIPS Addressing.

#### Unit – II

Unit – I

#### **ARITHMETIC FOR COMPUTER**

Addition and Subtraction — Multiplication — Division — Floating Point Representation — Floating Point Operations — Sub word Parallelism.

#### Unit – III

#### **PROCESSOR AND CONTROL UNIT**

A Basic MIPS implementation — Building a Data path — Control Implementation Scheme — Pipelining — Pipelined data path and control — Handling Data Hazards & Control Hazards — Exceptions.

#### Unit – IV

#### PARALLELISM

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Parallel processing challenges — Flynn's classification — SISD, MIMD, SIMD, SPMD, and Vector Architectures — Hardware multithreading — Multi-core processors and other Shared Memory Multiprocessors — Introduction to Graphics Processing Units, Clusters, Warehouse Scale Computers and other Message-Passing Multiprocessors.

# Unit - VMEMORY & I/O SYSTEM9Memory Hierarchy — memory technologies — cache memory — measuring and improving<br/>cache performance — virtual memory, TLB's — Accessing I/O Devices — Interrupts — Direct<br/>Memory Access — Bus structure — Bus operation — Arbitration — Interface circuits — USB.

Lecture: 45 Periods

Total: 45 Periods

## **TEXT BOOKS**

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1	"Computer Architecture: A Quantitative Approach" by John L. Hennessy and David A.
	Patterson (6th Edition, 2021).
2	"Computer Organization: Basic Processor Structure" by Robert L. Boccia (1st Edition,
	2017).
2	"Essentials of Computer Organization and Architecture" by Linda Null and Julia Lobur
3	(4th Edition, 2019).

# **REFERENCE BOOKS**

1	"Introduction to Computer Architecture: A General Purpose Approach" by Anshuman Sahu (1st Edition, 2019).
2	"Computer Systems: Theory, Technology, and Applications" by Gabriel Heifets (1st Edition, 2018).
3	"Computer Architecture and Organization: From 8085 to Core2Duo and Beyond" by Subrata Ghoshal.

E-I	E-RESOURCES						
1	https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/						
2	https://www.javatpoint.com/computer-organization-and-architecture-tutorial						
3	https://www.youtube.com/watch?v=OI8D69VKX2k						
4	https://www.youtube.com/watch?v=IbEr8B09W-M						
5	https://medium.com/@longeardev/computer-organization-and-architecture- fundamentals-of-computer-organization-bdd7dc4c0219						

	COURSE OUTCOMES (CO)								
After	RBT Level	Unit							
CO1	Identify the basics structure of computers, operations and instructions.	K3	1						
CO2	Illustrate the arithmetic and logic unit.	K2	2						
CO3	Analyze pipelined execution and design control unit.	K4	3						
CO4	K4	4							
CO5	К3	5							
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - (	Creating						

CO WISE DIRECT ASSESSMENT PATTERN										
Accossments			Maximum Marks				Total	Marks		
	Assessments			CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	САТ І	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200 to <b>30</b> 40 to <b>10</b>	<u>CIA:</u> 40
	CAT II	Part A			4	8	8	20		
CIA		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
		Part A	4	4	4	4	4	20		
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
LUL	- Theory	Total (d)	20	20	20	20	20	100	<b>60</b>	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

Sem	Programme	Course Code	Course Name	L	т	Ρ	С
III	B.E.CSE & B.Tech. IT	23CS3T3	USER INTERFACE DESIGN	3	1	0	4

**PRE-REQUISITES** NIL

	COURSE OBJECTIVES						
1	To Understand the importance of user interface and benefits of good design.						
2	To Develop an effective user interface considering human characteristics, interaction speeds and business functions in relevance to design standards and guidelines						
3	To Develop system menus, navigation schemes, windows, buttons, text boxes, selection controls and presentation controls for a user interface.						
4	To Demonstrate the use of multimedia system components in creating text, graphics, icons, images and video for web pages.						
5	To Develop test cases and evaluate the working system of windows layout for a mobile user interface.						

#### **COURSE CONTENT INTRODUCTION TO USER INTERFACE**

Topic - 1 Defining the User Interface - Importance and Benefits of Good Design - Graphical User Interface - Direct Manipulation - Characteristics of Graphical User Interface- Characteristics of Web User Interface Principles of User Interface Design.

Human Characteristics in Design-Human Considerations in Design-Human Interaction Speeds. Business Functions: Business Definition and Requirement Analysis-Determining Basic Business Functions-Design Standards or Style Guides

Topic - 3

#### **NAVIGATION AND LAYOUT**

9+3

9+3

9+3

Getting Around: Navigation, Signposts, and Way finding: Signposts- Way finding- Navigation Types -Design Considerations - Navigational Models - Patterns. Layout of Screen Elements: Basics of Layout -Patterns.

VISUAL STYLE AND MOBILE INTERFACES **Topic - 4** 

Visual Style and Aesthetics: Basics of Visual Design – Visual Design for Enterprise Applications – Range of Visual Styles. Mobile Interfaces: Challenges and Opportunities of Mobile Design - Approach to Mobile Design - Patterns

Topic - 5

**ACTIONS AND COMMANDS - FORMS AND CONTROLS** 

9+3

Actions and Commands: Tap, Swipe, and Pinch -Rotate and Shake -Buttons -Menu Bars - Menus -Toolbars - Links- Action Panels - Hover Tools - Keyboard Actions- Drag-and-Drop -Typed Commands-Affordance-Direct Manipulation.

THEORY	45	TUTORIAL	15	Total: 60 Periods
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**TEXT BOOKS** 

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1	Wilbert O. Galitz , "The Essential Guide to User Interface Design - An Introduction to GUI Design Principles and Techniques", Second Edition, John Wiley & Sons, Inc., 2018.
2	Soren Lauesen, "User Interface Design: A Software Engineering Perspective", Pearson/AddisonWesley, 2005.
3	Alan Cooper, "The Essential Of User Interface Design", Wiley - Dream Tech Ltd., 2002
4	Wilbert O. Galitz , "The Essential Guide to User Interface Design - An Introduction to GUI Design Principles and Techniques", Second Edition, John Wiley & Sons, Inc.,2018.
5	Soren Lauesen, "User Interface Design: A Software Engineering Perspective", Pearson/AddisonWesley, 2005.

BC	JOK REFERENCES
-	Wilbert O. Galitz , "The Essential Guide to User Interface Design - An Introduction to
L	GUI Design Principles and Techniques", Second Edition, John Wiley & Sons, Inc., 2018.
2	Soren Lauesen, "User Interface Design: A Software Engineering Perspective", Pearson/AddisonWesley, 2005.
3	Alan Cooper, "The Essential Of User Interface Design", Wiley - Dream Tech Ltd.,2002
4	Wilbert O. Galitz , "The Essential Guide to User Interface Design - An Introduction to
4	GUI Design Principles and Techniques", Second Edition, John Wiley & Sons, Inc., 2018.
5	Soren Lauesen, "User Interface Design: A Software Engineering Perspective", Pearson/AddisonWesley, 2005.

DEC		

1	https://en.v	wikipedia	.org/wiki/	User i	interface	design
			<u> </u>			

2 https://www.tutorialspoint.com/software\_engineering/software\_user\_interface\_design.htm

CO	JRSE	OUTCOMES	(CO)
			· /

After	RBT Level	Unit						
CO1	Understand the importance of user interface and benefits of good design.	K2	1					
CO2	Develop an effective user interface considering human characteristics, interaction speeds and business functions in relevance to design standards and guidelines	K3	2					
CO3	Develop system menus, navigation schemes, windows, buttons, text boxes, selection controls and presentation controls for a user interface.	K3	3					
CO4	Demonstrate the use of multimedia system components in creating text, graphics, icons, images and video for web pages.	K2	4					
CO5	Develop test cases and evaluate the working system of windows layout for a mobile user interface.		5					
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating								

CO WISE DIRECT ASSESSMENT PATTERN								
Assessments	Maximum Marks	Total	Marks					

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		CO1	CO2	CO3	CO4	CO5	Marks	Conversion			
		Part A	8	8	4			20			
	CATI	Part B	32	32	16			80			
		Total (a)	40	40	20			100	200		
		Part A			4	8	8	20	<b>30</b>	CIA:	
CIA	CAT II	Part B			16	32	32	80		40	
		Total (b)			20	40	40	100		-	
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>		
		Part A	4	4	4	4	4	20			
FSF	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:	
LUL	– Theory	Total (d)	20	20	20	20	20	100	60	60	
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00		

INDIRECT ASSESSMENT

COURSE END SURVEY

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
III	B.E CSE, B.Tech IT , B.Tech AI&DS	23CS3LT1	OBJECT ORIENTED PROGRAMMING WITH JAVA	2	0	4	4

# PRE-REQUISITES NIL

COURSE OBJECTIVES								
1	To Explain the object-oriented programming concepts, and apply them in solving problems							
2	To Determine the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.							
3	To Illustrate the implementation of packages and interfaces							
4	To Infer the concepts of exception handling and multithreading.							
5	To Outline the design of Graphical User Interface using applets and swing controls.							

			COURSE CO	DNTENT				
Topic - 1	INTRO	ουςτιο	ΟΝ ΤΟ ΟΟΡS Ο	ONCEPTS	AND C	LASSES	6	
Introduction to OOP– Java Fundamentals - Data Types, Variables, and Arrays Operators - Control Statements – Classes – Methods –Constructors- Garbage Collection.								
Topic - 2         STRINGS, INHERITANCE, INTERFACES, AND PACKAGES								
<b>Strings</b> : introduction to Strings, String operations, <b>Inheritance</b> :- Types of Inheritance, Method overriding, Final keyword. <b>Packages</b> and <b>Interface</b> s								
Topic - 3 EXCEPTION HANDLING & MULTI-THREADING							6	
Exception H Thread Class	landling: Fund , creating multi	amenta ple thre	als, Types of exe eads, life cycle	ception hand of thread, th	dling, nread p	Multi-threadin roperties	<b>g</b> :	
Topic - 4	I/O STRE	AMS A		ON FRAME	WORK	CLASSES	6	
I/O Stream work : Hiera Priority Queu	s: Byte Stream archy of collection archy Set, Ling	Classe on fram nked Ha	s and Characte nework, Array L ash Set, Tree S	r Stream Cla ist, Linked L et	asses. ( ist, Veo	Collection Franctor, Stack, Que	ne ue,	
Topic - 5	Topic - 5SWINGS6							
<b>Swing</b> – Intr Handling- Ha	<b>Swing</b> – Introduction, limitations of AWT, MVC architecture, components, containers, Event Handling – Handling mouse and keyboard events							
Lecture:	30 Periods					Total: 30 P	eriods	

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LABORATORY COURSE CONTENT								
Ex.No.		Experiment / Exerci	se	СО				
1	Write a program to	find the factorial of a given r	umber.	CO1				
2	Write a program to print numbers in sorting order.							
3	Write a program on illustration of use of packages							
4	Write a program on illustration of use of string operations in java							
5	Write a program to implement interfaces.							
6	Write a program that implements a stack ADT that converts infix expression into postfix expression.							
7	Write a program to read a file and displays the file on the screen within line number before each line.							
8	Write a program t streams.	o copy contents of a file	into another file using File	CO3				
9	Write a program fo Divide-by- zero Exc	or handling Array Index Ou eption.	t of Bounds Exception and	CO3				
10	Write a program for	custom exception creation.		CO4				
11	Write a program on multi-threading showing how CPU time is shared among all the threads.							
12	Write a program for Producer-Consumer problem using threads.							
Pract	ical: 60 Periods		Laboratory Total: 60 Per	iods				

# **BOOK REFERENCES**

1	Object Oriented Programming with Java Laboratory Manual, Al-AmeenPublications, 2020
2	Herbert Schildt, "Java the Complete Reference", Ninth edition Tata McGraw Hills, 2014.
3	Paul Deitel and Harvey Deitel, $-$ "Java How to Program (Early Objects)", Tenth Edition, Pearson Prentice Hall2014.
4	Timothy Budd, —"An Introduction to Object-Oriented Programming", Third Edition, Pearson Education, 2008.
5	E.Balaguruswamy, "Programming with Java", Sixth Edition, TMH,2019.

E-	RESOURCES
1	https://www.w3resource.com/java-exercises/
2	https://www.csie.ntu.edu.tw/~d00922011/java/320/java.html

COURSE OUTCOMES (CO)								
After	RBT Level	Unit						
CO1	Explain the object-oriented programming concepts, and apply them in solving problems	К2	1					
CO2	Determine the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.	К3	2					
CO3	Illustrate the implementation of packages and interfaces	К3	3					
CO4	Infer the concepts of exception handling and multithreading.	К3	4					
C05	Outline the design of Graphical User Interface using applets and swing controls.	K4	5					
RBT Le	evels: K1 – Remembering: K2 – Understanding: K3 – Applying: K4 – Apalyzing:	K5 – Eval	uating:					

K6 - Creating

	CO WISE DIRECT ASSESSMENT PATTERN										
	Acco	sements		Maximum Marks					Total	Marks	
					CO2	CO3	<b>CO4</b>	CO5	Marks	Conversion	
			Part A	4	4	4	4	4	20		
	Theory Components	CAT II	Part B	16	16	16	16	16	80	100 to	
CIA	•		Total	20	20	20	20	20	100	25	<u>CIA:</u> 25 +
	Laboratory Components	Lab Record	All Ex.	Rub	rics - 1	.0 marl Ex.	<s e<="" for="" th=""><th>each</th><th>75</th><th>100 25 <b>50</b></th><th>50 <u>50</u></th></s>	each	75	100 25 <b>50</b>	50 <u>50</u>
		Model Examination	Any One Ex.	Rubrics - 25 marks for the Ex. <b>25</b>						to 25	
	Theory Components	ts End Semester Examinations	Part A	2	2	2	2	2	10		
			Part B	Any 2 COs out of 5 COs					20	100	
ESE			Total	30					30	to 50	<u>ESE:</u> 50
	Laboratory Components		Any One Ex.	Rubrics - 25 marks for the Ex.					70		
Total Marks								1	.00		

INDIRECT ASSESSMENT

COURSE END SURVEY

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
III	B.E. CSE & B.Tech. IT	23CS3LT2	DATA STRUCTURES & ALGORITHMS	2	0	4	4

# PRE-REQUISITES NIL

COURSE OBJECTIVES				
1	To Understand the concepts of ADTS and Analyze the various Linked list Concepts with algorithms.			
2	To Apply the different linear data structures like stack and queue to various computing problems.			
3	To Understand the uses of various non-linear data structures - trees and analyse their performance.			
4	To Examine the performance of various trees and Graphs			
5	To Analyze and understand the concepts of various sorting, searching and hashing algorithms.			

## **COURSE CONTENT**

Topic - 1LIST6LISTS Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list<br/>implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists –<br/>Applications of lists – Polynomial ADT.6

#### Topic - 2

#### **STACKS AND QUEUES**

Stack ADT – Operations – Applications – Balancing Symbols – Evaluating arithmetic expressions Infix to Postfix conversion – Queue ADT – Operations – Circular Queue – De Queue – Applications of Queues.

#### Topic - 3

#### TREES

Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT – AVL Trees – Priority Queue (Heaps) – Binary Heap.

#### Topic - 4

#### MULTIWAY SEARCH TREES AND GRAPHS

B-Tree – B+ Tree – Graph Definition – Representation of Graphs – Types of Graph - Breadthfirst traversal – Depth-first traversal – Bi-connectivity – Euler circuits – Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's algorithm

# Topic - 5 SEARCHING, SORTING AND HASHING TECHNIQUES

Searching – Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion

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# **B.TECH.IT**

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6
R2023 –	CURRIC	ULUM &	SYLLABI
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**B.TECH.IT** 

sort – Shell sort –. Merge	Sort –	Hashing -	Hash	Function	s – Se	parate Chaining – Open
Addressing – Rehashing – Ex	tendib	le Hashing				
Lecture: 30 Periods						Total: 30 Periods

		LABORATORY COURSE CO	NTENT				
Ex.No.		Experiment / Exerci	se	СО			
1	Array implementation	on of Stack, Queue and Circu	lar Queue ADTs	CO1			
2	Implementation of Singly Linked List						
3	Linked list implementation of Stack and Linear Queue ADTs Co						
4	Implementation of Polynomial Manipulation using Linked list						
5	Implementation of Evaluating Postfix Expressions, Infix to Postfix conversion						
6	Implementation of Binary Search Trees CO						
7	Implementation of AVL Trees CO						
8	Implementation of I	Heaps using Priority Queues		CO3			
9	Implementation of I	Dijkstra's Algorithm		CO3			
10	Implementation of Prim's Algorithm C						
11	Implementation of Linear Search and Binary Search CC						
12	Implementation of Insertion Sort and Selection Sort C						
Pract	ical: 60 Periods		Laboratory Total: 60 Per	iods			

BC	OK REFERENCES
1	Reema Thareja, "Data structures using C, 1"' Edition. Oxford University Press, 2018.
2	Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed. "Fundamentals of Data Structures in C", 2,4 Edition, University Press, 2017.
3	Thomas H. Cormen, Charles E. Leiserson,"Introduction to Algorithms", 3 <sup>rd</sup> Edition, 2016.
4	Robert Sedgewick and Kevin Wayne, "Algorithms", 4 <sup>th</sup> Edtion, 2016
5	Michael T. Goodrich, Roberto Tamassia ,"Data Structures and Algorithms in Python", 5 <sup>th</sup> Edition, 2017

E-	E-RESOURCES			
1	https://www.youtube.com/watch?v=BBpAmxU_NQo			
2	https://www.youtube.com/watch?v=WwfhLC16bis			
3	https://www.youtube.com/watch?v=DWpVGpNfDmM			
4	https://www.youtube.com/watch?v=YWqla0UX-38			
5	https://www.youtube.com/watch?v=44A_jk4_Rx8			

	COURSE OUTCOMES (CO)			
After	Successful completion of the course, the students should be able to	RBT Level	Unit	
C01	Understand the concepts of ADTS and Analyze the various Linked list Concepts with algorithms.	К2	1	
CO2	Apply the different linear data structures like stack and queue to various computing problems.	К3	2	
СОЗ	Understand the uses of various non-linear data structures - trees and analyse their performance. understand and graphs	К2	3	
CO4	Examine the performance of various trees and Graphs	K4	4	
CO5	Analyze and understand the concepts of various sorting, searching and hashing algorithms.	K4	5	
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating				

### **B.TECH.IT**

	CO WISE DIRECT ASSESSMENT PATTERN										
	A	amonto		Maximum Marks Total				Total	Marks		
	Assessments			C01	CO2	CO3	<b>CO4</b>	CO5	Marks	Conversion	
			Part A	4	4	4	4	4	20		
	Theory Components	CAT II	Part B	16	16	16	16	16	80	100 to	
CIA	components		Total	20	20	20	20	20	100	25	<u>CIA:</u> 25 +
	Laboratory Components	Lab Record	All Ex.	Rub	orics - 1	.0 marl Ex.	<s e<="" for="" th=""><th>each</th><th>75</th><th>100</th><th>50 <u>50</u></th></s>	each	75	100	50 <u>50</u>
		Model Examination	Any One Ex.	Rubrics - 25 marks for the Ex. 25						to 25	
			Part A	2	2	2	2	2	10		
	Theory Components	End	Part B	Any 2 COs out of 5 COs					20	100	
ESE		Semester Examinations	Total	30					30	to 50	<u>ESE:</u> 50
	Laboratory Components		Any One Ex.	Rubr	Rubrics - 25 marks for the Ex.				70		
	Total Marks					1	00				

INDIRECT ASSESSMENT

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
III	B.E. / B.Tech., Common to all	23EN3L1	INTERPERSONAL COMMUNICATION SKILLS LABORATORY - I	0	0	3	1.5

### **PRE-REQUISITES** COMMUNICATIVE ENGLISH & TECHNICAL ENGLISH


1	To choose clear and friendly language for all kinds of transactions.
2	To engage and communicate effectively.
3	To reveal their personality clearly.
4	To develop essential communication skills.

**5** To understand work ethics and culture.

LIST OF EXPERIMENTS							
I	Conversation P	ractice	Sessions (To be done as r	eal-life	interactions)	3	
II	Talking to frien	alking to friends					
III	Listening skills	Listening skills					
IV	Email Etiquette					3	
V	Business Englis	Business English					
VI	I Discussion on the clips				3		
VII Decision Making				3			
VIII Developing Conversation				3			
PRACTICAL: 45 Periods			Tutorial: 0 Periods		Total: 45P	eriods	

### **BOOK REFERENCES**

1	Communication Skills in English by Anjana Tiwari, 2021
2	How to improve your communication skills by Dawood Khan, 2021.
3	Communication to connect, 2020.

### **E-RESOURCES**

- 1 https://youtu.be/cC2vxmBDAG8
- 2 https://youtu.be/I3RSiSUwIT0
- 3 https://youtu.be/cyXADWE7KPo

COURSE OUTCOMES (CO)									
After	RBT Level	Unit							
CO1	Produce appropriate and accurate language for transactions of various kinds.	К3	1						
CO2	Understand and converse with their higher authorities/ subordinates/ other persons concerned.	К3	2						
CO3	Expose their personality effectively.	K4	3						
CO4	Acquire skills in the critical areas of communication, viz., socializing, telephoning, and negotiations.	K4	4						
CO5	Perceive work ethics and work culture.	K2	5						
RBT Levels: K1 – Remembering: K2 – Understanding: K3 – Applying: K4 – Applyzing: K5 – Evaluating: K6 - Creating									

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments			Maximum Marks					Total	Marks	
			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
	Lab Record	All Ex.	Rub	rics - 1	.0 marl Ex.	ks for e	each	75	100	
CIA	Model Examination	Any One Ex.	Rubrics - 25 marks for the Ex.					25	100 to <b>60</b>	<u>CIA:</u> 60
ESE	End Semester Examinations – Practical	Any One Ex.	Rubrics - 25 marks for the Ex.				100	100 to <b>40</b>	<u>ESE:</u> 40	
Total Marks							1	.00		

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INDIRECT ASSESSMENT
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### **SEMESTER IV**

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С				
	THEORY COURSES												
1	23HS4T1	Universal Human Values 2: Understanding Harmony	HS	100	-	2	1	0	3				
2	23CS4T2	Software Engineering	PC	40	60	3	0	0	3				
3	23IT4T3	Web Technology	PC	40	60	3	1	0	4				
4		Open Elective – I	OE	40	60	3	0	0	3				
5		Database Management Systems	PC	40	60	3	0	0	3				
	THEOR	Y COURSES WITH LABO	RATO	RY C	OMPO	NEN	TS						
6	23CS4LT2	Operating Systems	PC	50	50	2	0	4	4				
		LABORATORY C	COURS	SES					-				
7		Database Management Systems Laboratory	PC	60	40	0	0	2	1				
8	23EN4L1	Inter Personal Communication Skills Laboratory - II	HS	60	40	0	0	3	1.5				
Total								9	22.5				

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
IV	B.E. CSE	23HS4T1	UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY	2	1	0	3

**B.TECH.IT** 

PRE-REQUISITES ----

	COURSE OBJECTIVES
-	Introduce the need, basic guidelines, and methodology of value education for holistic
4	development.
2	Develop self-awareness and an understanding of inner harmony for personal well-
2	being.
3	Foster harmonious relationships within the family and society by understanding human
	values and ethical interactions.
4	Promote awareness of harmony in nature and existence, emphasizing sustainable and
4	coexistence-based living.
L	Instill professional ethics to guide responsible and ethical decision-making in the
5	workplace.

### **COURSE CONTENT**

Unit – I Course Introduction - Need, Basic Guidelines, Content and Process for Value Education	6+3							
1. Purpose and motivation for the course, recapitulation from Universal Human Values-I								
2. Self-Exploration–what is it? - Its content and process; "Natural Acceptance" and Experiential Validation- as the process for self-exploration								
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations								
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority								
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenarioMethod to fulfill the above human aspirations: understanding and living in harmony at various levels.								
Unit – II Understanding Harmony in the Human Being - Harmony in Myself	6+3							
<ol> <li>Understanding human being as a co-existence of the sentient "I" and the "Body"</li> </ol>	material							
8. Understanding the needs of Self ("I") and "Body" - happiness and physical facil	ty							
9. Understanding the Body as an instrument of "I" (I being the doer, seer and enjoyer)								
10. Understanding the characteristics and activities of "I" and harmony in "I"								
11. Understanding the harmony of I with the Body: Sanyam and Health; correct ap Physical needs, meaning of Prosperity in detail	praisal of							
12. Programs to ensure Sanyam and Health.								

Unit – III       Understanding Harmony in the Family and Society- Harmony in Human Relationship         13. Understanding values in human-human relationship: meaning of Justice (nine unit)	6+3 niversal							
Unit - IIIUnderstanding Harmony in the Family and Society- Harmony in Human Relationship13. Understanding values in human-human relationship: meaning of Justice (nine unit)	6+3 niversal							
13. Understanding values in human-human relationship: meaning of Justice (nine uni	niversal							
values in relationships) and program for its fulfillment to ensure mutual happ Trust and Respect as the foundational values of relationship	, p ,							
14. Understanding the meaning of Trust; Difference between intention and competence 15. Understanding the meaning of Respect, Difference between respect and different the other salient values in relationship	ce itiation;							
16. Understanding the harmony in the society (society being an extension of fa Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive F Goals	family): Human							
17. Visualizing a universal harmonious order in society- Undivided Society, Universal ( from family to world family.	Order-							
Unit – IV Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	6+3							
<ol> <li>18. Understanding the harmony in the Nature</li> <li>19. Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self regulation in nature</li> <li>20. Understanding Existence as Co-existence of mutually interacting units in all pervasive</li> </ol>								
21. Holistic perception of harmony at all levels of existence.								
Unit - V Implications of the above Holistic Understanding of Harmony on Professional Ethics	6+3							
22. Natural acceptance of human values								
23. Definitiveness of Ethical Human Conduct								
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Uni Order	niversal							
25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco- friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.								
26. Case studies of typical holistic technologies, management models and prod systems	26. Case studies of typical holistic technologies, management models and production systems							
27. Strategy for transition from the present state to Universal Human Order: a. level of individual: as socially and ecologically responsible engineers, technologis managers b. At the level of society: as mutually enriching institutions organizations	At the ists and ns and							
28. Sum up								
Lecture: 30 PeriodsTutorial: 15 PeriodsTotal: 45 Peri	riods							

1	Jeevan Vidya: E.K. Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.										
2	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004										
3	The Story of Stuff (Book)by Annie Leonard , 2011										
4	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi										
5	Small is Beautiful - E. F Schumacher.										
6	Slow is Beautiful - Cecile Andrews										
7	Economy of Permanence - J C Kumarappa										
8	India Wins Freedom - Maulana Abdul Kalam Azad										
9	Vivekananda - Romain Rolland (English)										
10	Gandhi - Romain Rolland (English)										

### E-RESOURCES

1	https://www.youtube.com/watch?v=XGxNCFjDGEg
2	https://www.c-span.org/video/?292709-1/the-story-stuff

COURSE OUTCOMES (CO)								
After	RBT Level	Unit						
C01	Understand Need, Basic Guidelines, Content and Process for Value Education	K2	1					
CO2	Understand Harmony in the Human Being - Harmony in Myself	K2	2					
СО3	Understand Harmony in the Family and Society- Harmony in Human Relationship	K2	3					
CO4	Understand Harmony in the Nature and Existence - Whole existence as Coexistence	K2	4					
CO5	Understand Harmony on Professional Ethics	К2	5					
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 – Creating								

CO WISE DIRECT ASSESSMENT PATTERN											
Assessments				Maxi	mum M	larks		Total	Marks		
			CO1 CO2 CO3 CO4 CO5			Marks	Conversion				
		Part A	8	8	4			20			
	CATI	Part B	32	32	16			80			
	CATI	Total (a)	40	40	20			100	200		
		Part A			4	8	8	20	to <b>30</b>	CIA:	
CIA	CAT II	Part B			16	32	32	80		40	
		Total (b)			20	40	40	100			
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>		
		Part A	4	4	4	4	4	20			
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:	
102	– Theory	Total (d)	20	20	20	20	20	100	60	60	
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00		

INDIRECT ASSESSMENT

COURSE END SURVEY

**B.TECH.IT** 

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
IV	B.E. CSE & B.Tech. IT	23CS4T2	SOFTWARE ENGINEERING	3	0	0	3

**PRE-REQUISITES** NIL

### **COURSE OBJECTIVES**

1	To Design solutions using common life cycle models for a given software problem				
2	To Apply the Requirement engineering process with emphasis on elicitation analysis and modeling for any given software requirement.				
3	To Identify appropriate design strategies and analyze the requirement specifications for any software system				
4	To Examine various software testing techniques and analyze the given software requirements to determine appropriate testing techniques in commercial software environments				
5	To Inference the process of software project management and estimate the suitable cost				

### **COURSE CONTENT**

Topic - 1 THE SOFTWARE PROCESS	9				
Software Engineering: Generic View of Process - Software Engineering Practice - Software					
Process Model: Prescriptive Models - Waterfall Models - Increment - Evolution	nary and				
Specialized model - Comparison Study of Software Process Models - Agile Proc	cess and				
Models					
Topic - 2 REQUIREMENTS ANALYSIS AND SPECIFICATION	9				
Software Requirements: Need for SRS, Requirement Process, Problem Analysis: In	formal &				
formal Approaches, Data Flow Modeling, Object Oriented Modeling, Pro	totyping,				
Requirements Specifications: Characteristics of an SRS, Components of SRS, Spe	cification				
Language, Structure of Requirement Document: IEEE Standards for SRS, Validation,	Metrics.				
Topic - 3 SOFTWARE DESIGN	9				
Designing: Function Oriented Design: Design Principles: Problem Partitioning and H	ierarchy,				

Abstraction, Modularity, Top Down and Bottom-Up Strategies, Module Level Concepts: Coupling, Cohesion; Structure Design Methodology, Verification, Introduction to Object Oriented Design & User Interface Design, Software Measurement Metrics: Various Size Oriented Measures- Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures Control Flow Graphs.

Topic - 4	SOFTWARE TESTING TECHNIQUES	9
Product Spe	cifications - Defining the Final Product - Data Flow Diagram, Data Di	ictionary,
Structured E	nglish, Decision Trees, Decision Tables - Feasibility Study. Software -	Testing :
Test Plan - I	Development Testing : Verification and Validation - General Testing M	lethods :
White Box a	nd Black Box Testing - Unit Testing - System Integration Testing - V	/alidation
Testing - Sys	stem testing	

### Topic - 5

### PROJECT MANAGEMENT

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM. Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Lecture: 45 Periods

Total: 45 Periods

### **TEXT BOOKS**

1	"Clean Architecture: A Craftsman's Guide to Software Structure and Design" by Robert C. Martin (First Edition, 2017).
2	Roger S. Pressman and Bruce Maxim "Software Engineering: A Hands-On Approach" (Ninth Edition, 2021).
3	Roger S. Pressman "Software Engineering: A Practitioner's Approach" (Ninth Edition, 2021).

### **REFERENCE BOOKS**

	Andrew Heart and David Theorem IThe Durants Durants Very Jerman to
1	Andrew Hunt and David Thomas The Pragmatic Programmer: Your Journey to
	Mastery" (20th Anniversary Edition, 2019).
r	Roger S. Pressman and Bruce Maxim "Software Engineering: A Practitioner's Guide"
2	(Ninth Edition, 2021).

### E-RESOURCES

1 https://en.wikipedia.org/wiki/Software\_engineering

2 https://www.geeksforgeeks.org/software-engineering/

COURSE OUTCOMES (CO)							
After	After Successful completion of the course, the students should be able to <b>RBT</b> Level <b>Unit</b>						
CO1	Design solutions using common life cycle models for a given software problem	К2	1				
CO2	Apply the Requirement engineering process with emphasis on elicitation analysis and modeling for any given software requirement.	К3	2				
СО3	Identify appropriate design strategies and analyze the requirement specifications for any software system	K2	3				
CO4	Examine various software testing techniques and analyze the given software requirements to determine appropriate testing techniques in commercial software environments	K4	4				
CO5	Inference the process of software project management and estimate the suitable cost	K4	5				
RBT Le	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating						

### **B.TECH.IT**

9

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments			Maximum Marks					Total	Marks	
			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	CAT I	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200 to <b>30</b>	<u>CIA:</u> 40
	CAT II	Part A			4	8	8	20		
CIA		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20	100 to <b>60</b>	
ESE	End Semester	Part B	16	16	16	16	16	80		ESE:
LUL	- Theory	Total (d)	20	20	20	20	20	100		60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

### **B.TECH.IT**

Sem	Programme	Course Code	Course Name		т	Ρ	С
IV	B.E. CSE	231T4T3	WEB TECHNOLOGY	3	1	0	4

PRE-REQUISITES PYTHON PROGRAMMING

### **COURSE OBJECTIVES**

1	
2	
3	
4	
5	

	COURSE CONTENT						
Unit – I	nit – I WEBSITE BASICS, HTML 5						
Web Essentials : Clients, Servers and Communication – World wide web – HTTP Request Message – HTTP Response Message – HTML5 – Tables -Lists – Image – HTML5 control elements – Drag and Drop – Audio – Video controls – CSS3 –Backgrounds -Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations.							
Unit – II	JAVA SCRIPT	9					
JavaScript: JavaScript DOM Model – Variables and Data types – Operators – C statements – Functions – Arrays – Objects- Exception Handling-Validation.							
Unit – III	SERVLETS	9					
Servlets – S Basic JSP – N	ervlet Architecture – Servlet Life cycle – Introduction to Java Server 1VC Paradigm.	Pages:					
Unit – IV	PHP AND XML	9					
PHP – Introduction – String processing – Regular expressions – Form processing & Business logic – Creating a database in MySQL. XML Introduction – Structuring data – XML namespaces – DTDs – XML Schema .							
Unit - V	t - V INTRODUCTION TO ANGULAR and WEB APPLICATIONS FRAMEWORKS						
Introduction to AngularJS, MVC Architecture, Expressions and data binding, Style Directives, Controllers, Filters, Forms, Routers; Web Applications Frameworks and Tools –Node JS-React- Django-UI & UX.							
Lecture: 45 PeriodsTutorial: 15 PeriodsTotal: 60 Periode							

### **TEXT BOOKS**

- <sup>1</sup> Jeffrey C. Jackson, "Web Technologies A Computer Science Perspective ", 11th Impression, Pearson Education, 2012.
- P. J. Deitel, H. M. Deitel, "Internet & World Wide Web How to Program", Fourth Edition, Eleventh Impression, Pearson Education, 2016.
- <sup>3</sup> Robert W. Sebesta, "Programming the World Wide Web", 8th edition, Pearson Education, 2015.

### **REFERENCE BOOKS**

- <sup>1</sup> Joel Murach and Michael Urban, "Murach's Java Servlets and JSP",3rd edition, Murach Books, 2014.
- <sup>2</sup> Luke Welling, Laura Thomson, "PHP and MySQL Web Development", Fifth Edition, Pearson Education.

### **E-RESOURCES**

1	http://www.nptel.ac.in/courses/106105084/, "Internet Technology", Prof. Indranil Sengupta, IIT-Kharagpur.
2	https://nptel.ac.in/courses/106101163/45/, "Testing of Web Applications and Web Services", Prof. Meenakshi D'Souza, IIT- Bombay
3	https://en.wikibooks.org/wiki/Introduction_to_Information_Technology/We b_Technologies

4 https://youtu.be/JLcaX0XlQuI

### COURSE OUTCOMES (CO)

After Successful completion of the course, the students should be able to			Unit			
CO1	Identify the fundamental concept of web structure and creation of static webpage.	К3	1			
CO2	Discuss the various functions of JavaScript to build dynamic webpage creation.	К3	2			
CO3	Describe the importance of CSS and Bootstrap in webpage deigning.	К3	3			
CO4	Discuss the basic concepts and analyzed data processing in PHP.	K3	4			
C05	K4	5				
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating						

	CO WISE DIRECT ASSESSMENT PATTERN									
Assessments				Maxi	mum M	larks		Total	Ma	arks
			CO1	CO2	CO3	CO4	CO5	Marks	Conv	ersion
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
	0/11 2	Total (a)	40	40	20			100	200	
	CAT II	Part A			4	8	8	20	to <b>30</b>	CIA:
CIA		Part B			16	32	32	80		40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
ESE	- Theory	Total (d)	20	20	20	20	20	100	<b>60</b>	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

## B.TECH.IT

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
IV	B.E. CSE & B.Tech. IT		DATABASE MANAGEMENT SYSTEMS	3	0	0	3

### PRE-REQUISITES

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	COURSE OBJECTIVES
1	To Explain the basic concepts of the database management systems
2	To Examine SQL queries to create, manipulate and control the database
3	To Apply normalization technique to design database
4	To Analyse database transactions using ACID properties
5	To Compare the various storage and optimization techniques

### COURSE CONTENT

Topic - 1	INT	RODU	CTION TO RELATIONAL E	DATAB	ASE	6	
What is database system-purpose of database system-view of data-relational databases- database architecture- transaction managementDatabase Schema and Diagram Relational Algebra — ER Diagrams — Entities. Attributes, Relationships, Constraints,							
Topic - 2		STR	UCTURED QUERY LANGU	AGE		6	
Basics of SQ aggregate fu	L, DDL, DML,DC nctions, Built-ir	CL,TCL	<ul> <li>creation, alteration, definition</li> <li>ons — Views — Joins — Properties</li> </ul>	ning co ocedure	nstraints — Fun	ctions —	
Topic - 3			DATABASE DESIGN			6	
Relational c dependencie BCNF, 4NF, 5	Relational database model: Logical view of data, keys, integrity rules. Functional dependencies - Normalization - Normal forms based on primary keys (1 NF, 2NF, 3NF, BCNF, 4NF, 5NF) - Triggers - Cursor						
Topic - 4		TR	ANSACTION MANAGEME	NT		6	
Transaction based concu database rec	Transaction management: ACID properties-serializability and concurrency control-Lock based concurrency control (2PL, Deadlocks),Time stamping methods- optimistic methods-						
Topic - 5	IMPLEME	NTATI	ON TECHNIQUES AND No	SQL D	ATABASE	6	
Indexing and Hashing - Si- tree Index Files - B Tree Index Files - Query Processing and optimization - Introduction to NoSQL Databases - Types of NOSQL Databases- NoSQLVs SQL - Limitations of NoSQL - Basics of MONGODB							
Lecture: 45 Periods         Tutorial: 0 Periods         Total: 45 Periods							

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### **TEXT BOOKS**

1	"Database	System	Concepts"	by	Abraham	Silberschatz,	Henry	F.	Korth,	and	S.
T	Sudarshan	(7th Edit	ion, 2019).								

- 2 "SQL Performance Explained" by Markus Winand (latest edition: 2nd Edition, 2018).
- <sup>3</sup> "Modern Database Management" by Jeffrey A. Hoffer, Ramesh Venkataraman, and Heikki Topi (latest edition: 13th Edition, 2018).
- 4 "Database Systems: Design, Implementation, and Management" by Carlos Coronel, Steven Morris, and Peter Rob (latest edition: 13th Edition, 2019).

### **REFERENCE BOOKS**

- 1 "Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan (7th Edition, 2019).
- 2 "SQL Performance Explained" by Markus Winand (latest edition: 2nd Edition, 2018).
- <sup>3</sup> "Modern Database Management" by Jeffrey A. Hoffer, Ramesh Venkataraman, and Heikki Topi (latest edition: 13th Edition, 2018).
- 4 "Database Systems: Design, Implementation, and Management" by Carlos Coronel, Steven Morris, and Peter Rob (latest edition: 13th Edition, 2019).
- 5 "SQL Queries for Mere Mortals: A Hands-On Guide to Data Manipulation in SQL" by John L. Viescas and Michael J. Hernandez (latest edition: 4th Edition, 2018).

### **E-RESOURCES**

Pramod J. Sadalage and Mann Fowler, "NOSQL Distilled: A Brief guide to merging worldof Polyglot persistence", 24 Edition, Addision Wesley, 2012.

Ramakrishnan and Gehrke, 'Database Management Systems", 3,4 Edition, McGraw Hill,2003.

S	https://nptetac.inlcourses/106/105/106105175/.
---	--

4 https://www.edureka.co/mongodb-certification-training.

5 httpsfhwAv.coursera.orgAeamnntroduction-to-nosql-databases.

### COURSE OUTCOMES (CO)

After	RBT Level	Unit	
CO1	Explain the basic concepts of the database management systems	К2	1
CO2	Examine SQL queries to create, manipulate and control the database	К3	2
CO3	Apply normalization technique to design database	К3	3
CO4	Analyse database transactions using ACID properties	К4	4

CO5

Compare the various storage and optimization techniques

5

K4

### RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating

CO WISE DIRECT ASSESSMENT PATTERN										
	Accoccmonte		Maximum Marks				Total	Marks		
Assessments		CO1	CO1 CO2 CO3 CO4 CO5				Marks	Conv	Conversion	
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
		Part A			4	8	8	20	<b>30</b>	CIA:
CIA	CAT II	Part B			16	32	32	80		40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
FSF	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
101	– Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

Sem	Programme	Course Code	Course Name	L	т	Ρ	С
IV	B.E. CSE / B.Tech. IT	23CS4LT2	OPERATING SYSTEMS	2	0	4	4

### PRE-REQUISITES

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# COURSE OBJECTIVES1To Describe the important computer system resources and the role of operating system.2To Identify the various CPU scheduling algorithms and to handle deadlock mechanisms.3To Compare and contrast various memory management schemes.4To Implementation of functionality of file system and I/O system.5To Perform administrative tasks on Linux Servers.

### COURSE CONTENT

Topic - 1	OPERATING SYSTEM OVERVIEW	6
Computer Sy	stem Overview – Basic Elements - Operating system Overview - Evo	lution of
Operating Sy	stem; Operating System Structures and Services - System Calls -	System
Programs - O	S Generation and System Boot.	
Topic - 2	PROCESS MANAGEMENT	6
Process conc	epts - Process Scheduling - Inter-process Communication ; CPU Sc	heduling
criteria and	algorithms - Threads - Threading issues; Process Synchronization - The	Critical-
Section prob	lem-Semaphore - Mutex - Synchronization problems. Deadlock - I	Deadlock
prevention, a	voidance and Detection.	
Topic - 3	MEMORY MANAGEMENT	6
Main Memory	$\prime$ - Contiguous allocation - Paging – Segmentation, Segmentation with	paging;
Virtual Memo	ry - Demand paging - Page Replacement Algorithms - Thrashing.	
Topic - 4	FILE SYSTEMS AND I/O SYSTEMS	6
Disk Structu	re – Disk Scheduling, swap space management ; File concept – I	Directory
Structure- F	ile system mounting, File Sharing and Protection; File System S	tructure,
Directory imp	plementation, Allocation Methods, Free Space Management; I/O Syster	ms – I/O
Hardware - A	pplication I/O interface, Kernel I/O subsystem, Streams, Performance.	
Topic - 5	OS DESIGN PRINCIPLES	6
Linux System	<ul> <li>Design Principles, Kernel Modules, Process Management, Scheduling,</li> </ul>	

Memory Management, Input-Output Management, File System; Mobile OS -iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File ystem.

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Lecture: 45 Periods

Tutorial: 0 Periods

**Total: 45 Periods** 

LABORATORY COURSE CONTENT								
Ex.No.		Experiment / Exerci	se	со				
1	Write programs usir	ng basic Unix commands and	shell programming.	CO1				
2	Write programs usi operating system.	ing process and file manage	ement system calls of UNIX	CO1				
3	Develop programs SRTF, Priority, and	to Implement CPU schedul Round Robin).	ing algorithms (FCFS, SJF,	C01				
4	Developing application to implement Inter Process Communication using shared memory and pipes.							
5	Develop a program to understand synchronization using producer-consumer problem.							
6	Develop a program to understand deadlock avoidance using Bankers algorithm.							
7	Develop programs Optimal, and LRU).	to implement the page rep	lacement algorithms (FIFO,	CO3				
8	Develop programs SCAN, C-SCAN).	to implement disk scheduli	ng algorithms (FCFS, SSTF,	CO3				
9	Implementation of the various File Organization Techniques ( Sequential , Random and Serial).							
10	Implementation of the following File Allocation Strategies a) Sequential b) Indexed C) linked.							
Practical: 60 Periods Laboratory Total: 60 Per								

TE	хт воокѕ
1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2013.
2	Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.
3	Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education, 2004.
4	Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.
5	Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", Fourth Edition, Payload media, 2011.

### **REFERENCE BOOKS**

1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System										
Т	Concepts",9th Edition, John Wiley and Sons Inc., 2013.										
C	Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems - A Spiral										
Z	Approach", Tata McGraw Hill Edition, 2010.										

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3	Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson
	Education, 2004.
4	Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition,
	O'Reilly, 2005.
F	Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", Fourth Edition, Payload
5	media, 2011.

E-I	E-RESOURCES						
1	https://en.wikipedia.org/wiki/Operating_system						
2	https://www.geeksforgeeks.org/what-is-an-operating-system/						
3	https://www.javatpoint.com/operating-system						
4	https://www.youtube.com/watch?v=fkGCLIQx1MI						
5	https://www.youtube.com/watch?v=26QPDBe-NB8						

	CO WISE DIRECT ASSESSMENT PATTERN										
			Maximum Marks T					Total	Ma	Marks	
	Assessments			CO1	CO2	CO3	<b>CO</b> 4	CO5	Marks	Conversion	
	Theory Components		Part A	4	4	4	4	4	20		
		CAT II	Part B	16	16	16	16	16	80	100 to	<u>CIA:</u> 25 +
CIA			Total	20	20	20	20	20	100	25	
	Laboratory Components	Lab Record	All Ex.	Rubrics - 10 marks for each Ex.			75	100	25 = <b>50</b>		
		Model Examination	Any One Ex.	Rubrics - 25 marks for the Ex. 25					to 25		
	Theory Components Exan	End Semester Examinations – Practical	Part A	2	2	2	2	2	10		
			Part B	Any 2 COs out of 5 COs					20	100	
ESE			Total	30					30	to 50	<u>ESE:</u> 50
	Laboratory Components		Any One Ex.	Rubrics - 25 marks for the Ex.				70			
		т	otal Ma	arks						1	00

INDIRECT ASSESSMENT

Semester	Programme	Course Code	Course Name	L	т	Ρ	с
IV	B.E. CSE & B.Tech. IT		DATABASE MANAGEMENT SYSTEMS LABORATORY	0	0	2	1

### PRE-REQUISITES

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	COURSE OBJECTIVES
1	To Explain the basic concepts of the database management systems
2	To Examine SQL queries to create, manipulate and control the database
3	To Apply normalization technique to design database
4	To Analyse database transactions using ACID properties
5	To Compare the various storage and optimization techniques

COURSE CONTENT									
Ex.No.		Experiment / Exercise		СО					
1	Conceptual Databa	se design using E-R model — case study		CO1					
2	Implementation of SQL commands DDL, DCL, TCL								
3	Queries to demonstrate implementation of various integrity and key constraints								
4	Practice on various DML commands to write a query to interact with database								
5	Practice on and aggregate functions and views								
6	Implement joins, nested queries and stored procedures								
7	Practice on procedural extensions (Functions, Cursors, Triggers)								
8	Document Database creation using Mongo DB								
9	Creation of database objects: Synonyms, Sequences, Views, Indexes and save point								
10	Create an Employee database to set various constraints								
Pract	ical: 60 Periods		Total: 60 Pe	riods					

### **B.TECH.IT**

### **BOOK REFERENCES**

1	"Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan (7th Edition, 2019).
2	"SQL Performance Explained" by Markus Winand (latest edition: 2nd Edition, 2018).
3	"Modern Database Management" by Jeffrey A. Hoffer, Ramesh Venkataraman, and Heikki Topi (latest edition: 13th Edition, 2018).
4	"Database Systems: Design, Implementation, and Management" by Carlos Coronel, Steven Morris, and Peter Rob (latest edition: 13th Edition, 2019).
	ICOL Quarias for Mars Martalas A Llanda On Cuida to Data Manipulation in COLI but

5 "SQL Queries for Mere Mortals: A Hands-On Guide to Data Manipulation in SQL" by John L. Viescas and Michael J. Hernandez (latest edition: 4th Edition, 2018).

### **E-RESOURCES**

1	"Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan (7th Edition, 2019).
2	"SQL Performance Explained" by Markus Winand (latest edition: 2nd Edition, 2018).
3	"Modern Database Management" by Jeffrey A. Hoffer, Ramesh Venkataraman, and Heikki Topi (latest edition: 13th Edition, 2018).
4	"Database Systems: Design, Implementation, and Management" by Carlos Coronel, Steven Morris, and Peter Rob (latest edition: 13th Edition, 2019).
5	"SQL Queries for Mere Mortals: A Hands-On Guide to Data Manipulation in SQL" by John L. Viescas and Michael J. Hernandez (latest edition: 4th Edition, 2018).

COURSE OUTCOMES (CO)									
After	After Successful completion of the course, the students should be able to <b>RBT Ex. Level Nos.</b>								
CO1	Explain the basic concepts of the database management systems	К2	1						
CO2	Examine SQL queries to create, manipulate and control the database	К3	2						
CO3	Apply normalization technique to design database	К3	3						
CO4	Analyse database transactions using ACID properties	K4	4						
CO5	Compare the various storage and optimization techniques	К4	5						
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating									

	CO WISE DIRECT ASSESSMENT PATTERN										
	A		Maximum Marks				Total	Marks			
	Assessments			CO2	CO3	CO4	CO5	Marks	Conversion		
	Lab Record	All Ex.	Rub	Rubrics - 10 marks for each Ex. <b>75</b>						CTA	
CIA	Model Examination	Any One Ex.	Rubr	Rubrics - 25 marks for the Ex. 2						60	
ESE	End Semester Examinations – Practical	Any One Ex.	Rubr	Rubrics - 25 marks for the Ex. <b>100</b>					100 to <b>40</b>	<u>ESE:</u> 40	
	Total Marks							1	L <b>OO</b>		

INDIRECT ASSESSMENT	COURSE END SURVEY
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Semester	Program me	Course Code	Course Name	L	т	Ρ	С
IV	B.E. CSE	23EN4L1	INTERPERSONAL COMMUNICATION SKILLS LAB - II	0	0	3	1.5

PRE-REQUISITES	COMMUNICATIVE	ENGLISH	&	TECHNICAL	ENGLISH
	INTERPERSONAL CO	OMMUNICAT	ION S	<b>SKILLS LAB - I</b>	

	COURSE OBJECTIVES					
1	To achieve academic success.					
2	To embrace the opportunity.					
3	To use proper English in every situation.					
4	To engage in specific academic speaking activities.					
5	To make effective presentations.					

		Ľ	IST OF EXPERIMENTS			
I	Role Play					3
II	Empathy	mpathy				
III	Time Manageme	ent				3
IV	Body Language	Body Language				3
V	Mock Interview	Mock Interview				3
VI	Group Discussio	n				3
VII Presentation				3		
VIII Team Building Skills				3		
PRACTICAL: 45 Periods		Tutorial: 0 Periods		Total: 45 P	eriods	

BOO	K R	EFER	ENCES

1	Communication Skill by Dale Carnegie, 2022.
2	Communication: Core Interpersonal Skills by Gjyn O'Toolee, 2020.
3	Effective Communication in the workplace by David L.Lewis, 2019.
4	Communication skills/ BBA- 1 YEAR (NEP2020 (NEP2020 Department Of Higher Education ) Madhya Pradesh (Paperback, Dr. Sumit Kishore Mathur, Dr. Awanti Dixit).

### **OTHER REFERENCES**

- 1 https://youtu.be/cC2vxmBDAG8
- 2 https://youtu.be/I3RSiSUwIT0
- 3 https://youtu.be/cyXADWE7KPo

	COURSE OUTCOMES (CO)						
After	After Successful completion of the course, the students should be able to						
C01	Equip them with the English language skills required for the successful Undertaking of academic studies.	K3	1				
CO2	Read and understand any text in English according to the inputs given by the teacher in the classroom.	К3	2				
CO3	Write and speak good English in all situations.	K4	3				
CO4	Acquire guidance and practice in general and classroom conversation and to Engage in specific academic speaking activities.	K4	4				
CO5	Make effective presentations.	K2	5				
RBT Le	vels: K1 – Remembering: K2 – Understanding: K3 – Applying: K4 – Analyzing: K5 – Evalua	tina: K6 - C	Creating				

	CO WISE DIRECT ASSESSMENT PATTERN										
	A			Махі	num M	larks		Total	M	arks	
	Assessments		CO1	CO2	CO3	CO4	CO5	Marks	Conversion		
	Lab Record	All	Rub	rics - 1	.0 marl	ks for e	each	75			
		Ex.			Ex.				100	CIA:	
CIA	Model							to <b>60</b>	60		
	Evamination	One	Rubrics - 25 marks for the Ex. 2!				25				
	LAIIIIIation	Ex.									
	End	Δnv									
ESE	Semester	One	Ruhr	ics - 25	marke	s for th	ρFx	100	100	ESE:	
LUL	Examinations	Fy				to <b>40</b>		40			
	- Practical	۲۸.									
Total Marks 100					00						
									-		

INDIRECT ASSESSMENT

### SEMESTER V

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	Т	Р	С
		THEORY CO	DURSE	8					
1		Principles of Compiler Design	PC	40	60	3	1	0	4
2		Professional Ethics	HS	40	60	3	0	0	3
3		Professional Elective - I	PE	40	60	3	0	0	3
4		Open Elective – II	OE	40	60	3	0	0	3
5		Computer Networks	PC	40	60	3	0	0	3
	THEO	RY COURSES WITH LAB	ORAT	ORY (	COMP	ONE	NTS		
6	Mobile Application and DevelopmentPC5050							4	4
		LABORATORY	COUF	RSE					
7		Compiler Design Laboratory	PC	60	40	0	0	2	1
8		Computer Networks Laboratory	PC	60	40	0	0	2	1
	MANDATORY COURSE								
8		Soft Skills – I	EEC	100	-	2	1	0	0
		Total	·			19	2	8	22

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
V	B.Tech. IT		Principles of Compiler Design	3	1	0	4

### PRE-REQUISITES

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	COURSE OBJECTIVES
1	To understand the concepts of language translation and phases of compiler design.
2	To describe the common forms of parsers.
3	To demonstrate intermediate code using technique of syntax directed translation.
4	To understand the type checking with its dynamic storage allocation.
5	To Illustrate the various optimization techniques for designing various optimizing compilers.

### COURSE CONTENT

### Unit – I

**INTRODUCTION TO COMPILERS** 

9+3

Structure and phases of a compiler- Patterns-Lexemes-Tokens-Attributes-Regular Expression to Deterministic Finite Automata-Lexical Analyzer Generator.

### Unit – II

### SYNTAX ANALYSIS

9 + 3

Parser-Parse tree- Top Down Parsing –Recursive Descent Parsing –LL Grammars – Operator Precedence Parsing-LR parsers-SLR Parser Tables and Parsing, canonical LR(CLR) parsers-LALR Parsing.

Unit – III	SEMANTICS ANALYSIS AND INTERMEDIATE CODE GENERATION	9 + 3
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Syntax directed definition – Applications - Syntax directed translation schemes – Implementation of L-attribute Syntax directed definition. INTERMEDIATE CODE GENERATION: abstract syntax tree, three address code, types of three address statements and its implementation, syntax directed translation into three-address code, translation of simple statements, Boolean expressions and flow-of-control statements.

### Unit – IV

### TYPE CHECKING

9 + 3

Definition of type checking, static and dynamic checking of types, specification of a simple type checker, type conversions, overloading of functions and operators.

RUN TIME ENVIRONMENTS: Source language issues, Storage organization, storageallocation strategies, access to non-local names, parameter passing, symbol tables and language facilities for dynamic storage allocation

### Unit - V

### **CODE OPTIMIZATION**

9 + 3

Organization of code optimizer, basic blocks and flow graphs, optimization of basic blocks, the directed acyclic graph (DAG) representation of basic block, global data flow analysis. CODE GENERATION: Machine dependent code generation, object code forms, the target

machine, a simple code generator, register allocation, peephole optimization.

**Tutorial: 15 Periods** 

Total: 60 Periods

**B.TECH.IT** 

### **TEXT BOOKS**

- <sup>1</sup> Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman (2007), Compilers Principles, Techniques and Tools, 2nd edition, Pearson Education, New Delhi, India.
- 2 Kenneth C. Louden (1997), Compiler Construction– Principles and Practice, 1st edition, PWS Publishing.

### **REFERENCE BOOKS**

1	K. L. P Mishra, N. Chandrashekaran (2003), Theory of computer science- Automata Languages and computation, 2nd edition, Prentice Hall of India, New Delhi, India.
2	Modern Compiler Design – Dick Grune, Henry E.Bal, Cariel TH Jacobs, Wiley Dreatech.
3	Andrew W. Appel (2004), Modern Compiler Implementation C, Cambridge University Press, UK.
4	

4 Santanu Chattopadhyay, "Compiler Design", PHI Learning Pvt. Ltd., 2015.

### **E-RESOURCES**

- 1 https://youtu.be/\_ck1Lnm28hQ
- 2 https://www.youtube.com/watch?v=OQCjakjCJu4

	COURSE OUTCOMES (CO)			
After	After Successful completion of the course, the students should be able to			
C01	Understand the skills on selecting and using tools and techniques towards complier design.	К2	1	
CO2	Obtain CFG for language specifications with lexical analysis and parsing techniques.	K2	2	
CO3	Constructing symbol tables and generating intermediate code.	K4	3	
CO4	Apply the techniques and ideas for type checking for the purpose of software systems.	К3	4	
C05	Understand the insights on compiler optimization and code generation.	К2	5	
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - C	Creating	

CO WISE DIRECT ASSESSMENT PATTERN										
	Accordents		Maxi	mum M	larks		Total	irks		
Assessments		CO1 CO2 CO3 CO4 CO5			Marks	Conversion				
		Part A	8	8	4			20		
	САТ І	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200 to <b>30</b> <u>CIA:</u> <b>40</b>	
CIA		Part A			4	8	8	20	to 30 <u>CIA:</u> 40	CIA:
	CAT II	Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
LJL	- Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

**B.TECH.IT** 

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Sem	Programme	Course Code	Course Name	L	т	Ρ	с
v	Common to B.E. CSE & B.TECH. IT		COMPUTER NETWORKS	3	0	0	3

### **PRE-REQUISITES**

### **COURSE OBJECTIVES**

1	To Interpret the importance of layering, addressing and annotate the protocol stack of OSI and TCP/IP model.
2	To Apply the MAC protocols (Ethernet, Token Ring and Wi-Fi) supported by Data Link layer to ensure hop-to-hop reliable communication.
3	To Use IP addressing and routing protocols to find shortest route to achieve reliable network-layer data transmission.
4	To Classify the transport layer protocols and explain the congestion control or congestion avoidance techniques to ensure quality of service.
5	To Analyze the functions and services provided by the application layer protocols (HTTP, SMTP and DNS).

### **COURSE CONTENT**

# Data Communication– Networks–The OSI Model– Layers in the OSI Model – TCP/IP Protocol Suite – Addressing – Transmission Media

### Unit – II

Unit – I

### DATA LINK LAYER

DATA COMMUNICATIONS

Framing – Error Detection and Correction– IEEE Standards (802.3,802.5,802.11)– MAC protocols and types

### Unit – III

### **NETWORK LAYER**

Internetworking: Switching and Bridging – Basic Internetworking-IPv4 - IPv6 – Routing Techniques: Distance vector (RIP) – Link state (OSPF) –– Interdomain Routing (BGP).

### Unit – IV

### TRANSPORT LAYER

**APPLICATION LAYER** 

Congestion Control and Resource Allocation: TCP Congestion Control – Congestion Avoidance Mechanisms – Quality of Service: Integrated Services – Differentiated Services

### Unit - V

# Domain Name System - File Transfer – Web Services and SNMP - HTTP - Electronic Mail (SMTP, POP3, IMAP, MIME).

Lecture: 45 Periods

Tutorial: 0 Periods

Total: 45 Periods

### **TEXT BOOKS**

- 1Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth<br/>Edition, Morgan Kaufmann Publishers, 2011.
- 2 Behrouz A. Forouzan, "Data Communications and Networking", Fifth Edition, Tata McGraw - Hill, Reprint 2017.
- 3 Goleniewski, L. (2006) Telecommunications Essentials, Addison Wesley Professional.
- 4 Kurose, J.F. and K.W. Ross (2003) Computer Networking: A Top Down Approach Featuring the Internet, Addison Wesley.
- 5 Mir, N.F. (2006) Computer and Communication Networks, Prentice Hall.

### **REFERENCE BOOKS**

- 1 William Stallings, "Data Communication and Networks", Pearson Education, Tenth edition, 2014.
- <sup>2</sup> James.F. Kurouse& W. Rouse, "Computer Networking: A Topdown Approach Featuring", Seventh dition, Pearson Education, 2016.
- William Stallings, "Data Communication and Networks", Pearson Education, Tenth edition, 2014.
- 4 *Computer Networking First-Step* by Wendell Odom provides a comprehensive introduction to the world of computer networking.
- <sup>5</sup> "*Computer Network Time Synchronization"* by David L. Mills, we embark on a journey through the evolution of time synchronization on computer networks.

### E-RESOURCES

- 1http://www.nptel.ac.in/downloads/106105080, "Computer Networks", Prof.Sujoy<br/>Ghosh, IIT Kharagpur.2https://www.elsevier.com/journals/subjects/computer-science
- 3 https://www.youtube.com/watch?v=DYgRqIeuwVQ
- 4 https://www.youtube.com/watch?v=9BIN99rHOCQ
- 5 https://www.youtube.com/watch?v=9BIN99rHOCQ

### COURSE OUTCOMES (CO)

After	RBT Level	Unit	
CO1	Interpret the importance of layering, addressing and annotate the protocol stack of OSI and TCP/IP model.	K2	1
CO2	Apply the MAC protocols (Ethernet, Token Ring and Wi-Fi) supported by Data Link layer to ensure hop-to-hop reliable communication.	К3	2
CO3	Use IP addressing and routing protocols to find shortest route to achieve reliable network-layer data transmission.	К3	3
CO4	Classify the transport layer protocols and explain the congestion control or congestion avoidance techniques to ensure quality of service.	K2	4

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	-	-			
COF	Analyze the functions and services provided by the application	К4	F		
CUS	layer protocols (HTTP, SMTP and DNS).		5		
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing: K5 – Evaluating: K6 - Creating					

	CO WISE DIRECT ASSESSMENT PATTERN									
Assessments				Maxi	mum M	larks		Total	arks	
			CO1 CO2 CO3 CO4 CO5			Marks	Conversion			
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
		Part A			4	8	8	20	40 to 10 40	CIA:
CIA		Part B			16	32	32	80		40
	0,11 11	Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
		Part A	4	4	4	4	4	20		
FSF	End Semester Examinations	Part B	16	16	16	16	16	80	100 to	<u>ESE:</u>
LUL	– Theory	Total (d)	20	20	20	20	20	100	60	60
Tota	l Marks (a + b +	c + d)	68	68	68	68	68	340	1	00

INDIRECT ASSESSMENT

Semester	Programme	Course Code	Course Name	L	Т	Ρ	с
VI	B.Tech. IT		MOBILE APPLICATION DEVELOPMENT	2	0	4	4

### **PRE-REQUISITES**

	COURSE OBJECTIVES
1	To study about the mobile operating systems
2	To design an Android SDK
3	To design and develop android applications
4	To understand layouts and multimedia concepts
5	To prepare apps for deployment on app stores, focusing on practical skills and industry standards
	Standards.

### THEORY COURSE CONTENT

	n	iŧ	_	т
J				_

### **MOBILE PLATFORM AND APPLICATIONS**

6

6

Mobile Device Operating Systems - Special Constraints & Requirements - Commercial Mobile Operating Systems - Software Development Kit: iOS, Android, BlackBerry, Windows Phone -Mobile Payment System.

Unit – II	AND
0mt - 11	ANL

### ANDROID OVERVIEW

Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

•••						
Unit – III	ANDROID APPLICATION DESIGN ESSENTIALS	6				
Anatomy of Android applications, Android terminologies, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions Activity Lifecycle - Navigation						
Unit – IV	ANDROID USER INTERFACE DESIGN & MULTIMEDIA	6				
User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation. Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures.						
Unit - V	ANDROID APIs	6				
Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World Handling						

LABORATORY COURSE CONTENT						
Ex.No.	Experiment / Exercise			СО		
1	Develop an application that uses GUI components, Font and Colors.			1		
2	Develop an application that uses Layout Managers.					
3	Develop an application that uses event listeners.			3		
4	Develop an application that uses adapters, Toast.			3		
5	Develop an application that makes use of databases. \					
6	Develop an application that makes use of RSS Feed. $\$			4		
7	Implement an application that implements Multithreading.					
8	Develop a native application that uses Camera and writes the image to the storage.					
9	Develop a basic SMS receiver application.			5		
10	Implement an application that creates an alert upon receiving a message.			5		
Practical: 60 Periods Laboratory Total: 60 Perio		iods				

### **TEXT BOOKS**

- 1. Prasanth Kumar Pattnaik, Rajib Mall, IFundamentals of Mobile ComputingI, PHI Learning Pvt.Ltd, New Delhi-2012 (UNIT – 1)
- 2. Lauren Darcey and Shane Conder, —Android Wireless Application Developmentl, 2nd edition, Pearson Education, 2011 (UNIT 2 - 5)
- 1. Prasanth Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt.Ltd, New Delhi-2012 (UNIT – 1)
- 2 2. Lauren Darcey and Shane Conder, —Android Wireless Application Developmentl, 2nd edition, Pearson Education, 2011 (UNIT 2 – 5)

### **REFERENCE BOOKS**

- 1
   Reto Meier, —Professional Android 2 Application Developmentl, Wiley India Pvt Ltd, 2010.

   2
   Google Developer Training, "Android Developer Fundamentals Course Concept Referencel,
- <sup>2</sup> Google Developer Training Team, 2017.
   3 Dawn Griffiths and David Griffiths, —Head First Android Developmentl, 1st Edition, O"Reilly SPD Publishers, 2015.

### **E-RESOURCES**

- 1 <u>http://developer.android.com/develop/index.htmm</u>
- 2 <u>https://www.tutorialspoint.com/android</u>
- 3 <u>http://www.androidhive.info/</u>
- 4 <u>https://www.codeschool.com/learn/ios</u>
5 <u>https://onlinecourses.nptel.ac.in/noc20\_cs52/preview</u>

COURSE OUTCOMES (CO)								
After S to	After Successful completion of the course, the students should be able <b>RBT Level Theory Lab</b> to <b>Constant</b>							
CO1	Analyze and identify the computing requirements appropriate to a real world problem	K1	1	1				
CO2	Design an Android application using layout, UI components	K3	2	2-3				
CO3	Portray and implement the ethical responsibilities in mobile application development using modern tools	K2	3	3-6				
CO4	Develop a fully functional native mobile app by applying industry's best practices	K2	4	7-8				
CO5	<b>CO5</b> Present their projects and compile thorough reports, K4 5 9-10 demonstrating teamwork and reflective learning.							
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 –	Evaluatin	ng; K6 - Cre	ating				

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
V	B.TECH.IT		COMPILER DESIGN LABORATARY	0	0	2	1

# PRE-REQUISITES

	COURSE OBJECTIVES					
1	To understand the concepts of language translation and phases of compiler design.					
2	To describe the common forms of parsers.					
3	To demonstrate intermediate code using technique of syntax directed translation.					
4	To understand the type checking with its dynamic storage allocation.					
5	To Illustrate the various optimization techniques for designing various optimizing compilers.					

CO	URS	E C	ON	TEI	ΝТ
	0110				

Ex.No.	Experiment / Exercise	со
1	Write a Program for Token separation with a given expression.	CO1
2	Write a Program for Token separation with a given file.	CO3
3	Write a Program for Lexical analysis using LEX tools.	CO4
4	Write a Program to identify whether a given line is a comment or not.	CO3
5	Write a Program to check whether a given identifier is valid or not.	CO2
6	Write a Program to recognize strings under 'a', 'a*b+', 'abb'.	CO1
7	Write a Program to simulate lexical analyser for validating operators.	CO1
8	Write a Program for implementation of Operator Precedence Parser.	CO2
9	Study of LEX and YACC tools: (i) Write a Program for implementation of calculator using YACC tool. (ii) Write a Program for implementation of Recursive Descent Parser using LEX tool.	CO3
10	Write a Program for implementation of LL (1) Parser.	CO2
11	Write a Program for implementation of LALR Parser.	CO2
12	Generating code with the LLVM backend.	CO2
13	Using LLVM-style RTTI for the AST and generating IR from the AST.	C02

## **B.TECH.IT**

Pract	ical: 60 Periods		Total: 60 Pe	riods
15	Emitting assembler text and object code.			
14	Converting types from an AST description to LLVM types.			
	1			

**B.TECH.IT** 

### **BOOK REFERENCES**

1	Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman (2007), Compilers Principles, Techniques and Tools, 2nd edition, Pearson Education, New Delhi, India.
2	Kenneth C. Louden (1997), Compiler Construction- Principles and Practice, 1st edition, PWS Publishing.
3	Modern Compiler Design – Dick Grune, Henry E.Bal, Cariel TH Jacobs, Wiley Dreatech.
4	Andrew W. Appel (2004), Modern Compiler Implementation C, Cambridge University Press, UK.
5	Santanu Chattopadhyay, "Compiler Design", PHI Learning Pvt. Ltd., 2015.

#### **E-RESOURCES**

- 1 https://youtu.be/\_ck1Lnm28hQ
- 2 https://www.youtube.com/watch?v=OQCjakjCJu4

COURSE OUTCOMES (CO)						
After	RBT Level	Ex. Nos.				
CO1	Help in improving the programming skills of the students.	K3	1,2,3			
CO2	The implementation of different parsers.	K2	10,11			
CO3	Acquire knowledge of different phases of compiler.	K2	4,5,6			
CO4	Able to use the compiler tools like LEX, YACC, etc.	K4	8,9			
CO5	Identify different types of grammars.	K3	10,11			
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - C	Creating			

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
V	Common to B.E. CSE & B.TECH. IT		COMPUTER NETWORKS LABORATORY	0	0	2	1

## PRE-REQUISITES

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	COURSE OBJECTIVES					
1	To Apply the network topologies using NS2 for data communication.					
2	To Experiment Automatic Repeat Request protocols (Stop and Wait, Go back-N and Selective Repeat) using the appropriate elements and packages in Socket programming.					
3	To Develop a java program to find shortest path using Distance Vector for a given scenario					
4	To Build the java socket program for simulating TCP communication and UDP communication.					
5	To Create a Point-to-Point Network and Local Area Network using CISCO Packet Tracer					

COURSE CONTENT					
Ex.No.	Experiment / Exercise	СО			
1	Study of Network simulator 2 (NS2).	1			
2	Implementation of Various Topologies using NS2 Simulator.	1			
3	Bit Stuffing and CRC computation.	1			
4	Socket program to implement echo client and echo server using TCP	2			
5	Socket program to contact a given DNS server to resolve a given host name using UDP	2			
6	Program to simulate Stop & Wait protocol.	2			
7	Implementation of Sliding Window Protocol.	3			
8	Program to simulate Distance Vector Routing algorithm.	3			
9	Case Study using Cisco Packet Tracer. Establish and test communication within a Local Area Network (LAN) using IP addressing, ARP, and basic network commands.	3			
10	Establish a LAN in Cisco Packet Tracer and perform traffic analysis for FTP using Traffic Generator.	4			
11	Configure IP Address in a system in LAN (TCP/IP Configuration) and Implement the client server communication using socket connection	4			
12	Write a program for transferring a file between nodes in a network.	4			
13	Write a program for downloading a file from HTTP server	5			

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# **B.TECH.IT**

14	Develop a client that contacts a given DNS server to resolve a given host name.				
15	Configure a Network topology using Packet tracer software			5	
Pract	ical: 30 Periods		Total: 30 Pe	riods	

### **BOOK REFERENCES**

1	Computer Network Lab Manual : An Introduction Part - I BRAJ KISHOR PRASAD; 1st edition (2 October 2022)
2	Behrouz A. Forouzan, "Data Communications and Networking", Fifth Edition, Tata McGraw - Hill, Reprint 2017.
3	Goleniewski, L. (2006) Telecommunications Essentials, Addison Wesley Professional.
4	Kurose, J.F. and K.W. Ross (2003) Computer Networking: A Top Down Approach Featuring the Internet, Addison Wesley.
5	Mir, N.F. (2006) Computer and Communication Networks, Prentice Hall.

### **E-RESOURCES**

1	https://beej.us/guide/bgnet/
2	https://www.netacad.com/learning-collections/cisco-packet-tracer?courseLang=en-US
3	https://networksimulationtools.com/how-to-run-ns2-program-in-linux/
4	https://www.nsnam.org/docs/installation/html/
5	https://www.khanacademy.org/computing/computers-and- internet/xcae6f4a7ff015e7d:the-internet/xcae6f4a7ff015e7d:connecting- networks/e/computer-networks

	COURSE OUTCOMES (CO)							
After	After Successful completion of the course, the students should be able to <b>RBT Ex.</b> <b>Level Nos.</b>							
CO1	Apply the network topologies using NS2 for data communication.	K3	1-3					
CO2	Experiment Automatic Repeat Request protocols (Stop and Wait, Go back-N and Selective Repeat) using the appropriate elements and packages in Socket programming.	K4	4-6					
CO3	Develop a java program to find shortest path using Distance Vector for a given scenario	K4	7-9					
CO4	Build the java socket program for simulating TCP communication and UDP communication.	K3	9-11					
CO5	Create a Point-to-Point Network and Local Area Network using CISCO Packet Tracer	K4	11-15					
R	BT Levels: K1 – Remembering; K2 – Understanding; K3 – Apply Analyzing; K5 – Evaluating; K6 - Creating	ving; K4	-					

CO WISE DIRECT ASSESSMENT PATTERN										
	<b>A</b>		Maximum Marks				Total	Marks		
Assessments			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
CTA	Lab Record	All Ex.	Rub	Rubrics - 10 marks for each Ex. <b>75</b>				100	CIA:	
CIA	Model Examination	Any One Ex.	Rubr	ics - 25	5 marks	25	to <b>60</b>	60		
ESE	End Semester Examinations – Practical	Any One Ex.	Rubr	Rubrics - 25 marks for the Ex. <b>100</b>			100 to <b>40</b>	<u>ESE:</u> 40		
	Total Marks 100									

TNDTR	FCT .	ASSE	SSM	FNT
THDIK		ASSL	3311	

COURSE END SURVEY

# **SEMESTER VI**

Sl. No.	Course Code	Course Title	ESE	L	Т	Р	С		
THEORY COURSES							4		
1		Artificial Intelligence	PC	40	60	3	1	0	4
2	2Cryptography and Network SecurityPC406030				3				
3	3         Internet of Things         PC         40         60         3         0         0					3			
4	4Professional Elective – IIPE4060300				0	3			
5	5 Open Elective - III OE				60	3	0	0	3
	THEO	RY COURSES WITH LAB	ORAT	ORY (	COMP	ONE	INTS		
6	6 Professional Elective - III PE 50 50				50	2	0	4	4
		LABORATORY	COUI	RSE					
7	7Internet of Things LaboratoryPC6040					0	0	2	1
		MANDATORY	COUR	SE					
9		Soft Skills – II	MC	100	-	2	1	0	0
		Total				19	2	6	21

Sem	Programme	Course Code	Course Name	L	т	Ρ	С
VI	Common to B.E. CSE & B.TECH. IT		ARTIFICIAL INTELLIGENCE	3	1	0	4

PRE-REQUISITES ----

#### **COURSE OBJECTIVES**

1	To understand the basic concepts of intelligent agents and blind search
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2	To explain the	various	types	of informed	search	strategies
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- **3** To apply A\* algorithm and randomized search methods in various problems
- **4** To choose various methodologies in planning and game playing algorithms
- **5** To analyze various logical approaches in AI

#### **COURSE CONTENT**

Unit – I	Intelligent Agents and Blind search	9 + 3					
Definition – rationality – Generate and – Compariso	History – Agents and Environments – Good behaviour and the con Nature of environments –Structure of intelligent agents. State space d Test – Simple search – Depth First Search (DFS) – Breadth First Sear n of DFS and BFS – Depth Bounded DFS.	cepts of search: ch (BFS)					
Unit – II	Informed Search Methods	9 + 3					
Informed Se Climbing – L search – Tab search.	arch Methods: Heuristic Search: Heuristic functions – Best First Sear ocal maxima – Solution state space – Variable neighbor hood descent ou search. Peak to Peak Methods. Brute force – Branch and Bound – Re	ch – Hill – Beam finement					
Unit – III	A* and Randomized Search Methods	9 + 3					
Algorithm A <sup>2</sup> Iterated hill Salesman Pro	<ul> <li>Admissibility of A*- Recursive Best First Search. Escaping local</li> <li>climbing - Simulated annealing - Genetic algorithms (GA) - T</li> <li>oblem (TSP) - GA based methods for TSP</li> </ul>	maxima: ravelling					
Unit – IV	Planning and Algorithms	9 + 3					
Board games Search – Li Backward sta	s – Game playing algorithms: Algorithm Minimax – Algorithm AlphaBe mitations of search. The STRIPS domain – Forward state space pla ate space planning – Goal stack planning – Plan space planning	eta – B* anning –					
Unit - V	Logic in AI	9 + 3					
Formal logic – Incomplete resolution – logic – First	Logic In Al       9 + 3         Formal logic – Propositional logic – Resolution in propositional logic – First Order Logic (FOL)         – Incompleteness of forwardchaining – Resolution refutation in FOL – Horn clauses and SLD         resolution – Backward chaining Formal logic – Propositional logic – Resolution in propositional         logic – First Order Logic (FOL)         – Incompleteness of forward chaining Formal logic – Propositional logic – Resolution in propositional         logic – First Order Logic (FOL)         – Incompleteness of forward chaining – Resolution refutation						

**B.TECH.IT** 

in FOL –Horn clauses and SLD resolution – Backward chaining	

## **TEXT BOOKS**

1	The Singularity Is Nearer: When We Merge with AI by Ray Kurzweil (Author) June 2024
2	Supremacy: Ai, Chatgpt, and the Race That Will Change the World Hardcover – $10$ September 2024 by Parmy Olson (Author)
3	Nexus: A Brief History of Information Networks from the Stone Age to Ai Hardcover – 10 September 2024 by Yuval Noah Harari (Author)
4	Artificial Intelligence: A Modern Approach (Pearson Series in Artifical Intelligence) Hardcover – 17 November 2020 by Stuart Russell (Author), Peter Norvig (Author)
5	Introduction To Artificial Intelligence By Akerkar, Rajendra Edition : Second Edition January 2022

#### **REFERENCE BOOKS**

	Artificial Intelligence: A Modern Approach Stuart Jonathan Russell, Peter Norvig, Ernest
1	Davis
	Prentice Hall, 2010
	Architects of
	Intelligence:
	The Truth
2	about AI
2	from the
	people
	building it by
	Martin Ford
	Deep
	Learning
	Illustrated: A
	Visual,
	Interactive
	Guide to
З	Artificial
5	Intelligence
	Authors:
	John Krohn,
	Grant
	Beyleveld,
	and Aglae
	Bassens
	Super
4	intelligence
•	Author: Nick
	Bostrom.

5

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_	. – •		

E-	RESOURCES
1	http://nptel.ac.in/courses/106106126/1,"Introduction, State space search, Heuristic search, problem decomposition, Planning, Constraint satisfaction", Prof. Deepak Khemani, Department of Computer Science and Engineering, IIT, Madras.
2	Introduction to Artificial Intelligence (Undergraduate Topics in Computer Science) Kindle Edition by Wolfgang Ertel (Author), Nathanael T. Black (Translator) Format: Kindle Edition
3	https://www.shiksha.com/online-courses/articles/best-resources-to-learn-artificial- intelligence/
4	https://udc.libguides.com/ai/resources
5	https://guides.temple.edu/ai-research-tools/databases

COURSE OUTCOMES (CO)									
After	RBT Level	Unit							
CO1	Define the basic concepts of intelligent agents and blind search	K1	1						
CO2	Illustrate the various types of informed search strategies	K2	2						
CO3	Apply A* algorithm and randomized search methods	К3	3						
CO4	Choose the methodologies in planning and game playing algorithms	К3	4						
CO5	Analyze various logic applied in AI	K4	5						
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating									

## CO WISE DIRECT ASSESSMENT PATTERN

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Assessments			Maximum Marks				Total	Marks		
			CO1	CO2	CO3	<b>CO4</b>	CO5	Marks	Conv	ersion
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	<u>CIA:</u> 40
		Part A			4	8	8	20	<b>30</b>	
CIA	CAT II	Part B			16	32	32	80	40 to <b>10</b>	
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
		Part A	4	4	4	4	4	20		<u>ESE:</u>
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	
LJL	- Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

**COURSE END SURVEY** 

Sem	Programme	Course Code	Course Name		т	Ρ	с
VI	B.TECH IT		CRYPTOGRAPHY AND NETWORK SECURITY	3	0	0	3

# PRE-REQUISITES

	COURSE OBJECTIVES						
1	To understand basics of Cryptography						
2	To Classify the encryption techniques and identify the use of private key encryption						
3	To Classify the types of Asymmetric ciphers and its principles						
4	To Develop Algorithms for data integration						

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**5** To Explain the privacy issues and Use the procedures in internet security

COURSE CONTENT									
Unit – I			INTRODUCTION			9 + 3			
Introduction attacks servi	Introduction to Cryptography –Security threats- The OSI security architecture - security attacks service mechanism - Model for network security – classical encryption techniques.								
Unit – II			SYMMETRIC CIPHERS	•		9 + 3			
Festal Cipher Structure -Data encryption standard – block cipher operations – cipher block chaining mode – advanced encryption standard – double DES – triple DES – Block cipher Design principles – key expansion									
Unit – III	AS	үммет	RIC CIPHER AND KEY M	ANAGE	MENT	9 + 3			
Primary nur Algorithm d infrastructur Key Exchang	Primary numbers –Public key cryptography-Principles of public key cryptography-RSA Algorithm distribution of public keys –key management and distribution – public key infrastructure – symmetric key distribution using asymmetric encryption- Diffie -Hellman Key Exchange								
Unit – IV	CRYPT	OGRAP	HIC AND DATA INTEGRI		GORITHM	9 + 3			
Hash and MAC Algorithms: Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security of Hash Functions And Macs, Secure Hash Algorithm, Digital Signatures									
Unit - V		NETW	ORK AND INTEGRITY SE		ΓY	9 + 3			
Web and System Security-Web Security: Secure socket layer and transport layer security - secure electronic transaction (SET) - System Security: Intruders - Viruses and related threads - firewall design principals – trusted systems									
Lecture:	45 Periods		Tutorial: 15 Periods		Total: 60 P	eriods			

TE	ХТ ВООКЅ
1	William Stallings, Cryptography and Network security Principles and Practices, 5th edition, Pearson Education, 2010
2	William Stallings, Network security essentials $\tilde{A}\varphi \ref{alpha}$ application and standards, Prentice Hall of India , 2010
3	Charles P.Fleeger, Shari Lawrence P.Fleeger, Security in computing, Prentice Hall of India, 2009
4	W. Mao, Modern Cryptography $\tilde{A}$ ¢?? Theory and Practice, Pearson Education, 2007
5	Wade Trappe, Lawrence C Washington, Introduction to Cryptography with coding theory, Pearson Education, 2007

### **B.TECH.IT**

#### **REFERENCE BOOKS** https://www.notesforgeeks.in/2021/07/cs8792-cryptography-and-network-securitysyllabus-2017-regulation.html 1 https://www.studocu.com/in/document/anna-university/cryptography-and-network-2 security/cs8792-cryptography-and-network-security/8876690 https://cse-r17.blogspot.com/2020/09/cs8792-cryptography-and-network.html 3 https://padeepz.net/cs6701-syllabus-cryptography-and-network-security-regulation-4 2013-anna-university/ https://www.rejinpaul.com/2016/07/cs6701-cryptography-and-network-security-5 syllabus-notes-question-bank-with-answers.html

E-	E-RESOURCES					
1	https://www.rejinpaul.com					
2	https://en.wikipedia.org/wiki/cryptography and network security					
3	https://youtube.ac.in/ cryptography and network security					
4	https://onlinecourses.nptel.ac.in					
5	https://padeepz.net					

COURSE OUTCOMES (CO)								
After	RBT Level	Unit						
CO1	Analyze the basic concepts of network security	K4	1					
CO2	Identify the types of symmetric ciphers and its principles	К3	2					
CO3	Classify the types of Asymmetric ciphers and its principles	К3	3					
CO4	Analyze the basic concepts of network security	K2	4					
C05	Identify the types of symmetric ciphers and its principles	К3	5					
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - C	Creating					

	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating
1	

CO WISE DIRECT ASSESSMENT PATTERN											
	Accoccmonte		Maxi	mum N	Total	Marks					
Assessments			CO1	CO2	CO3	CO4	CO5	Marks	Conversion		
	CAT I	Part A	8	8	4			20	200		
СТА		Part B	32	32	16			80		<u>CIA:</u>	
CIA		Total (a)	40	40	20			100	30	40	

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		Part A			4	8	8	20		
	CAT II	Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other	Total							40	
	Assessment	(c)	8	8	8	8	8	40	to <b>10</b>	
	_	Part A	4	4	4	4	4	20		
FSF	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
LJL	- Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

Semester	Programme	Course Code	Course Name	L	т	Ρ	с
VI	B.TECH. IT		INTERNET OF THINGS	3	0	0	З

PRE-REQUISITES

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**COURSE OBJECTIVES** 

1	To identify various characteristics and deployment levels of IoT.
2	To analyze the concepts of M2M and IoT architecture.
3	To implement Various IoT communication protocols like MQTT,CoAP, and HTTP in developing IoT applications.
4	To analyze the functioning of arduino boards and various communications technologies to use with it.
5	To perform in a team to build automation, agriculture and various real time applications using arduino.

Unit – I	INTRODUCTION TO INTERNET OF THINGS									
Characteristic Sensor Netwo Sensors and A	Characteristics of IoT - Physical and Logical Design of IoT - IoT Enabling Technologies - Wireless Sensor Networks - Cloud Computing - Big Data Analytics— Overview of Microcontroller, Basics of Sensors and Actuators - Examples and Working Principles of Sensors and Actuators.									
Unit – II		M2M AND IOT ARC	HITE	CTURE	9					
Building Arch Devices and Service, M2M	Building Architecture - An IoT Architecture Outline - M2M and IoT Technology Fundamentals: Devices and Gateways - Local and Wide Area Networking - Data management, Everything as a Service, M2M and IoT Analytics - Knowledge Management - IoT Reference Model.									
Unit – III		IOT PROTO	COLS		9					
PHY/MAC Lay Network Laye SessionLayer	/er: 3GPP MT er: 6LoWPAN r: HTTP- CoAF	C, IEEE 802.15 – Wireless H - RPL - CORPL - CARP - Trar P- XMPP- AMQP- MQTT.	IART- Z Isport La	-Wave, BLE- Zigbee - ayer: TCP - MPTCP - UI	DASH7 - DP-DCCP-					
Unit – IV		PROGRAMMING USI	NG AF	RDUINO	9					
Introduction pins- Serial( Zero and 101	to Arduino pı JART), I2C Co - Prototyping	rocessor- General Block diagi ommunications and SPI comm basics - Technical description	ram- Wo nunicatio - Setting	orking of Analog and D on - Arduino Boards: Me g Up Arduino IDE	igital I/O ega, Due,					
Unit - V		APPLICATIONS	6 OF 10	от	9					
Various Re Environment applications -	al time ap : Weather m Case Studies	oplications of IoT- Home nonitoring system - Agricultu	Autor re: Sma	mation - Smart Pa art irrigation – Domair	arking - Specific					
Lecture: 45 PeriodsTutorial: 0 PeriodsTheory Total: 45 Period										

TE	ТЕХТ ВООКЅ							
1	Internet of Things: Smart Environments and Services, Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley, 2nd Edition, 2020.							
2	Internet of Things: Architecture and Design Principles, M. A. Babar, M. S. Obaidat, CRC Press, 1st Edition, 2020.							
3	Handbook of Smart Antennas for RFID Systems, K. Finkenzeller, John Wiley & Sons, 2nd Edition, 2020.							

- Internet of Things: From Data to Insights, RMD Sundaram, Shriram K Vasudevan, Abhishek S Nagarajan, John Wiley & Sons, 2nd Edition, 2019.
   IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet
- 5 of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Cisco Press, 1st Edition, 2021.

#### **REFERENCE BOOKS**

1	Internet of Things: A Hands-On Approach, Arshdeep Bahga, Vijay Madisetti, VPT, 2nd Edition, 2021.
2	Internet of Things: Technologies and Applications for a New Age of Intelligence, G. M. Lee, J. H. Lee, John Wiley & Sons, 2nd Edition, 2021.
3	Internet of Things: Architecture and Design Principles, R. C. Joshi, S. G. Patel, CRC Press, 1st Edition, 2022.
4	Internet of Things: Principles and Applications, S. Chatterjee, P. Gupta, Elsevier, 1st Edition, 2023.
5	Machine Learning for the Internet of Things, L. Zeng, F. B. Bastani, Wiley, 1st Edition, 2023.

E-	RESOURCES
1	IoT: From Research and Innovation to Market Deployment, Ovidiu Vermesan, Peter Friess, River Publishers, 1st Edition, 2021 https://www.riverpublishers.com/book_details.php?book_id=686
2	Smart Cities and Internet of Things, R. R. Hossain, M. S. Hossain, Springer, 1st Edition,2022.https://link.springer.com/book/10.1007/978-3-030-56228-2
3	Internet of Things: Concepts and Applications, David K. P. Lee, Elsevier, 1st Edition,2023.http://www.elsevier.com/books/internet-of-things/lee/9780128216061
4	Machine Learning for the Internet of Things, L. Zeng, F. B. Bastani, Wiley, 1st Edition,2023.https://www.wiley.com/en- us/Machine+Learning+for+the+Internet+of+Things-p-9781119872730

After S able to	RBT Level	Theory Unit	
CO1	Identify various characteristics and deployment levels of IoT.	K2	1
CO2	Analyze the concepts of M2M and IoT architecture.	K4	2
СО3	Implement Various IoT communication protocols like MQTT,CoAP, and HTTP in developing IoT applications.	К3	3
CO4	Analyze the functioning of arduino boards and various communications technologies to use with it.	K4	4
CO5	Perform in a team to build automation, agriculture and various real time applications using arduino.	К5	5

CO WISE DIRECT ASSESSMENT PATTERN								
Accoccmonto		Maxir	num M	Total	Marks			
Assessments	CO1	CO2	CO3	<b>CO4</b>	CO5	Marks	Conversion	

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				4	4	4	4	4	20			
			Part A	4	4	4	4	4	20	100		
	Theory	CAT II	Part B	16	16	16	16	16	80	to		
	Components		Total	20	20	20	20	20	100	25	<u>CIA:</u> 25 +	
CIA	Laboratory Components		Lab Record	All Ex.	Rub	rics - 1	.0 marl Ex.	ks for e	each	75	100	25 = <b>50</b>
		nts Model	Any							to		
	Theory Components Exam	Examination	One Ex.	Rubrics - 25 marks for the Ex.					25	25		
			Part A	2	2	2	2	2	10			
		End	Part B	Any 2 COs out of 5 COs					20			
ESE		Semester Examinations	Total			30		30	100 to	<u>ESE:</u> 50		
	Laboratory Components		Any One Ex.	Rubrics - 25 marks for the Ex.					70	50		
		٦	otal Ma	rks						1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

# **B.TECH.IT**

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
VI	B.TECH. IT		Internet of Things Laboratory	0	0	2	1

**B.TECH.IT** 

PRE-REQUISITES --

### COURSE OBJECTIVES

1	To identify various characteristics and deployment levels of IoT.
2	To analyze the concepts of M2M and IoT architecture.
3	To implement Various IoT communication protocols like MQTT,CoAP, and HTTP in developing IoT applications.
4	To analyze the functioning of arduino boards and various communications technologies to use with it.
5	To perform in a team to build automation, agriculture and various real time applications using arduino.

	LABORATORY COURSE CONTENT					
Ex.No.		Experiment / Exerci	se	СО		
1	Implement a progra	am to Blink LED using Arduin	0.	1		
2	Implement a program to control intensity light using Arduino.					
3	Implement a program for LCD Display using Arduino.					
4	Implement a program for Buzzer Indication using Arduino.					
5	Implement a program for LDR using Arduino.					
6	Implement a program for Servo Motor Control using Arduino.					
7	Implement a progra	am for interfacing the RGB L	ED with the Arduino.	3		
8	Implement a program for detection of the light using photo resistor.			4		
9	Implement a program for controlling the LED with a Push button.			5		
10	Implement a program for detecting distance of an obstacle using IR sensor and Ultrasonic sensor.			5		
Pract	Practical: 30 Periods Laboratory Total: 30 Periods			iods		

## REFERENCE BOOKS

1	Internet of Things: A Hands-On Approach, Arshdeep Bahga, Vijay Madisetti, VPT, 2nd Edition, 2021.
2	Internet of Things: Technologies and Applications for a New Age of Intelligence, G. M. Lee, J. H. Lee, John Wiley & Sons, 2nd Edition, 2021.
3	Internet of Things: Architecture and Design Principles, R. C. Joshi, S. G. Patel, CRC Press, 1st Edition, 2022.

4	Internet of Things: Principles and Applications, S. Chatterjee, P. Gupta, Elsevier, 1st Edition, 2023.
5	Machine Learning for the Internet of Things, L. Zeng, F. B. Bastani, Wiley, 1st Edition, 2023.

### **E-RESOURCES**

	IoT: From Research and Innovation to Market Deployment, Ovidiu Vermesan, Peter
1	Friess, River Publishers, 1st Edition, 2021
	https://www.riverpublishers.com/book_details.php?book_id=686
S	Smart Cities and Internet of Things, R. R. Hossain, M. S. Hossain, Springer, 1st
2	Edition,2022.https://link.springer.com/book/10.1007/978-3-030-56228-2
3	Internet of Things: Concepts and Applications, David K. P. Lee, Elsevier, 1st
	Edition,2023.http://www.elsevier.com/books/internet-of-things/lee/9780128216061
4	Machine Learning for the Internet of Things, L. Zeng, F. B. Bastani, Wiley, 1st
	Edition,2023.https://www.wiley.com/en-
	us/Machine+Learning+for+the+Internet+of+Things-p-9781119872730

After Successful completion of the course, the students should be able to			Ex. Nos.
CO1	Identify various characteristics and deployment levels of IoT.	K2	1-3
CO2	Analyze the concepts of M2M and IoT architecture.	K4	4-6
СО3	Implement Various IoT communication protocols like MQTT,CoAP, and HTTP in developing IoT applications.	К3	7
CO4	Analyze the functioning of arduino boards and various communications technologies to use with it.	К4	8,9
CO5	Perform in a team to build automation, agriculture and various real time applications using arduino.	К5	10

	CO WISE DIRECT ASSESSMENT PATTERN										
	A		Maximum Marks Tota			Total	Marks				
Assessments			C01	CO2	CO3	CO4	CO5	Marks	Conversion		
CTA	Lab Record	All Ex.	Rub	Rubrics - 10 marks for each Ex. <b>75</b>						CIA:	
CIA	Model Examination	Any One Ex.	Rubrics - 25 marks for the Ex.					25	to <b>60</b>	60	
ESE	End Semester Examinations – Practical	Any One Ex.	Rubrics - 25 n		Rubrics - 25 marks for the Ex. <b>100</b>			100 to <b>40</b>	<u>ESE:</u> 40		
Total Marks					1	00					

INDIRECT ASSESSMENT

COURSE END SURVEY

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# VERTICAL COURSE

VC No.	Course Code	Course Title	L	Т	Р	С	
	VERTICAL I – Java FULL Stack						
VCI-I		Java Programming	3	0	0	3	
VCI-II		Web Technology using JavaScript	2	0	4	4	
VCI-III		Database Management with MySQL	3	0	0	3	
VCI-IV		React JS Framework	2	0	4	4	
VCI-V		Advanced JAVA with RestAPI	2	0	4	4	
		VERTICAL II - MERNStack					
VCII-I		Logical Programming Mastery with Java	2	0	4	4	
VCII-II		NoSQL with Mongo Database	3	0	0	3	
VCII-III		Web Technology using JavaScript	2	0	4	4	
VCII-IV		Node JS & Express Framework	3	0	0	3	
VCII-V		React JS Framework	2	0	4	4	

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCI-I	JAVA PROGRAMMING	3	0	0	3

#### **PRE-REQUISITES**

**Data Structures and Algorithms** 

#### **COURSE OBJECTIVES**

- **1** To introduce the fundamentals of Object-Oriented Programming (OOP).
- **2** To familiarize students with the Java programming language.
- **3** To understand the concepts of classes, objects, inheritance, polymorphism, abstraction, and encapsulation.
- **4** To develop problem-solving skills using Java.
- **5** To implement basic Java programming constructs in real-world applications.

#### COURSE CONTENT

Unit – I	Introduction to Java	9 + 3			
Installing and setting up the Java environment and Eclipse – Basic syntax and structure of programs – Data types -Variables and constants – Operators and expressions – Input/output operations.					
Unit – II	Control Statements				
Conditional statements (if, switch) – Looping statements (for, while, do-while). Creatir manipulating arrays – String class and methods - Scenario Based logical programs in Arra Strings.					
Unit – III	Object-oriented concepts	9 + 3			
Classes: Cla Constructors Parameters Line and Var	ss Fundamentals-objects –Assigning Object Reference Variables – Me – this keyword – Garbage Collection – Overloading Methods – Ob – Argument Passing –Static – final – Nested and Inner Classes – Con iable Length Arguments.	ethods – ojects as omand –			
Unit – IV	Inheritance	9 + 3			
Basics – Sup with Inherita	per keyword -Multilevel Hierarchy–Method Overriding – Abstract Classen nce – polymorphism–Access modifiers – Encapsulation and data hiding.	ıs – final			
Unit - V	Exception Handling	9 + 3			
Multiple cato Exception. P	h Clauses – Nested try Statements –Java's Built-in Exceptions – User Packages – Packages and Member Access–Importing Packages – Int	r-defined terfaces-			

**B.TECH.IT** 

Default, Static, Private interface methods – Reading and Writing Files.

**Lecture: 45 Periods** 

**Tutorial: 15 Periods** 

**Total: 60 Periods** 

### **TEXT BOOKS**

1	Core Java Volume I – Fundamentals-2023 by Cay S. Horstmann
2	Java: The Complete Reference(2023) by Herbert Schildt
3	Ralph Johnson, "Design Patterns: Elements of Reusable Object-Oriented Software," Addison- Wesley, 2024.
4	David Flanagan, "Java in a Nutshell," 8th Edition, O'Reilly Media, 2023.
5	<b>M. Deitel and P. Deitel, "Java: The Complete Reference,"</b> 11th Edition, McGraw-Hill Education, 2023.

### **REFERENCE BOOKS**

1	Cay S. Horstmann, "Core Java Volume I – Fundamentals," 11th Edition, Prentice Hall, 2023.
2	Herbert Schildt, "Java: The Complete Reference," 11th Edition, McGraw-Hill Education, 2023.
3	Kathy Sierra and Bert Bates, "Head First Java," 4th Edition, O'Reilly Media, 2024.
4	Bruce Eckel, "Thinking in Java," 14th Edition, Prentice Hall, 2024.
5	James Gosling, Bill Joy, Guy Steele, and Gilad Bracha, "The Java Programming Language," 10th Edition, Addison-Wesley, 2024.

### E-RESOURCES

1	https://refactoring.guru/design-patterns/java
2	https://www.javacodegeeks.com/
3	https://www.geeksforgeeks.org/java/
4	https://docs.oracle.com/javase/8/docs/
5	https://www.w3schools.com/java/

	COURSE OUTCOMES (CO)					
After	After Successful completion of the course, the students should be able to					
CO1	Design and implement object-oriented solutions using Java.	K2	1			
C02	Understand and apply the basic control flow structures in Java, including decision-making statements (if, if-else, switch) to control the flow of execution based on conditions.	К2	2			
CO3	Apply principles of OOP (Encapsulation, Inheritance, Polymorphism, Abstraction).	К3	3			
CO4	Develop Java applications using standard libraries and APIs.	K4	4			

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R2023 -	R2023 – CURRICULUM & SYLLABI B.TECH.IT						
CO5	Understand and utilize exception handling, file handling, and multithreading in Java.	K4	5				
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating							

	CO WISE DIRECT ASSESSMENT PATTERN									
	Accoremente	Maximum Marks				Total	Marks			
	Assessments		CO1 CO2 CO3 CO4 CO5			Marks	Conversion			
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
	CATI	Total (a)	40	40	20			100	200 to <b>30</b> 40 to <b>10</b>	<u>CIA:</u> 40
	CAT II	Part A			4	8	8	20		
CIA		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
		Part A	4	4	4	4	4	20	100 to <b>60</b>	<u>ESE:</u> 60
FSF	End Semester	Part B	16	16	16	16	16	80		
	– Theory	Total (d)	20	20	20	20	20	100		
Tota	Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00

INDIRECT ASSESSMENT

COURSE END SURVEY

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCI-II	WEB TECHNOLOGY USING JAVASCRIPT	2	0	4	4

#### **PRE-REQUISITES**

#### **Object-Oriented Programming (OOP)**

	COURSE OBJECTIVES
1	To understand the basic principles of web design and develop structured HTML documents using various markup tags.
2	To apply HTML elements such as text formatting, lists, tables, hyperlinks, images, multimedia, forms, and controls to create interactive web pages.
3	To implement CSS for styling web pages, including background properties, text formatting, font control, and the usage of CSS classes and IDs for improved design.
4	To develop interactive and dynamic web pages using JavaScript operators, control structures, functions, arrays, event handling, JSON, and object-oriented programming concepts.
5	To utilize JavaScript's Browser Object Model (BOM) and Document Object Model (DOM) for manipulating web page elements, managing data storage, and ensuring security in web applications.

#### **THEORY COURSE CONTENT**

Unit – I HTML Web Design Principles: Basic principles involved in developing a website Introduction

to HTML: What is HTML - HTML Documents - Basic structure of an HTML document -Creating an HTML document - Mark up Tags - Heading - Paragraphs - Line Breaks -HTML Tags.

#### Unit – II

### Introduction to elements of HTML - Working with Text - Working with Lists, Tables and Frames - Working with Hyperlinks, Images and Multimedia - Working with Forms and controls.

**Elements of HTML** 

CSS

Unit – III

Introduction to Cascading Style Sheets: Concept of CSS - Creating Style Sheet - CSS Properties - CSS Styling (Background, Text Format, Controlling Fonts) - CSS Id and Class.

Unit – IV JAVASCRIPT	6				
Introduction - Operators - Control Structures: Selection: if - if-else -	switch.				
Repetition: while - do-while - for - break and continue. Functions: Function Definit					
- Scope Rules - Recursion. Array: Declaration - Initialization - Growing A	Arrays –				
Passing Arrays to Function. Event Handling Indexed Collections - JSON -	Regular				

6

6

6

**B.TECH.IT** 

Expressions – Objects – Prototype based Object Oriented Programming – Classes Server side JavaScript: General overview of server – side JavaScript.

Unit - V			JavaScript in	Browse	r	6
Browser Object Model - Document Object Model - Document Object Model -Data						
Storage – Se	Storage – Security.					
Lecture: 3	0 Periods		<b>Tutorial: 0 Periods</b>		Theory Total: 30 l	Periods

LABORATORY COURSE CONTENT						
Ex.No.	Experiment / Exercise					
1	Write a Program on H	TML - Basic Structure of HTML Do	ocuments	C01		
2	Write a Program on H	TML - Working with Forms and C	ontrols	C01		
3	Write a Program on H	TML - Responsive Web Design wi	th Media Queries	C01		
4	Write a Program on CS	SS - Styling Text and Background		CO2		
5	Write a Program on CS	SS - Using CSS Classes and IDs for	Styling	CO2		
6	Write a Program on CSS - CSS Transitions and Animations (					
7	Write a Program on JavaScript - Basic Operators and Control Structures     C					
8	Write a Program on JavaScript - Loops and Iteration					
9	Write a Program on JavaScript - Working with JSON					
10	Write a Program on JavaScript - Regular Expressions (Regex)					
11	Write a Program on JavaScript - Prototype-based Object-Oriented Programming (OOP)					
12	Write a Program on JavaScript - Working with the DOM					
13	Write a Program on JavaScript - Error Handling and Debugging Co					
14	Write a Program on JavaScript - Fetch API for Making HTTP Requests					
15	Write a Program on JavaScript - Simple Form Validation Using JavaScript       CO5					
Pract	Practical: 60 Periods Laboratory Total: 60 Periods					

TE	техт воокѕ					
1	Duckett, J. (2011). HTML and CSS: Design and Build Websites. Wiley.					
2	Bochicchio, J. (2021). Murach's HTML and CSS (5th Edition). Mike Murach & Associates.					
3	Bochicchio, J. (2021). Murach's HTML and CSS (5th Edition). Mike Murach & Associates.					
4	Haverbeke, M. (2024). Eloquent JavaScript (4th Edition).					

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5 Flanagan, D. (2020). JavaScript: The Definitive Guide (7th Edition). O'Reilly Media.

RE	FERENCE BOOKS
1	Paul McFedries, Web Design Playground: HTML & CSS the Interactive Way, 2021, 2nd Edition.
2	Jennifer Robbins, <i>Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics</i> , 2023, 5th Edition.
3	David Sawyer McFarland, CSS: The Missing Manual, 2022, 4th Edition.
4	Marijn Haverbeke, Eloquent JavaScript, 2024, 4th Edition.
5	Pavel Panchekha & Chris Harrelson, Web Browser Engineering, 2023, 1st Edition.

E-I	RESOURCES

- 1 https://www.w3schools.com/html/html\_basic.asp
- 2 <u>https://www.youtube.com/watch?v=PypMN-yui4Y</u>
- 3 <u>https://www.youtube.com/watch?v=ULNJSTSJc7s</u>
- 4 <u>https://www.youtube.com/watch?v=OXGznpKZ\_sA</u>
- 5 https://www.youtube.com/watch?v=23hrM4saaMk

COURSE OUTCOMES (CO)								
After S able to	successful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.				
CO1	Understand the basic principles of web design and develop structured HTML documents using various markup tags.	К2	1	1,2,3				
CO2	Apply HTML elements such as text formatting, lists, tables, hyperlinks, images, multimedia, forms, and controls to create interactive web pages.	К3	2	4,5,6				
СО3	Implement CSS for styling web pages, including background properties, text formatting, font control, and the usage of CSS classes and IDs for improved design.	K4	3	7,8,9				
CO4	Develop interactive and dynamic web pages using JavaScript operators, control structures, functions, arrays, event handling, JSON, and object-oriented programming concepts.	K4	4	10,11,12				
C05	Utilize JavaScript's Browser Object Model (BOM) and Document Object Model (DOM) for manipulating web page elements, managing data storage, and ensuring security in web applications.	К5	5	13,14,15				
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing;	K5 – Eva	luating; K6	- Creating				

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCI-III	DATABASE MANAGEMENT WITH MYSQL	3	0	0	Ŋ

# PRE-REQUISITES

SQL basics

	COURSE OBJECTIVES
-	To provide a comprehensive understanding of database concepts, design, and management
T	using MySQL.
h	To introduce students to the principles of relational databases, SQL, and how to work with
2	MySQL in creating, managing, and querying databases.
3	To help students understand the significance of normalization, indexing, and transactions in
	managing large-scale databases.
Л	To equip students with the skills to design and implement databases for real-world
4	applications.
5	To develop practical skills in managing databases and writing SOL queries.

### **COURSE CONTENT**

Unit – I	MySQL Fundamentals						
Introduction and Overview of MySQL -Installation and GUI Tools.Introducing SELECT statement – Introducing WHERE clause - sort results using ORDER BY - Using FROM to specify the source tables - Importance of clause Orders - Data Modification tricks.							
Unit – II	Databases and Tables	9 + 3					
Creating a da constraints - Changing a s Data Types -	atabase - creating a table -Creating indexes - Controlling column beha Usingforeign key constraints - Creating an ID column -Creating an ID co schema with ALTER - Introducing NULL and NOT_NULL Introduction to Setting up default values - MySQL Warnings - Alerting a table.	vior with olumn - o MySQL					
Unit – III	MySQL Functions & Clause	9 + 3					
Introduction to MySQL Functions – String Functions : CONCAT, SUBSTRING, REPLACE, REVERSE, LENGTH, UPPER,LCASE - Aggregate Functions : COUNT, MIN, MAX, SUM, AVG, ROUND							
Unit – IV	MySQL Tables & Joins	9 + 3					
Date/Time Functions: CURDATE, CURTIME, CURRENT_DATE, LOCAL TIME, Control Flow Functions : IF, IFNULL, NULLIF-Introduction to JOINS - Different types of JOINS- JOINS and Aliases - Multiple Table Joins.							
Unit - V	MySQL Transactions and Stored Routines	9 + 3					
Creating a si	Creating a simple Subselect -Understanding of Primary keys and Foreign keys. Transactions						

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& Stored Routines - Triggers.

Lecture: 45 Periods

**Tutorial: 15 Periods** 

Total: 60 Periods

#### **TEXT BOOKS**

- 1 **Michael J. Hernandez, "Database Design for Mere Mortals,"** 3rd Edition, Pearson Education, 2023.
- 2 Phil Simon, "The New Small: How a New Generation of Small Businesses Is Using the Internet to Find, Serve, and Keep Customers," 12th Edition, Wiley, 2023.
- 3 Thomas Connolly, Carolyn Begg, "Database Systems: A Practical Approach to Design, Implementation, and Management," 6th Edition, Addison-Wesley, 2024.
- 4 **Katherine A. McMillan and Gary A. Olson, "Database Management Systems,"** 4th Edition, McGraw-Hill, 2022.
- 5 **Elmasri, R., Navathe, S. B., "Fundamentals of Database Systems,"** 6th Edition, Pearson Education, 2022.

#### **REFERENCE BOOKS**

- 1 Ben-Feringa, "MySQL Database Design and Tuning," 11th Edition, O'Reilly Media, 2023.
- Rick F. Van der Lans, "SQL in 1000 Minutes, Sams Teach Yourself," 15th Edition, Sams Publishing, 2023.
- <sup>3</sup> Practical SQL, by Anthony DeBarros, "Practical SQL: A Beginner's Guide to Storytelling with Data," 2nd Edition, No Starch Press, 2022.
- 4 **C.J. Date, "An Introduction to Database Systems,"** 18th Edition, Addison-Wesley, 2023.
- 5 **K. L. Seshadri, "Database Management Systems,"** 13th Edition, Wiley, 2024.

#### **E-RESOURCES**

- 1 <u>https://www.geeksforgeeks.org/mysql-tutorial/</u>
- 2 <u>https://stackoverflow.com/questions/tagged/mysql</u>
- 3 https://dev.mysql.com/doc/
- 4 <u>https://www.percona.com/blog/</u>
- 5 <u>https://www.edx.org/course/databases-5-sql</u>

	COURSE OUTCOMES (CO)		
After	Successful completion of the course, the students should be able to	RBT Level	Unit
CO1	Understand the fundamentals of database systems, their architecture, and various database models with a focus on relational databases.	K2	1
CO2	Design and implement relational databases using MySQL, including	К3	2

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## **B.TECH.IT**

	creating and managing tables, keys, and relationships.				
602	Implement normalization techniques to ensure data integrity and	К3	2		
003	reduce redundancy in database design.		5		
CO4	Apply indexing and optimization techniques to improve the	K3	4		
	performance of MySQL queries.		4		
COF	Utilize advanced features of MySQL, including stored procedures,	K4	F		
COS	triggers, and views for efficient database management.		5		
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating					

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments			Maximum Marks					Total	Marks	
			CO1	CO2	CO3	<b>CO4</b>	CO5	Marks	Conv	Conversion
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
	CAT II	Part A			4	8	8	20	<b>30</b>	CIA:
CIA		Part B			16	32	32	80		40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20	100	
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
	- Theory	Total (d)	20	20	20	20	20	100	60	60
Tota	Total Marks (a + b + c + d)			68	68	68	68	340	1	00

INDIRECT ASSESSMENT

COURSE END SURVEY

B.TECH.IT
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Semester	Programme	Course Code	Course Name	L	т	Ρ	с
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCI-IV	REACT JS FRAMEWORK	2	0	4	4

#### **PRE-REQUISITES**

HTML & CSS

	COURSE OBJECTIVES					
1	To understand the basics of React, including components, JSX syntax, and the concept of virtual DOM.					
2	To understand how to integrate Material UI into a React project and implement Material UI components such as AppBar, Toolbar, NavBar, and icons for creating professional UI designs.					
3	To know how to optimize components using Pure Components and how React's DOM updating strategy reduces unnecessary re-renders.					
4	To understand how to handle HTTP requests (GET, POST, DELETE, and UPDATE) in React using Axios or Fetch API.					
5	To know the importance of React Router in single-page applications (SPA) and learn how to set it up in a React project.					

### THEORY COURSE CONTENT

Unit – I	Introduction to React	6					
React Component Demonstration using code pen – Environment Setup for Application - Using VS Code – VS Code extensions for ES6 – Hello world app in Re Babel - Create React Component – Understanding JSX.							
Unit – II	React Components	6					
Props and Functional Components Toolbar, Nat	State – Handling Events with methods – Manipulating the (Stateless) VS Class (Stateful Components) - List and keys – s – CSS Styling - Installing Material UI – Material UI AppBar – Mate vBar, icons.	State – Styling erial UI's					
Unit – III	React ES6 and JSX	6					
Understand hooks – Pu <b>Events:</b> Rea Props – Vali	ing Error Boundaries – React Component life cycle – updating l re Components – React's DOM Updating Strategy – Fragments act Component in Details – Higher Order Components –Passing u dating Props – Using References – Updated LifeCycle hooks - React	ife cycle <b>React</b> nknown Forms.					
Unit – IV	CRUD	6					
Deast Durais	Dome anna UTTD Dequests / Ajox Calla UTTD Dequests in	Dooot					

React Projects – Demo apps - HTTP Requests/Ajax Calls – HTTP Requests in React – Introduction of Axios package – HTTP GET Request – fetching & transforming data – HTTP POST – DELETE – UPDATE – Handing Errors – Adding/Removing Interceptors – Creating/Using Axios instances. *Deploying React Application to the Web*.

Unit - V			React Rou	ting		6
Setting Up the Router Package - react-router vs react router dom - Preparing the						
Project For Routing – Switching Between Pages.						
Lecture: 3	0 Periods		Tutorial: 0 Periods		Theory Total: 30 P	Periods

LABORATORY COURSE CONTENT						
Ex.No.		Experiment / Exerci	se	СО		
1	Write a simple React a	pp that displays "Hello, World!"	using JSX.	CO1		
2	Write a React compor screen.	nent using ES6 class syntax and r	render a simple message on the	CO1		
3	Write a React compon	ent that renders a styled div us	ing inline styles in JSX.	CO1		
4	Create a React class displays the updated c	component where clicking a bu count.	tton increments a counter and	CO2		
5	Write a component th on a button click.	rite a component that uses state to toggle between "Light Mode" and "Dark Mode" a button click.				
6	Build a React component that imports an external CSS file to apply styles to its elements.					
7	Create a class-based component that logs a message when a button is clicked.					
8	Write a higher-order component (HOC) that adds extra functionality to an existing component, such as logging when it is mounted.					
9	Create a form that uses refs to focus on the input field when the component mounts.					
10	Create a React compo list.	nent that uses Axios to fetch dat	a from an API and display it in a	CO4		
11	Write a form compone with Axios.	ent that sends user input to a ser	ver using an HTTP POST request	CO4		
12	Use JSON Server to sin CRUD operations on a	mulate a backend and create a I fake REST API.	React component that performs	CO4		
13	Set up React Router in	your app and create routes for t	he Home and About pages.	CO5		
14	Create a dynamic rou userId in the URL.	ute that fetches and displays a	a user's profile based on their	CO5		
15	Implement the Switc matching route is rend	ch component from React Rout dered.	er to ensure that only the first	CO5		
Pract	ical: 60 Periods		Laboratory Total: 60 Per	iods		

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TE	ХТ ВООКЅ
1	"Learning React: Modern Patterns for Developing React Apps" by Alex Banks and Eve Porcello
2	"React Up and Running: Building Web Applications" by Stoyan Stefanov
3	"React - The Complete Guide (incl Hooks, React Router, Redux)" by Maximilian Schwarzmüller (Packt Publishing)
4	"React - The Complete Guide (incl Hooks, React Router, Redux)" by Maximilian Schwarzmüller (Packt Publishing)
5	"React Router Quick Start Guide: The complete guide to client-side routing in React.js" by Venkateshwaran S

RE	FERENCE BOOKS
1	Wieruch, R. (2021). The Road to React. Leanpub.
2	Erikson, M. (2023). Learning Path for React. SitePoint.
3	Boduch, A., & Sakhniuk, M. (2023). React and React Native - Fifth Edition. Packt Publishing.
4	Accomazzo, A., Murray, N., & Lerner, A. (2022). Fullstack React: The Complete Guide to ReactJS and Friends. Fullstack.io.
F	Manning Publications (2024) Poact in Donth Manning

5	Manning Publications.	(2024). React ir	Depth. Manning
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- 1 <u>https://www.w3schools.com/react/react\_intro.asp</u>
- 2 <u>https://react.dev/learn/tutorial-tic-tac-toe</u>
- 3 <u>https://legacy.reactjs.org/docs/higher-order-components.html</u>
- 4 <u>https://hackernoon.com/how-to-simulate-a-backend-rest-api-with-json-</u> server-for-crud-development-in-react
- 5 <u>https://github.com/remix-run/react-router/issues/10551</u>

	COURSE OUTCOMES (CO)										
After S able to	uccessful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.							
CO1	Apply event handling and state management techniques in React applications.	К3	1	1,2,3							
CO2	Implement Material UI components like AppBar, Toolbar, NavBar, and icons for professional UI design.	К3	2	4,5,6							
CO3	Analyse the performance bottlenecks and implement optimizations in React applications.	K4	3	7,8,9							

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CO4	Explain the CRUD operations (GET, POST, DELETE, UPDATE) using REST APIs in a React application.	K2	4	10,11,12			
CO5	Outline the importance of React Router in building SPAs.	K2	5	13,14,15			
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating							

Semester	Programme	Course Code	Course Name	L	Т	Ρ	с
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCI-V	ADVANCED JAVA WITH RESTAPI	2	0	4	4

### PRE-REQUISITES

**OOPs** 

	COURSE OBJECTIVES						
1	To understand and implement Java Collection Framework components like List, Set, Queue, and Map with real-world applications.						
2	To learn and apply Java 8 features like lambdas, functional interfaces, Streams API, and Date-Time API for better code efficiency.						
3	To gain proficiency in JDBC, including driver types, SQL query execution, and ResultSet management in Java applications.						
4	To explore Java web application architecture and lifecycle using Servlets and JSP for building dynamic web applications.						
5	To develop and deploy RESTful web services with Spring Boot using dependency injection, annotations, and best practices.						

		т	HEORY COURSE CO	ONTENT			
Unit – I			Collectio	ns		6	
List - ArrayL Enumerator- V	yList – Set – HashSet - TreeSet- Queue – PriorityQueue - Map - HashMap – - Wrapper Classes- Autoboxing and Unboxing.					Iterator –	
Unit – II			JAVA 8 Fea	itures		6	
Regular Expressions - Functional Interfaces - Lambdas, Functional interfaces types, default methods, methods references – Date and Time API - Using LocalTime and Local Date- Using Zoned Date Time API - Using period and Duration - Compatibility with date and Calendar - Date and Time Formatting - Java Streams API. Method References -Regular Expression.							
Unit – III			<b>DB</b> Connec	tivity		6	
Develop and deploy RESTful web services using Spring Boot, incorporating dependency injection, annotations, and API development best practices.							
Unit – IV			Web Applic	ation		6	
Basics, Architecture and challenges of Web Application - Introduction to servlet - Servlet life cycle - Handling Request and Response - JSP Introduction.							
Unit - V			React Rou	ting		6	
Introduction @annotations.	to SpringBoot RestAPI.	:: Mave	en, Gradle, Depender	ncy Injec	tion, SprintBoot Starte	r project,	
Lecture: 3	0 Periods	r	<b>Futorial: 0 Periods</b>		Theory Total: 30 P	eriods	

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Semester	Programme	Course Code	Course Name	L	т	Ρ	С
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCII-I	LOGICAL PROGRAMMING MASTERY IN JAVA	2	0	4	4

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#### **PRE-REQUISITES**

COURSE OBJECTIVES						
1	To understand the process of installing and setting up the Java environment, including Eclipse, and to explore the fundamental syntax, data types, variables, operators, and input/output operations in Java.					
2	To apply conditional and looping statements effectively and develop logical programs using arrays and string manipulation techniques in Java.					
3	To gain proficiency in object-oriented programming concepts such as classes, objects, constructors, method overloading, and memory management through garbage collection.					
4	To analyze and implement inheritance, polymorphism, encapsulation, and abstraction while utilizing access modifiers to enhance data security in Java applications.					
5	To handle exceptions using built-in and user-defined exception handling mechanisms, work with packages and interfaces, and perform file reading and writing operations efficiently in Java.					

#### THEORY COURSE CONTENT

Unit – I

#### Introduction to Java

**Control Statements** 

Installing and setting up the Java environment and Eclipse – Basic syntax and structure of Java programs – Data types -Variables and constants – Operators and expressions – Input/output

# operations.

#### Unit – II

Conditional statements (if, switch) – Looping statements (for, while, do-while). Creating and manipulating arrays – String class and methods - *Scenario Based logical programs in Arrays and* Strings.

#### Unit – III

**Object-oriented concepts** 

Classes: Class Fundamentals-objects –Assigning Object Reference Variables – Methods – Constructors – this keyword – Garbage Collection – Overloading Methods – Objects as Parameters – Argument Passing –Static – final – Nested and Inner Classes – Command – Line and Variable Length Arguments.

Unit – IV	Inheritance	6
Basics – Supe	er keyword -Multilevel Hierarchy–Method Overriding – Abstract Classes –	final with

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Inheritance – polymorphism–Access modifiers – Encapsulation and data hiding.										
Unit - V	Exception Handling					6				
Multiple catch Clauses – Nested try Statements –Java's Built-in Exceptions – User-defined Exception. Packages – Packages and Member Access–Importing Packages – Interfaces- Default, Static, Private interface methods – Reading and Writing Files.										
Lecture: 3	0 Periods		Tutorial: 0 Periods		Theory Total: 30 P	eriods				

LABORATORY COURSE CONTENT									
Ex.No.	Experiment / Exercise								
1	Write a Java program that calculates the area of a rectangle and prints the result.	CO1							
2	Write a Java program that accepts two numbers from the user, performs arithmetic operations (addition, subtraction, multiplication, division), and displays the result.	CO1							
3	Write a Java program that takes an integer input and converts it into a double, and then performs a mathematical operation on both values.	CO1							
4	Write a Java program that accepts a number and checks whether it is even or odd using an if-else statement.	CO2							
5	Write a Java program to implement a menu-driven program where the user selects an option (1-4) to perform tasks like addition, subtraction, multiplication, and division.	CO2							
6	Write a Java program to reverse a number using a while loop.	CO2							
7	Write a Java program to create a Student class with attributes like name and marks, and display the information using methods.	CO3							
8	Write a Java program where an object of the Employee class is passed to a method that updates its salary. Display the salary before and after the update.	CO3							
9	Write a Java program that demonstrates method overloading by creating methods for addition with different numbers of parameters.	CO3							
10	Write a Java program that demonstrates method overriding by creating a base class Shape with a method area().	CO4							
11	Write a Java program where the final keyword is used to prevent the modification of a class or method.	CO4							
12	Write a Java program that demonstrates polymorphism by creating a base class Shape and subclasses Circle and Square.	CO4							
13	Write a Java program where the Shape interface has methods for calculateArea() and calculatePerimeter().	CO5							
14	Write a Java program that creates a custom exception AgeNotValidException to check if a user's entered age is less than 18.		CO5						
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15	Develop a program that catches built-in exceptions and handles custom exceptions, such as ensuring that the user's age is within a valid range (positive integer).		CO5						
Practical: 60 Periods			Laboratory Total: 60 Per	iods					

**B.TECH.IT** 

# TEXT BOOKS

R2023 - CURRICULUM & SYLLABI

1	Herbert Schildt (2022), "Java: The Complete Reference," 12th Edition, McGraw-Hill.
2	Kathy Sierra & Bert Bates (2022), "Head First Java," 3rd Edition, O'Reilly Media.
3	Paul Deitel & Harvey Deitel (2023), "Java How to Program: Early Objects," 12th Edition, Pearson.
4	Venkat Subramaniam (2021), "Programming with Java: A Practical Approach," 2nd Edition, Addison-Wesley.
5	Joshua Bloch (2023), "Effective Java," 3rd Edition, Addison-Wesley.

### **REFERENCE BOOKS**

1	Herbert Schildt (2022), "Java: The Complete Reference," 12th Edition, McGraw-Hill.
2	Kathy Sierra & Bert Bates (2022), "Head First Java," 3rd Edition, O'Reilly Media.
3	Paul Deitel & Harvey Deitel (2023), "Java How to Program: Early Objects," 12th Edition, Pearson.
4	Venkat Subramaniam (2021), "Programming with Java: A Practical Approach," 2nd Edition, Addison-Wesley.
5	Joshua Bloch (2023), "Effective Java," 3rd Edition, Addison-Wesley.

# E-ESOURCES 1 https://www.geeksforgeeks.org/data-types-in-java/ 2 https://www.w3schools.in/java/examples/addition-subtraction-multiplication-division 3 https://www.geeksforgeeks.org/method-overloading-in-java/ 4 https://www.w3resource.com/java-exercises/java-polymorphism-exercise-3.php 5 https://www.geeksforgeeks.org/user-defined-custom-exception-in-java/

	COURSE OUTCOMES (CO)				
After S able to	uccessful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.	
CO1	Apply knowledge of Java environment setup, Eclipse IDE,	K3	1	1,2,3	

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**B.TECH.IT** 

	and fundamental Java syntax, including data types, variables, operators, and input/output operations.			
CO2	Analyze and implement conditional and looping statements, and develop logical programs using arrays and string manipulation techniques in Java.	K4	2	4,5,6
CO3	Evaluate and implement object-oriented programming principles such as classes, objects, constructors, method overloading, and garbage collection for efficient memory management.	К5	3	7,8,9
CO4	Analyze the concepts of inheritance, polymorphism, encapsulation, and abstraction, and apply access modifiers to ensure data security in Java applications.	K4	4	10,11,12
CO5	Apply exception handling mechanisms, effectively use packages and interfaces, and perform file handling operations in Java programs.	К3	5	13,14,15
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating				

LABORATORY COURSE CONTENT				
Ex.No.		Experiment / Exerci	se	со
1	Write a Java progra to it, and then itera	im to create an Array List of te through the list using an it	integers, add five elements terator.	CO1
2	Write a Java progr names and display t	ram to create a Hash Set them in sorted order using Tr	that stores unique student ree Set.	CO1
3	Write a Java progr removing elements	ram that demonstrates Pric in ascending order.	prity Queue by adding and	CO1
4	Write a Java progr expression that add	am to implement a function s two numbers and returns t	nal interface with a lambda he sum.	CO2
5	Write a Java progra print only the even	nm to use the Stream API to numbers.	filter a list of numbers and	CO2
6	Write a Java program that demonstrates the use of Local Date, Local Time, and Zoned Date Time to display current date, time, and a different time zone.			CO2
7	Write a Java program using JDBC to connect to a MySQL database and retrieve all records from a table named employees.			CO3
8	Write a Java program using Prepared Statement to insert a new user record into a users table in MySQL.			CO3
9	Write a Java program to create a RESTful web service using Spring Boot that returns a list of products in JSON format.			CO3
10	Write a Java servlet that handles a GET request and returns "Hello, Servlet!" Cas a response.			CO4
11	Write a JSP page that displays the current date and time using JSP C scripting.			CO4
12	Write a Java program to create a servlet that accepts a user's name as a request parameter and displays a personalized greeting message.			CO4
13	Write a Spring Boot application that exposes a REST API /hello which C returns a JSON response { "message": "Hello, World!" }.			CO5
14	Write a Java Spring Boot application that demonstrates @Autowired C dependency injection in a service class.			CO5
15	Write a React Router application with two routes: /home displaying "Home Page" and /about displaying "About Page".			CO5
Practical: 60 Periods Laboratory Total: 60 Period				

# **TEXT BOOKS**

1 *"Java: The Complete Reference"*, Herbert Schildt, 2021, 12th Edition.

2	"Modern Java in Action: Lambdas, Streams, Functional and Reactive Programming", Raoul-Gabriel Urma, Mario Fusco, Alan Mycroft, 2021, 3rd Edition.
3	"JDBC API Tutorial and Reference", Maydene Fisher, Jon Ellis, Jonathan Bruce, 2021, 3rd Edition.
4	"Murach's Java Servlets and JSP", Joel Murach, 2021, 4th Edition.
5	"Spring Boot in Action", Craig Walls, 2021, 2nd Edition.

### **REFERENCE BOOKS**

1	"Head First Java: A Brain-Friendly Guide", Kathy Sierra, Bert Bates, Trisha Gee, 2022, 3rd Edition.
2	"Modern Java in Action: Lambdas, Streams, Functional and Reactive Programming", Raoul-Gabriel Urma, Mario Fusco, Alan Mycroft, 2021, 3rd Edition.
3	DB Connectivity: "Java: The Complete Reference", Herbert Schildt, 2021, 12th Edition.
4	"Spring in Action", Craig Walls, 2023, 6th Edition.
5	"Spring Boot: Up and Running: Building Cloud Native Java and Kotlin Applications", Mark Heckler, 2021, 1st Edition.

### **E-RESOURCES**

- 1 https://www.geeksforgeeks.org/how-to-sort-hashset-in-java/
- 2 <u>https://www.geeksforgeeks.org/lambda-expressions-java-8/</u>
- 3 https://www.youtube.com/watch?v=KyVRYSA3EHM
- 4 <u>https://www.youtube.com/watch?v=lbZ47eErvtU</u>
- 5 <u>https://www.youtube.com/watch?v=ZF73dpgRrWI</u>

	COURSE OUTCOMES (CO)					
After S able to	After Successful completion of the course, the students should be <b>RBT</b> Level Unit Lab Ex.					
CO1	Understand and implement Java Collection Framework classes like List, Set, Queue, and Map for efficient data handling.	К2	1	1,2,3		
CO2	Apply Java 8 features such as lambdas, functional interfaces, Streams API, and Date-Time API for optimized coding.	К3	2	4,5,6		
CO3	Organize the JDBC for database connectivity, query execution, and managing ResultSets in Java applications.	К3	3	7,8,9		
CO4	Develop web applications using Servlets and JSP for handling HTTP requests, responses, and session management.	К3	4	10,11,12		

R2023 – CURRICULUM & SYLLABI					
CO5	Build RESTful web services using Spring Boot with dependency injection, annotations, and React Routing.	K3	5	13,14,15	
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing;	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating			

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCII-II	NOSQL WITH MONGO DATABASE	З	0	0	З

# PRE-REQUISITES

Node.js & Express

	COURSE OBJECTIVES			
1	To understand the fundamentals of NoSQL databases.			
2	To learn about MongoDB and its features for handling large-scale unstructured data.			
3	To explore data modeling, querying, and performance optimization techniques in MongoDB.			
4	To be able to integrate MongoDB with applications and perform CRUD operations.			
5	To gain hands-on experience in using MongoDB to store, manage, and manipulate large-scale data.			

# COURSE CONTENT

Unit – I	Introduction to NoSQL Database							
What in NoSQL - Difference between NoSQL and RDBMS- Benefits of NoSQL. Objectives - Design Goals – The Mongo Shell - JSON Introduction - JSON Structure.								
Unit – II	Mongo DB Installation							
Installing Tools - Overview of Blog Project – Swig Express - Node Packaged Modules (npm). CRUD (Creating, Reading & Updating Data) Mongo Shell - Query Operators - Update Operators and Commands.								
Unit – III	Jnit – III Data Modeling					9 + 3		
Schema Desi Class -Exterr	gn Pattern - Ca 1al Storage Clas	se Studi s - Regi	ies & Tradeoffs. Automatic ster Storage Class.	: Storag	ge Class - Statio	: Storage		
Unit – IV	Unit – IV Indexing and Performance Considerations				9 + 3			
Performance Using Indexes -Monitoring And Understanding Performance - Performance In Sharded Environments-The Use Of The Pipeline								
Unit - V			Aggregation			9 + 3		
Aggregation Drivers - Imp	Aggregation Framework Goals-Comparison With SQL Facilities-Application Engineering Drivers - Impact Of Replication And Sharding On Design And Development Hub.							
Lecture: 45 Periods			Tutorial: 15 Periods		Total: 60 P	eriods		

TE	TEXT BOOKS						
1	MongoDB: The Definitive Guide( 6th Edition), Kristina Chodorow, Michael Dirolf, 2022						
2	NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Pramod J. Sadalage, Martin Fowler,2023.						
3	MongoDB: A Guide for Developers and Administrators, Kristina Chodorow, 2023.						
4	Mastering MongoDB 4.x, Alex Giamas,2023						
5	MongoDB Applied Design Patterns, Rick Copeland, 2024						

### **REFERENCE BOOKS**

- 1 MongoDB in Action (3rd Edition), Kyle Banker, 2022.
- 2 MongoDB for Java Developers, Francesco Marchioni,2023.
- 3 Building Scalable Web Applications Using MongoDB and Node.js, Bruno Figueiredo, 2023.
- 4 NoSQL for Dummies, Adam Fowler, 2024.
- 5 NoSQL and SQL Database Management Systems, Guy Harrison, 2023.

### **E-RESOURCES**

- 1 <u>https://docs.mongodb.com</u>
- 2 <u>https://university.mongodb.com</u>
- 3 <u>https://www.freecodecamp.org/news/mongodb-tutorial-for-beginners/</u>
- 4 <u>https://github.com/mongodb/mongo</u>
- 5 <u>https://www.geeksforgeeks.org/mongodb-replication-and-sharding/</u>

COURSE OUTCOMES (CO)								
After	RBT Level	Unit						
CO1	Understand the concept and types of NoSQL databases.	K2	1					
CO2	Design and implement MongoDB databases using various tools and techniques.	К3	2					
CO3	Perform CRUD operations and query optimization in MongoDB.	К3	3					
CO4	Integrate MongoDB with web applications.	K4	4					
CO5	Apply MongoDB in real-world data handling and management scenarios.	К3	5					
RBT Le	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating							

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments				Maximum Marks				Total	Marks	
			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	САТ І	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
	CAT II	Part A			4	8	8	20	to <b>30</b>	<u>CIA:</u> 40
CIA		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	<u>ESE:</u>
LUE	– Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	100		

INDIRECT ASSESSMENT

COURSE END SURVEY

Semester	Programme	Course Code	Course Name	L	т	Ρ	С
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCII-III	WEB TECHNOLOGY USING JAVASCRIPT	2	0	4	4

### **PRE-REQUISITES**

### **Object-Oriented Programming (OOP)**

	COURSE OBJECTIVES						
1	To understand the basic principles of web design and develop structured HTML documents using various markup tags.						
2	To apply HTML elements such as text formatting, lists, tables, hyperlinks, images, multimedia, forms, and controls to create interactive web pages.						
3	To implement CSS for styling web pages, including background properties, text formatting, font control, and the usage of CSS classes and IDs for improved design.						
4	To develop interactive and dynamic web pages using JavaScript operators, control structures, functions, arrays, event handling, JSON, and object-oriented programming concepts.						
5	To utilize JavaScript's Browser Object Model (BOM) and Document Object Model (DOM) for manipulating web page elements, managing data storage, and ensuring security in web applications.						

### THEORY COURSE CONTENT

Unit – I HTML Web Design Principles: Basic principles involved in developing a website Introduction

to HTML: What is HTML – HTML Documents – Basic structure of an HTML document – Creating an HTML document - Mark up Tags - Heading - Paragraphs - Line Breaks -HTML Tags.

### Unit – II

Introduction to elements of HTML - Working with Text - Working with Lists, Tables and Frames - Working with Hyperlinks, Images and Multimedia - Working with Forms and controls.

**Elements of HTML** 

CSS

### Unit – III

Introduction to Cascading Style Sheets: Concept of CSS - Creating Style Sheet - CSS Properties - CSS Styling (Background, Text Format, Controlling Fonts) - CSS Id and Class.

### Unit – IV **JAVASCRIPT** 6 Introduction - Operators - Control Structures: Selection: if - if-else - switch. Repetition: while - do-while - for - break and continue. Functions: Function Definition - Scope Rules - Recursion. Array: Declaration - Initialization - Growing Arrays -Passing Arrays to Function. Event Handling. - Indexed Collections - JSON - Regular

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**B.TECH.IT** 

Expressions – Objects – Prototype based Object Oriented Programming – Classes Server side JavaScript: General overview of server – side JavaScript.

Unit - V	JavaScript in Browser								
Browser Object Model - Document Object Model - Document Object Model -Data									
Storage – Security.									
Lecture: 3	0 Periods		<b>Tutorial: 0 Periods</b>		Theory Total: 30 l	Periods			

	LABORATORY COURSE CONTENT							
Ex.No.		Experiment / Exerci	se	СО				
1	Write a Program on H	TML - Basic Structure of HTML Do	ocuments	C01				
2	Write a Program on H	TML - Working with Forms and C	ontrols	C01				
3	Write a Program on H	TML - Responsive Web Design wi	th Media Queries	C01				
4	Write a Program on CS	SS - Styling Text and Background		CO2				
5	Write a Program on CSS - Using CSS Classes and IDs for Styling							
6	Write a Program on CSS - CSS Transitions and Animations							
7	Write a Program on JavaScript - Basic Operators and Control Structures							
8	Write a Program on JavaScript - Loops and Iteration							
9	Write a Program on Ja	vaScript - Working with JSON		CO3				
10	Write a Program on Ja	vaScript - Regular Expressions (R	egex)	CO4				
11	Write a Program on Ja	vaScript - Prototype-based Objec	t-Oriented Programming (OOP)	CO4				
12	Write a Program on JavaScript - Working with the DOM							
13	Write a Program on Ja	vaScript - Error Handling and Del	ougging	CO5				
14	Write a Program on JavaScript - Fetch API for Making HTTP Requests							
15	Write a Program on Ja	vaScript - Simple Form Validation	n Using JavaScript	CO5				
Pract	ical: 60 Periods		Laboratory Total: 60 Per	riods				

ТЕ	TEXT BOOKS					
1	Duckett, J. (2011). HTML and CSS: Design and Build Websites. Wiley.					
2	Bochicchio, J. (2021). Murach's HTML and CSS (5th Edition). Mike Murach & Associates.					
3	Bochicchio, J. (2021). Murach's HTML and CSS (5th Edition). Mike Murach & Associates.					
4	Haverbeke, M. (2024). Eloquent JavaScript (4th Edition).					

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E-RESOURCES

5 Flanagan, D. (2020). JavaScript: The Definitive Guide (7th Edition). O'Reilly Media.

1 https://www.w3schools.com/html/html\_basic.asp

2 <u>https://www.youtube.com/watch?v=PypMN-yui4Y</u>
 3 <u>https://www.youtube.com/watch?v=ULNJSTSJc7s</u>

RE	REFERENCE BOOKS						
1	Paul McFedries, Web Design Playground: HTML & CSS the Interactive Way, 2021, 2nd Edition.						
2	Jennifer Robbins, <i>Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics</i> , 2023, 5th Edition.						
3	David Sawyer McFarland, CSS: The Missing Manual, 2022, 4th Edition.						
4	Marijn Haverbeke, <i>Eloquent JavaScript</i> , 2024, 4th Edition.						
5	Pavel Panchekha & Chris Harrelson, Web Browser Engineering, 2023, 1st Edition.						

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	4	https://www.youtube.com/watch?v=OXGznpKZ_sA										
	5	https://www.youtube.com/watch?v=23hrM4saaMk										
		COURSE OUTCOMES (CO)										
/ a	After Successful completion of the course, the students should be <b>RBT Level Unit Lab</b>											
	со	<b>1</b> Understand the basic principles of web design and develop structured HTML documents using various markup tags.	K2	1	1,2,3							
	CO	Apply HTML elements such as text formatting, lists, tables, hyperlinks, images, multimedia, forms, and controls to create interactive web pages.	К3	2	4,5,6							
	CO	Implement CSS for styling web pages, including background properties, text formatting, font control, and the usage of CSS classes and IDs for improved design.	K4	3	7,8,9							
	co	Develop interactive and dynamic web pages using JavaScript operators, control structures, functions, arrays, event handling, JSON, and object-oriented programming concepts.	K4	4	10,11,12							
	CO	Utilize JavaScript's Browser Object Model (BOM) and Document Object Model (DOM) for manipulating web page elements, managing data storage, and ensuring security in web applications.	К5	5	13,14,15							
	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating											

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Sem	Programme	Course Code	Course Name		т	Ρ	с
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCII-IV	NODE JS AND EXPRESS FRAMEWORK	3	0	0	З

### **PRE-REQUISITES**

# **REST API Concepts**

	COURSE OBJECTIVES
1	To understand the fundamentals of server-side JavaScript programming using Node.js.
2	To learn how to work with the Express.js framework to develop RESTful APIs and server- side applications.
3	To understand how to manage asynchronous programming using Node.js.
4	To integrate databases and other services with Node.js and Express for building modern web applications.
5	To explore how to build scalable and high-performance web applications using Node.js.

# COURSE CONTENT

### **Introduction to Node JS**

Introduction - Environment Setup - Node Package Manager -Callbacks Events And Event Loop Streams And Buffers – Express Framework

### Unit – II

Unit – I

### **Introduction to Express JS**

**JSON** 

**HTTP Handling** 

MongoDB - Connecting Node.JS To Database - Creating Rest APIs -GET-POST- HTTP request - Node/HTTP servers 101 - serving routes and static files - Basic Routing and Serving static files with Express

### Unit – III

Middleware - Respond with JSON - Express with a view Engine -Rendering in Express - Handlebars - Pug/Jade-Getting Date from request object - Forms and Cookies

### Unit – IV

Getting data from the query string - Getting date from params - req.params and req.param()-Sending files and header already sent- The Express Generator.

# Unit - V

Touting: The router

project Setup – router-use -Adding the request model - putting data in template - search feature-Introduction to DB Connectivity - MongoDB connection – Capstone project.

Lecture: 45 Periods		Tutorial: 0 Periods		Total: 45 Periods
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### **TEXT BOOKS**

- 1 Learning Node.js Development, Andrew Mead,2022.
- 2 Node.js Design Patterns (3rd Edition), Mario Casciaro, 2022.
- 3 Express.js: Web Application Development, Ethan Brown,2023.
- 4 **Node.js Web Development** (15th Edition), David Herron, 2023.
- 5 Pro Express.js, Azat Mardan, 2024.

### **REFERENCE BOOKS**

- 1 Node.js 8 Cookbook, David Mark Clements, 2022.
- 2 Mastering Express.js,K. B. Dinesh,2023.
- 3 MongoDB and Node.js,Christian Wenz,2023.
- 4 Learning JavaScript Design Patterns, Addy Osmani, 2024.
- 5 JavaScript: The Good Parts, Douglas Crockford, 2023.

### **E-RESOURCES**

- 1 <u>https://expressjs.com/</u>
- 2 <u>https://www.codecademy.com/learn/learn-node-js</u>
- 3 <u>https://developer.mozilla.org/en-US/docs/Web/JavaScript</u>
- 4 <u>https://github.com/nodejs</u>
- 5 <u>https://nodeschool.io/</u>

	COURSE OUTCOMES (CO)						
After	After Successful completion of the course, the students should be able to <b>RBT Level Unit</b>						
CO1	Understand the fundamentals of Node.js and the Express framework.	K2	1				
CO2	Handle asynchronous programming and concurrency issues in Node.js applications.	K2	2				
CO3	Build and deploy web applications using Node.js.	К3	3				
CO4	Implement security measures in Node.js and Express applications.	К3	4				
CO5	Develop and deploy full-stack applications using Node.js, Express, and related technologies.	K4	5				
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating							

	CO WISE DIRECT ASSESSMENT PATTERN									
	Accoremente		Maxi	mum M	1arks		Total	Marks		
	Assessments		CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	САТ І	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
		Part A			4	8	8	20	<b>30</b>	CIA:
CIA		Part B			16	32	32	80		40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
191	- Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)			68	68	68	68	68	340	1	00

INDIRECT ASSESSMENT

COURSE END SURVEY

Semester	Programme	Course Code	Course Name		Т	Ρ	с
	Common To B.E- CSE, B.TECH-IT, AI&DS	VCII-V	REACT JS FRAMEWORK	2	0	4	4

# PRE-REQUISITES

COURSE OBJECTIVES

HTML & CSS

1	To understand the basics of React, including components, JSX syntax, and the concept of virtual DOM.
2	To understand how to integrate Material UI into a React project and implement Material UI components such as AppBar, Toolbar, NavBar, and icons for creating professional UI designs.
3	To know how to optimize components using Pure Components and how React's DOM updating strategy reduces unnecessary re-renders.
4	To understand how to handle HTTP requests (GET, POST, DELETE, and UPDATE) in React using Axios or Fetch API.
5	To know the importance of React Router in single-page applications (SPA) and learn how to set it up in a React project.

	THEORY COURSE CONTENT						
Unit – I	Introduction to React	6					
React Comp Application Babel - Crea	ponent Demonstration using code pen – Environment Setup fo - Using VS Code – VS Code extensions for ES6 – Hello world app in ate React Component – Understanding JSX.	or React React –					
Unit – II	React Components	6					
Props and Functional Components Toolbar, Nav	Props and State – Handling Events with methods – Manipulating the State – Functional (Stateless) VS Class (Stateful Components) - List and keys – Styling Components – CSS Styling - Installing Material UI – Material UI AppBar – Material UI's Toolbar, NavBar, icons.						
Unit – III	Unit – III React ES6 and JSX 6						
Understand hooks – Pu <b>Events:</b> Rea Props – Vali	Understanding Error Boundaries – React Component life cycle – updating life cycle hooks – Pure Components – React's DOM Updating Strategy – Fragments. <b>React</b> <b>Events:</b> React Component in Details – Higher Order Components –Passing unknown Props – Validating Props – Using References – Updated LifeCycle books - React Forms						
Unit – IV	CRUD	6					
React Project Introduction HTTP POST Creating/Us	React Projects – Demo apps - HTTP Requests/Ajax Calls – HTTP Requests in React – Introduction of Axios package – HTTP GET Request – fetching & transforming data – HTTP POST – DELETE – UPDATE – Handing Errors – Adding/Removing Interceptors – Creating/Using Axios instances. <i>Deploying React Application to the Web</i> .						
Unit - V	React Routing	6					

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**B.TECH.IT** 

Setting Up the Router Package – react-router vs react router dom – Preparing the Project For Routing – Switching Between Pages.

Lecture: 30 Periods

Tutorial: 0 Periods

Theory Total: 30 Periods

	LABORATORY COURSE CONTENT					
Ex.No.	Experiment / Exercise					
1	Write a simple React a	pp that displays "Hello, World!"	using JSX.	CO1		
2	Write a React compor screen.	nent using ES6 class syntax and r	ender a simple message on the	CO1		
3	Write a React compon	ent that renders a styled div us	ing inline styles in JSX.	CO1		
4	Create a React class displays the updated c	component where clicking a bu count.	tton increments a counter and	CO2		
5	Write a component th on a button click.	at uses state to toggle between	"Light Mode" and "Dark Mode"	CO2		
6	Build a React compo elements.	nent that imports an external	CSS file to apply styles to its	CO2		
7	Create a class-based c	omponent that logs a message w	hen a button is clicked.	CO3		
8	Write a higher-order component (HOC) that adds extra functionality to an existing C component, such as logging when it is mounted.					
9	Create a form that uses refs to focus on the input field when the component C mounts.					
10	Create a React component that uses Axios to fetch data from an API and display it in a list.					
11	Write a form component that sends user input to a server using an HTTP POST request with Axios.					
12	Use JSON Server to simulate a backend and create a React component that performs CRUD operations on a fake REST API.					
13	Set up React Router in your app and create routes for the Home and About pages.					
14	Create a dynamic route that fetches and displays a user's profile based on their UserId in the URL.					
15	15 Implement the Switch component from React Router to ensure that only the first matching route is rendered.					
Pract	Practical: 60 Periods Laboratory Total: 60 Periods					

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TE	XT BOOKS
1	"Learning React: Modern Patterns for Developing React Apps" by Alex Banks and Eve Porcello
2	"React Up and Running: Building Web Applications" by Stoyan Stefanov
3	"React - The Complete Guide (incl Hooks, React Router, Redux)" by Maximilian Schwarzmüller (Packt Publishing)
4	"React - The Complete Guide (incl Hooks, React Router, Redux)" by Maximilian Schwarzmüller (Packt Publishing)
5	"React Router Quick Start Guide: The complete guide to client-side routing in React.js" by Venkateshwaran S

# **REFERENCE BOOKS**

1	Wieruch, R. (2021). The Road to React. Leanpub.
2	Erikson, M. (2023). Learning Path for React. SitePoint.
3	Boduch, A., & Sakhniuk, M. (2023). React and React Native - Fifth Edition. Packt Publishing.
4	Accomazzo, A., Murray, N., & Lerner, A. (2022). Fullstack React: The Complete Guide to ReactJS and Friends. Fullstack.io.
5	Manning Publications. (2024). React in Depth. Manning.

### **E-RESOURCES**

1	https://www.w3schools.com/react/react_intro.asp
2	https://react.dev/learn/tutorial-tic-tac-toe

3	https://legacy.reactjs.org/docs/higher-order-components.html
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- 4 <u>https://hackernoon.com/how-to-simulate-a-backend-rest-api-with-json-</u> server-for-crud-development-in-react
- 5 https://github.com/remix-run/react-router/issues/10551

	COURSE OUTCOMES (CO)									
After S able to	successful completion of the course, the students should be	RBT Level	Theory Unit	Lab Ex.						
CO1	Apply event handling and state management techniques in React applications.	К3	1	1,2,3						
CO2	Implement Material UI components like AppBar, Toolbar, NavBar, and icons for professional UI design.	К3	2	4,5,6						
CO3	Analyse the performance bottlenecks and implement optimizations in React applications.	K4	3	7,8,9						
CO4	Explain the CRUD operations (GET, POST, DELETE, UPDATE) using	K2	4	10,11,12						

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R2023 – CURRICULUM & SYLLABI							
	REST APIs in a React application.						
CO5	Outline the importance of React Router in building SPAs.	K2	5	13,14,15			
RBT Le	RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating						

# **OPEN ELECTIVE COURSES OFFERED TO OTHER DEPARTMENTS (OE)**

Sl.No.	Course Code	Course Title	L	Т	Р	С
1		Fundamentals of Databases	3	0	0	3
2		Python Programming and Frameworks	3	0	0	3
3		Data Structures	3	0	0	3
4		Computational Science for Engineers	3	0	0	3
5		Java Programming 3 0		0	0	3
6		Web Engineering		0	0	3
7		Fundamentals of Blockchain		0	0	3
8		Introduction to Artificial Intelligence	3	0	0	3
9		Fundamentals of Internet of Things30		0	0	3
10		Cloud Technology	3	0	0	3

Sem	Programme	Course Code	Course Name	L	т	Ρ	С
			FUNDAMENTALS OF DATABASES	3	0	0	3

PRE-REQUISITES

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# **COURSE OBJECTIVES**

1	To Understand Database Concepts & E-R Model					
2	To Study the Relational Model & SQL Basics					
3	To Advance SQL Knowledge & Programming Integration					
4	To Master Normalization Techniques					
5	To Analyze Transactions & Query Processing					

Unit – I	BASIC CONC	EPTS AND E-R MODEL		9				
Database System Applications – Purpose of Database Systems – Views of Data – Database Languages –Database and Application Architecture. Overview of the Design Process – The Entity-Relationship model – Complex Attributes – Mapping Cardinalities and Keys.								
Unit – II	RELATIONAL MODEL AND SQL FUNDAMENTALS							
Introduction to Relational Model: Structure of Relational Databases – Database Schema –Keys – Schema Diagrams. Overview of the SQL Query Language – SQL Data Definition – Basic Structure of SQL Queries – Additional Basic Operations – Set operations – Null values – Aggregate functions – Modification of the Database.								
Unit – III	IN	TERMEDIATE SQL AND ADVA	ANCED SQL	9				
Join Express Programming	ions – Views – Ti g Language – Fun	ransactions – Integrity Constraints – A ctions and Procedures – Triggers – Recu	uthorization –Accessing S ursive Queries.	QL from				
Unit – IV		NORMALIZATION		9				
Functional Dependencies – Non-loss Decomposition – First, Second and Third Normal Forms, Dependency Preservation– Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.								
Unit - V	TRA	ANSACTIONS AND QUERY PRO	DCESSING	9				
Transaction Durability – Query Proce	Transaction Concept – A Simple Transaction Model – Storage Structure – Transaction Atomicity and Durability –Transaction Isolation – Serializability – Concurrency Control – Lock-Based protocols – Query Processing overview							
Lecture: 45 Periods         Tutorial: 0 Periods         Total: 45 Period								

TE	XT BOOKS						
1	Abraham Silberschatz, Henry F. Korth and S. Sudharshan, Database System Concepts, Tata McGraw Hill, New Delhi, Seventh Edition, 2019.						
	RamezElmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education,						
2	New Delhi,						
	Seventh Edition, 2016.						
RE	REFERENCE BOOKS						

1	Abraham Silberschatz, Henry F. Korth and S. Sudharshan, Database System Concepts, Tata McGraw Hill, New Delhi, Sixth Edition, 2015.
2	S.K.Singh, Database Systems Concepts, Design and Applications, Pearson Education, New Delhi, Second Edition, 2011.
3	1. C.J.Date, A.Kannan and S.Swamynathan, An Introduction to Database Systems, Pearson Education, New DelhiEighth Edition, 2006.
4	2. http://freevideolectures.com/course/2668/database-management-system#

E-	E-RESOURCES					
1	https://www.w3schools.com/sql/					
2	https://ieeexplore.ieee.org/					
3	https://www.youtube.com/c/GateSmashers					
4	https://www.geeksforgeeks.org/dbms					
5	https://www.w3schools.com/sql/					

COURSE OUTCOMES (CO)									
1	After Successful completion of the course, the students should be able to <b>RBT</b> Level <b>Unit</b>								
CO1	Outline database architecture and the E-R Model for Database design.	K2	1						
CO2	Apply Structured query language to create and manipulate a relational databa	К3	2						
CO3	Build functions, triggers and recursive queries	К3	3						
CO4	Demonstrate the purpose of normalization.	К2	4						
CO5	Discover about transaction and query processing concepts.	K2	5						
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - C	Creating						

CO WISE DIRECT ASSESSMENT PATTERN										
	Accordinates		Maximum Marks				Total	Marks		
Assessments			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
	CATI	Total (a)	40	40	20			100	200	<u>CIA:</u> 40
	CAT II	Part A			4	8	8	20	<b>30</b>	
CIA		Part B			16	32	32	80	40 to <b>10</b>	
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
		Part A	4	4	4	4	4	20		
FSF	End Semester	Part B	16	16	16	16	16	80	100 to <b>60</b>	<u>ESE:</u> 60
	- Theory	Total (d)	20	20	20	20	20	100		
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

**B.TECH.IT** 

Sem	Programme	Course Code	Course Name		т	Ρ	С
			PYTHON PROGRAMMING AND FRAMEWORKS	3	0	0	3

**PRE-REQUISITES** 

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### **COURSE OBJECTIVES**

1	To understanding basic of programming concepts (variables, loops, conditionals).						
2	To understanding the Python programming language from basics to advanced concepts.						
3	To develop web applications using Python-based frameworks like Flask and Django.						
4	To understand object-oriented programming (OOP) principles and how they are applied in Python.						
5	To work with databases RESTful APIs and web development best practices						

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### **COURSE CONTENT**

Unit – I	- IIntroduction to Python Programming9					
Variables - <b>Data Types:</b> strings, integers, floats, lists, tuples, dictionaries – <b>Operators:</b> arithmetic, comparison, logical, etc <b>Control Structures:</b> if-else, for loop, while loop, break/continue – Functions: defining and calling functions, arguments, return values – Exception handling (try-except blocks).						
Unit – II	Data Structures & Algorithms in Python	9				
Lists – Tuple algorithms – File I/O (read Python Libra	Lists – Tuples – Sets – Dictionaries in-depth – List comprehensions – Sorting and searching algorithms – Time and Space complexity (Big O notation) – <b>File Handling and Libraries:</b> File I/O (reading, writing, appending files) – Working with CSV, JSON, and XML files – Using Python Libraries (e.g., math, os, datetime, re, requests, Pandas for data manipulation).					
Unit – III	Advanced Web Development with Django	9				
Introduction architecture migrations - validation.	Introduction to Django - Setting up a Django project and app - MVC (Model-View-Controller) architecture in Django - Django ORM (Object-Relational Mapping) – Creating models, migrations - Django Templates - Views, URL routing, and templates - Handling forms and validation.					
Unit – IV	Object-Oriented Programming (OOP)	9				
Classes and Objects - Constructors and destructors - Instance vs Class variables and methods - Inheritance, Polymorphism, Encapsulation, and Abstraction - Method Overriding - Static Methods and Class Methods						
Unit - V	RESTful API Development	9				
Introduction to REST and RESTful APIs - Using Flask or Django to build REST APIs - HTTP Methods (GET, POST, PUT, DELETE) - JSON Responses - Authentication & Authorization (JWT, OAuth) - API Testing (Postman, unit tests).						

R2023 – CURRICULUM & SYLL	ABI	B.TECH.IT
Lecture: 45 Periods	Tutorial: 0	Total: 60 Periods

TE	XT BOOKS
1	"Automate the Boring Stuff with Python" by Al Sweigart
2	"Flask Web Development" by Miguel Grinberg
3	"Django for Beginners" by William S. Vincent
4	"Python Crash Course" by Eric Matthes

# **REFERENCE BOOKS**

1	"Learning Python" by Mark Lutz
2	"Fluent Python" by Luciano Ramalho
3	"Effective Python: 90 Specific Ways to Write Better Python" by Brett Slatkin
4	"Python Programming: An Introduction to Computer Science" by John Zelle

# **E-RESOURCES**

- 1 Official Documentation (Python, Flask, Django)
- 2 Tutorials on websites like RealPython, W3Schools, or FreeCodeCamp
- 3 Stack Overflow for troubleshooting

# COURSE OUTCOMES (CO)

After	RBT Level	Unit		
CO1	Understanding basic of programming concepts (variables, loops, conditionals).	K2	1	
CO2	Understanding the Python programming language from basics to advanced concepts.	K2	2	
CO3	Develop web applications using Python-based frameworks like Flask and Django.	К3	3	
CO4	Organize the object-oriented programming (OOP) principles and how they are applied in Python.	К3	4	
CO5	<b>CO5</b> Organize work with databases, RESTful APIs, and web development K3 5 best practices.			
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - C	reating	

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments			Maximum Marks				Total	Marks		
			CO1	CO2	CO3	<b>CO4</b>	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	CAT I	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
	CAT II	Part A			4	8	8	20	<b>30</b>	<u>CIA:</u> 40
CIA		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20	100	
FSF	End Semester	Part B	16	16	16	16	16	80	100 to <b>60</b>	<u>ESE:</u>
LUL	- Theory	Total (d)	20	20	20	20	20	100		60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

**COURSE END SURVEY** 

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
			DATA STRUCTURES	3	0	0	3

PRE-REQUISITES ----

	COURSE OBJECTIVES
1	Develop the abstract data types for linear data structures.
2	Apply the appropriate linear data structures to solve problems.
3	Infer the use of appropriate tree data structures in problem solving.
4	Choose appropriate Graph representations and solve real-world applications.
5	Analyze the various sorting and searching algorithms.

# **COURSE CONTENT**

Unit – I	LINEAR DATA STRUCTURES – LIST 9						
Algorithm analysis-What to analyze-running time calculations-Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation –-singly linked lists- circularly linked lists- doubly-linked lists – applications of lists –Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).							
Unit – II	LINEAR DATA STRUCTURES – STACKS, QUEUES	9					
Stack ADT – symbols - E Queue ADT Priority Queu	Stack ADT – Stack Model - Implementations: Array and Linked list - Applications - Balancing symbols - Evaluating arithmetic expressions - Conversion of Infix to postfix expression- Queue ADT – Queue Model - Implementations: Array and Linked list - Circular Queue – Priority Queue - deQueue – applications of queues.						
Unit – III	NON LINEAR DATA STRUCTURES – TREES	9					
Tree ADT – binary searc Queues – Ap	Tree ADT – tree traversals - Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees- AVL Trees – B-Tree - B+ Tree – Priority Queues – Applications of priority queues.						
Unit – IV	NON LINEAR DATA STRUCTURES - GRAPHS	9					
Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.							
Unit - V	SEARCHING, SORTING AND HASHING TECHNIQUES	9					
Searching- Linear Search - Binary Search. Sorting - Bubble sort - Selection sort - Insertion sort - Shell sort - Radix sort. Hashing- Hash Functions - Separate Chaining - Open Addressing - Rehashing - Extendible Hashing.							

R2023 – CURRICULUM & SYLL	B.TECH.IT	
Lecture: 45 Periods	Tutorial: 0 Periods	Total: 45 Periods

TE	XT BOOKS
1	"Data Structures and Algorithm Analysis in Java" by Mark Allen Weiss - The 4th edition
2	"Data Structures and Algorithms in Python" by Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser - The 3rd edition
3	"Algorithms" by Robert Sedgewick and Kevin Wayne 4th edition 2022.
4	"Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein - The 3rd edition of this book was published in 2009
5	"Data Structures and Algorithms Made Easy" by NarasimhaKarumanchi. This book is popular for its simplified explanations and extensive coverage of data structures and algorithms. It's suitable for beginners and intermediate-level readers.

E-I	RESOURCES
1	https://www.youtube.com/playlist?list=PL5fCG6TOVhr6qwdzBKkioxPkqbzCY9IZ_
2	https://www.youtube.com/watch?v=zg9ih6SVACc
3	https://www.youtube.com/watch?v=5_5oE5lgrhw
4	https://www.youtube.com/watch?v=rZ41y93P2Qo
5	https://www.youtube.com/watch?v=MtVZAXepMPM

COURSE OUTCOMES (CO)							
After Successful completion of the course, the students should be able to <b>RBT</b> Level							
CO1	Develop the abstract data types for linear data structures.	K3	1				
CO2	Apply the appropriate linear data structures to solve problems.	K3	2				
CO3	Infer the use of appropriate tree data structures in problem solving.	К2	3				
CO4	Choose appropriate Graph representations and solve real-world applications.	К3	4				
CO5	Analyze the various sorting and searching algorithms.	K4	5				
RBT Le	vels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evalua	ting; K6 - C	Creating				

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments				Maximum Marks					Marks	
			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	САТ І	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200 to <b>30</b>	
	CAT II	Part A			4	8	8	20		CIA:
CIA		Part B			16	32	32	80		40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	<u>ESE:</u>
LUL	– Theory	Total (d)	20	20	20	20	20	100	60	60
Tota	l Marks (a + b +	c + d)	68	68	68	68	68	340	1	00

INDIRECT ASSESSMENT

COURSE END SURVEY

Sem	Programme	Course Code	Course Name		т	Ρ	С
			COMPUTATIONAL SCIENCE FOR ENGINEERS	3	0	0	3

PRE-REQUISITES

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# **COURSE OBJECTIVES**

1	To introduce fundamental concepts of computational science and numerical methods.
2	To develop problem-solving skills using computational approaches.
3	To apply scientific computing techniques in engineering applications.
4	To implement numerical algorithms using MATLAB/Python.
5	To explore optimization and machine learning techniques to solve complex engineering
	problems and enhance computational efficiency.

# **COURSE CONTENT**

Unit – I	INTRODU	CTION	TO COMPUTATIONAL SC	IENCE		9		
Overview of Computational Science – Definition, Scope, and Applications - Basics of Mathematical Modeling and Scientific Computing - Floating Point Arithmetic – Errors and Stability Analysis - Overview of Programming Tools: Python, MATLAB, and C++								
Unit – II	LINEAR S	YSTEM	S AND INTERPOLATION			9		
Direct Metho Jacobi Metho Interpolation	Direct Methods: Gaussian Elimination, LU Decomposition - Iterative Methods: Gauss-Seidel, Jacobi Methods - Eigenvalues and Eigenvectors: Power Method - Polynomial and Spline Interpolation: Lagrange and Newton's Method.							
Unit – III	NUMERIC	AL DIF	FERENTIATION AND INT	EGRA	TION	9		
Finite Differe Differentiatic Gaussian Qu	ence Approxima on – Error Anal adrature - Engil	tions – ysis - ľ neering	Forward, Backward, and C Numerical Integration: Trap Applications: Signal Proces	Central pezoida ssing a	Differences - N al Rule, Simpso nd Structural Ar	umerical n's Rule, alysis		
Unit – IV	NUMERIC	AL SOL	UTIONS OF ODEs AND P	DEs		9		
Solution of C Stiff Equation - Computation	Drdinary Differe ns and Stability onal Fluid Dynar	ntial Eo - Partia nics (C	quations (ODEs): Euler's M al Differential Equations (PI FD) Applications	lethod, DEs): F	Runge-Kutta M inite Difference	ethods - Methods		
Unit - V	Unit - V OPTIMIZATION AND MACHINE LEARNING IN 9							
Optimization	Optimization Techniques: Gradient Descent, Newton's Method - Linear and Nonlinear							
Programming - Introduction to Machine Learning in Scientific Computing - Regression Analysis and Data Fitting - Case Study: AI Applications in Engineering Optimization								
Lecture:	45 Periods		Tutorial: 0 Periods		Total: 45 P	eriods		

### TEXT BOOKS

- 1 Chapra, S.C., & Canale, R.P., Numerical Methods for Engineers, McGraw Hill, 2019
- <sup>2</sup> Press, W.H., Teukolsky, S.A., Vetterling, W.T., & Flannery, B.P., Numerical Recipes, Cambridge University Press, 2007
- <sup>3</sup> Jain, M.K., Iyengar, S.R.K., & Jain, R.K., Numerical Methods for Scientific and Engineering Computation, New Age International, 2019
- 4 Kincaid, D., & Cheney, W. Numerical Analysis: Mathematics of Scientific Computing, Brooks/Cole, 2009
- 5 Atkinson, K.E. An Introduction to Numerical Analysis, Wiley, 2008

### **REFERENCE BOOKS**

- 1 Heath, M.T., Scientific Computing: An Introductory Survey, McGraw Hill, 2018
- 2 Quarteroni, A., Numerical Models for Differential Problems, Springer, 2010
- 3 Burden, R.L., & Faires, J.D., Numerical Analysis, Cengage, 2019.
- 4 Moler, C. Numerical Computing with MATLAB, SIAM, 2004
- <sup>5</sup> LeVeque, R.J. Finite Difference Methods for Ordinary and Partial Differential Equations, SIAM, 2007.

### **E-RESOURCES**

- 1 https://www.siam.org/
- 2 https://docs.python.org/
- 3 https://www.mathworks.com/help/matlab/

4 https://harvard-cs205.github.io/

5 https://online.stanford.edu/courses

### COURSE OUTCOMES (CO)

After	RBT Level	Unit			
CO1	Apply computational methods to solve engineering problems.	K3	1		
CO2	Implement numerical algorithms using programming tools.	K4	2		
CO3	Analyze error propagation and stability in numerical computations.	К3	3		
CO4	Develop solutions for differential equations and PDEs in scientific computing.	K4	4		
CO5	Utilize optimization and machine learning techniques in engineering applications.	K4	5		
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating					

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments				Maximum Marks					Marks	
			CO1	CO2	CO3	CO4	CO5	Marks	Conv	Conversion
		Part A	8	8	4			20		
	САТ І	Part B	32	32	16			80		
	CATI	Total (a)	40	40	20			100	200 to <b>30</b>	
	CAT II	Part A			4	8	8	20		CIA:
CIA		Part B			16	32	32	80		40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
ESE	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
LUL	- Theory	Total (d)	20	20	20	20	20	100	60	60
Tota	l Marks (a + b +	c + d)	68	68	68	68	68	340	1	00

INDIRECT ASSESSMENT

COURSE END SURVEY

**B.TECH.IT** 

Sem	Programme	Course Code	Course Name		т	Ρ	С
			JAVA PROGRAMMING	3	0	0	3

PRE-REQUISITES

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	COURSE OBJECTIVES						
1	To understand the basic concepts of Java						
2	To Understand Packages and Interfaces						
3	To understand exception handling and Multi Threading in Java						
4	Understand IO Streams						
5	To understand the GUI part of Java						

### **COURSE CONTENT**

# Unit – I INTRODUCTION

Object-Oriented Languages: Introduction to Java - Importance of Java for the Internet -Byte-code and its Features, Object-Oriented Programming in Java. Java Program Structure and Java Class Library - Data Types, Variables and Operators, Operator Precedence -Selection Statements, Iterative Statement. Defining Classes & Methods, Constructors, Creating Objects of a Class, Assigning object Reference Variables, \_this` Keyword- Automatic Garbage Collection. Arrays : Declaration and usage of Arrays, Arrays of Characters- String: String as a class - String Handling Using String Class, Operations on String.

### Unit – II INHERITANCE AND PACKAGES

Inheritance: Inheriting Classes- Type of Inheritance, Polymorphism: Overloading – Over riding, Abstract Classes - Access Modifier: Final. Package : Understanding Packages, Defining a package, Packaging up multiple classes, Importing and Using Packages - Understanding CLASSPATH, Standard Packages, Access Protection in Packages- Scope of Variable: Access specifiers, - Using Inbuilt packages. Interfaces : Declaring Interfaces - Implementing Interfaces - Using inbuilt interfaces

# Unit – III EXCEPTION HANDLING AND MULTITHREADING

Exception Handling : The concept of Exceptions in Java, Types of Exceptions, Exception Objects, Try - Catch and Finally blocks, Multiple Catch blocks - Understanding \_Throws` and \_Throw\_ - Defining Your Own Exceptions. Multithreading Programming: The Java Thread Model, Understanding Threads, The Main Thread - Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter thread communication- Deadlocks.

### Unit – IV IO STREAM

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Input/Output in Java : I/O Basic, Byte Streams - Character Streams- Stream Chaining – Reading and writing to Console , Reading and Writing on Files - Special Streams – InputStreamReader and OutputStreamWriter – PushbackInputStreams

### Unit - V WORKING WITH WINDOWS AND GRAPHICS

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**B.TECH.IT** 

Applet Basics, Applet Architecture, Applet Life Cycle, Paint and Repaint methods, Using The Status Window, The HTML APPLET Tag Passing Parameters to Applets. Working AWT Classes- AWT Controls – getter and setter methods, Event Handling – interfaces – Adapter Classes. Working with Graphics and Texts: Working with Color, and Font.

Lecture: 45 Periods Ti	utorial: 0 Periods	Total: 45 Periods
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TE	XT BOOKS
1	1. Cay S. Horstman and Gary Cornell, —Core Java Volume I—Fundamentals , 9th Ed (Core Series), Prentice Hall, 2013
2	2. Herbert Schildt, —Java 2: The Complete Reference∥, 5th Ed, Tata McGraw Hill, 2002.
3	"Head First Java" – Kathy Sierra & Bert Bates.
4	<b>"Design Patterns: Elements of Reusable Object-Oriented Software"</b> – Erich Gamma et al.

### **REFERENCE BOOKS**

- 1 Cay S. Horstman and Gary Cornell, —Core Java Volume I—Fundamentals||, 9th Ed (Core Series), Prentice Hall, 2013
- 2 2. Ken Arnold, James Gosling, and David Holmes, —The Java Programming Language , 4th edition, Addison-Wesley, 2005.
- 3 **"Java Concurrency in Practice"** Brian Goetz.
- 4 **"Head First Java"** Kathy Sierra & Bert Bates
- 5 **"Data Structures and Algorithms in Java"** Robert Lafore

### **E-RESOURCES**

1	Oracle Java Documentation – The official Java documentation from Oracle.
2	Baeldung – Best for Spring, Hibernate, REST APIs, and modern Java features.
3	Java Design Patterns – Learn software design patterns in Java.
4	Codecademy Java Course – Hands-on Java learning.
5	W3Schools Java Tutorial – Beginner-friendly tutorials with examples.

# COURSE OUTCOMES (CO)

**B.TECH.IT** 

After	RBT Level	Unit			
CO1	Interpret the importance of layering, addressing and annotate the protocol stack of OSI and TCP/IP model.	K2	1		
CO2	Apply the MAC protocols (Ethernet, Token Ring and Wi-Fi) supported by Data Link layer to ensure hop-to-hop reliable communication.	К3	2		
CO3	Use IP addressing and routing protocols to find shortest route to achieve reliable network-layer data transmission.	К3	3		
CO4	Classify the transport layer protocols and explain the congestion control or congestion avoidance techniques to ensure quality of service.	К2	4		
CO5	Analyze the functions and services provided by the application layer protocols (HTTP, SMTP and DNS).	K4	5		
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating					

CO WISE DIRECT ASSESSMENT PATTERN										
Assossments			Maximum Marks				Total	Marks		
Assessments		CO1	CO2	CO3	<b>CO4</b>	CO5	Marks	Conversion		
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
	CATI	Total (a)	40	40	20			100	200	
	CAT II	Part A			4	8	8	20	<b>30</b>	CIA:
CIA		Part B			16	32	32	80	40 to <b>10</b>	40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
		Part A	4	4	4	4	4	20		
FSF	End Semester Examinations – Theory	Part B	16	16	16	16	16	80	100 to <b>60</b>	<u>ESE:</u> 60
LUL		Total (d)	20	20	20	20	20	100		
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

Sem	Programme	Course Code	Course Name	L	т	Ρ	с
			WEB ENGINEERING	3	0	0	3

**B.TECH.IT** 

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## **PRE-REQUISITES**

### **COURSE OBJECTIVES**

- To design fundamental knowledge of networks 1 2 To design user interface for websites using HTML and CSS 3 To develop client side scripting for data validation and manipulation 4 To develop database concept and MySQL webserver
- 5 To develop web application using PHP

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# **COURSE CONTENT**

Unit – I	Basics of Computer Networks	9					
Data Communications – Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model - Network Layer: IPv4Addresses - Address Space – Classful Addressing – Classless Addressing- DHCP - Network Address Translation (NAT) – IPv6 Addressing – Ipv6 Protocol.							
Unit – II	HTML and CSS	9					
HTML 5 – B	asic Tags – Input Tags – Page Structure Elements – Cascading Styl	e Sheet:					

H٦ nts – Cascading Style Sheet: inking External Style Sheets -In Positioning Elements - Background - Element Dimensions - Box Model and Text Flow -Media types and Media queries – Drop – Down Menus.

### Unit –III

# **Client Side Scripting – Java Script**

Introduction - Control Statements - Functions: Function Definition - Random Number Generation: Scaling and Shifting Random Number - Displaying Random Images - Scope Rules - Global Functions - Recursion - Recursion vs Iterations. - Arrays: Declaring and Allocating Arrays – Random Image Generator using Array – Sorting and Searching Array – Java Script Objects: Introduction - Math Object - String Object - Date Object - Boolean and Number Objects - Document Objects - Document Object Model: DOM Nodes and Trees -Traversing and Modifying a DOM Tree – DOM Collections – Dynamic Style – Events – Event Handling: Load Event – Mousemove – Mouseover and Mouseout - Form Processing Events

### Unit – IV

### Database Concepts, MySQL and WebServer

Relational Database Concepts - Basic SQL - SELECT - INSERT - UPDATA - DELETE - MySQL - Setting Up a MySQL User Account - Creating Databases in MySQL - Web Servers -Introduction – HTTP Transactions – Multitier Application Architecture – Client-Side Scripting versus Server-Side Scripting Accessing Web Servers - XAMPP Installation - Running the Examples Using Apache HTTP Server.

### Unit - V Server Side Scripting PHP 9 Introduction - Data Type Conversion - Operators - Arrays - Strings Comparisons - String Processing: Searching for Expressions - Representing Patterns - Finding Matches -Character Classes - Finding Multiple Instance of a Pattern - Regular Expressions - Form Processing – Database Connectivity – Session Tracking.

	ABI	B.IECH.II
Lecture: 45 Periods	Tutorial: 0 Periods	Total: 45 Periods

TE	EXT BOOKS
1	Forouzan, Behrouz. A , "Data Communication and Networking", 5 <sup>th</sup> Edition, Tata McGraw – Hill, 2013. (Unit 1)
2	Paul Deitel, Harvey M.Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", 5 <sup>th</sup> Edition, Prentice Hall, 2011. (Unit 2-5)
3	Xavier C, "World Wide Web Design with HTML", 2 <sup>nd</sup> Edition, Tata McGraw Hill, New Delhi, 2012.
4	Robin NIXON, "Learning PHP, MYSQL, JavaScript, CSS & HTML 5" 3 <sup>rd</sup> Edition, OREILLY, 2014.
5	Paul Deitel, Harvey Deitel, Abbey Deitel, Internet & World Wide Web-pearson education, 2012.

RE	REFERENCE BOOKS						
1	JeffreyC.jackson,"web Technologies-A computer science Perspective",pearson Education						
2	James F.Kurose, "Computer Networking: A Top-Down Approach", 6 <sup>th</sup> Edition, Pearson, 2012.						
3	Steven Holzener, PHP-The Complete Reference, 1 <sup>st</sup> Edition, MC-Graw hill, 2017						
4	Bates,"Developing Web Applications",Wiley,2006.						
5	Fritz Schneider, Thomas Powell, Javascript, The complete reference, 3 <sup>rd</sup> edition, MC-Graw Hill, 2017.						

E-F	RESOURCES
1	Cisco Networking Academy - <u>https://www.netacad.com</u>
2	Coursera – Computer Networking - https://www.coursera.org
3	Practice SQL queries without installing MySQL: <u>http://sqlfiddle.com/</u>
4	https://www.geeksforgeeks.org/sql-tutorial/
5	https://www.w3schools.com/

	COURSE OUTCOMES (CO)										
After	RBT Level	Unit									
CO1	Apply the fundamental concepts of computer networking and design a LAN	К3	1								
CO2	Design static web pages using HTML and CSS	К3	2								
CO3	Develop interactive web pages using JavaScript	К3	3								
CO4	Apply SQL Queries to create and manipulate relational databases	К3	4								
	Develop web er							ام مر م			
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CO5	Develop web ap	Develop web application		PHP WI	th data	base co	nnectiv	ity and	K3	5	
								• • • • •			
	KBI Leveis: K1 –	Analyzir	nbering 1g; K5	g; K2 - – Eval	uating	; K6 - (	Creatin	s – Apply Ig	'ing; K4	-	
	(	O WISE	DIRE	CT ASS	SESSM	ENT PA	TTERN	1			
	_			Maxi	mum M	larks		Total	Mar	ks	
	Assessments		CO1	CO2	CO3	<b>CO4</b>	CO5	Marks	Conversion		
		Part A	8	8	4			20			
	CAT I	Part B	32	32	16			80			
		Total (a)	40	40	20			100	200		
СТА	CAT II	Part A			4	8	8	20	to <b>30</b>	<u>CIA:</u>	
CIA		Part B			16	32	32	80		40	
		Total (b)			20	40	40	100			
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>		
		Part A	4	4	4	4	4	20			
FSF	End Semester	Part B	16	16	16	16	16	80	100	ESE:	
	- Theory	Total (d)	20	20	20	20	20	100	to <b>60</b>	60	
Total Marks (a + b + c + d)			68	68	68	68	68	340	10	0	

**B.TECH.IT** 

INDIRECT ASSESSMENT

R2023 – CURRICULUM & SYLLABI

COURSE END SURVEY

Sem	Programme	Course Code	Course Name	L	т	Ρ	С
			FUNDAMENTALS OF BLOCKCHAIN	3	0	0	3

**PRE-REQUISITES** ---

## **COURSE OBJECTIVES**

1	To acquire knowledge various data storage mechanisms and blockchain.				
2	To understand fundamental security technologies for supporting e-payment and cryptocurrency.				
3	To learn about bitcoin and its transaction process.				
4	To get familiar with Ethereum and DLT.				
5	To program and work with Corda				

**5** To program and work with Corda.

# **COURSE CONTENT**

#### Unit – I

# What is Blockchain – Centralized Vs. Decentralized Systems – Layers of Blockchain – Why is Blockchain Important - Blockchain uses and Use Cases.

**Getting started with Block chain** 

#### Unit – II Working of Block chain Blockchain foundation - Cryptography - Game Theory - Merkle Trees - Properties of Blockchain solutions - Blockchain Transactions - Distributed Consensus Mechanisms -

Blockchain Applications – Scaling Blockchain.

#### Unit –III

Unit – IV

#### **Working of Bitcoin**

History of Money – Dawn of Bitcoin – The Bitcoin Blockchain – The Bitcoin Network – Bitcoin Scripts - Full Nodes vs SPVs - Bitcoin Wallets.

#### **Working of Etherium**

From Bitcoin to Ethereum - Ethereum Blockchain - Merkle Patricia Tree - RLP Encoding -Ethereum Transaction and Message Structure - State Transaction Function - Gas and Transaction Cost - Smart Contracts - Ethereum Virtual Machine - Ethereum Ecosystem : Swarm – Whisper – DApp – Development Components. Hands-On Case study: DApp – Setting up a Private Ethereum Network: Install go-etherum – Create geth Data.

#### Unit - V **Enterprise Blockchain and its challenges**

Blockchain Vs Distributed Databases, How does an enterprise view blockchain?, Types of blockchain technology, what is blockchain in business?, Blockchain for business - how does the blockchain work?, Business benefits of blockchain, Example use cases, Challenges in enterprise adoption, Hyperledger, Corda.

Lecture: 45 Periods		Tutorial: 0 Periods		Total: 45 Periods
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TE	ХТ ВООКЅ
1	Bikramaditya Singhal, Gautam Dhameja and Priyansu Sekhar Panda, "Beginning Blockchain – A Beginner's Guide to Building Blockchain Solutions", Apress Publication, 2018.
2	Manav Gupta, "Blockchain for the Enterprise: the definitive guide to adoption of blockchain in the enterprise", ISBN-10:1999387104, 2018.
3	Mastering Blockchain: Inner workings of blockchain, from cryptography and decentralized identities, to DeFi, NFTs and Web3, 4th Edition
4	<i>Blockchain and Web3: Building the Cryptocurrency, Privacy, and Security Foundations of the Metaverse, Apress Publication, 2020.</i>
5	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, "Bitcoin and Cryptocurrency Technologies", Princeton University Press, 2016.

	-10	

1	Andreas M. Antonopoulos ," Mastering Bitcoin – Programming the Open Blockchain", O'Reilly Publication, 2017
2	Michael J. Casey and Paul Vigna , "The Truth Machine – The Blockchain and the Future of Everything", St. Martin's Press, 2018
3	William Mougayar, "The Business Blockchain: Promise, Practice, and Application of the Next Internet Technology", Wiley Edition, 2016.
4	Imran Bashir, Mastering Blockchain: Distributed Ledger Technology, Decentralization, and Smart Contracts Explained, 2nd Edition, Pockt Publishing.
5	Neil Hoffman, Gary McAllen, "Blockchain: Everything You Need to Know About Blockchain Technology and How It Works" – Amazon Kindle Edition.

# E-RESOURCES

1	https://onlinecourses.nptel.ac.in/noc18_cs47/preview
2	https://nptel.ac.in/courses/106106168/27.
3	https://nptel.ac.in/courses/106105184/
4	https://www.youtube.com/watch?v=yubzJw0uiE4
5	https://www.youtube.com/watch?v=SSo_EIwHSd4

COURSE OUTCOMES (CO)					
After Successful completion of the course, the students should be able to <b>RBT Level</b>					
CO1	The students will be able to describe blockchain technology and its key concepts	К2	1		
CO2	The students will be able to design and implement cryptocurrency and e-payment systems/applications.	К3	2		
CO3	The students will be able explain bitcoin transaction process.	K3	3		
CO4	The students will be able to deploy a private Ethereum block chain.	K2	4		
CO5	The students will be able to develop applications using Corda	K4	5		
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating					

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	(	CO WISI	E DIRE	CT AS	SESSM	ENT P/	ATTERI	N		
Assessments				Maxi	mum M	larks		Total	Marks	
			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
		Part A	8	8	4			20		
	CAT I	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	
	CAT II	Part A			4	8	8	20	<b>30</b>	CIA:
CIA		Part B			16	32	32	80		40
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		
FSF	End Semester	Part B	16	16	16	16	16	80	100 to	ESE:
LUE	- Theory	Total (d)	20	20	20	20	20	100	60	60
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

# **B.TECH.IT**

Sem	Programme	Course Code	Course Name	L	т	Р	С
			INTRODUCTION TO ARTIFICIAL INTELLIGENCE	3	0	0	3

PRE-REQUISITES

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# **COURSE OBJECTIVES**

1	Understand the basic concepts of Artificial Intelligence and its intelligent agents
2	Apply the problem solving methods
3	Demonstrate the Logical agents in AI
4	Outline the knowledge representation and planning concepts in AI
5	Infer the learning and expert systems in AI

# **COURSE CONTENT**

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#### ARTIFICIAL INTELLIGENCE AND INTELLIGENT AGENTS

Introduction to AI – Foundations of Artificial Intelligence - Intelligent Agents – Agents and Environments - Concept of rationality – Nature of environments – Structure of agents -Problem solving agents – Example Problems - Search Algorithms – Uninformed Search Strategies

UNIT – II PROBLEM SOLVING METHODOLOGIES	Unit – II	PROBLEM SOLVING METHODOLOGIES
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Heuristic search strategies – heuristic functions- Game Playing – Mini-max Algorithm - Optimal decisions in games – Alpha-beta search –Monte-Carlo search for Games - Constraint satisfaction problems – Constraint propagation – Backtracking search for CSP – Local search for CSP – Structure of CSP

# Unit – III LOGICAL AGENTS IN AI

Knowledge-based agents – Logic - Propositional logic – Propositional theorem proving – Propositional model checking – Agents based on propositional logic. First-Order Logic – Syntax and semantics – Using First-Order Logic - Knowledge representation and engineering

# Unit – IV KNOWLEDGE REPRESENTATION AND PLANNING IN AI

Ontological engineering – Categories and objects – Events – Mental objects and modal logic – Reasoning systems for categories – Reasoning with default information Classical planning – Algorithms for classical planning – Heuristics for planning – Hierarchical planning – nondeterministic domains – Time, schedule, and resources - Analysis

# Unit - V LEARNING AND EXPERT SYSTEMS IN AI

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Forms of Learning – Developing Machine Learning systems – Statistical Learning - Deep Learning: Simple feed-forward network - Neural Networks – Reinforcement Learning: Learning from rewards – Passive and active Reinforcement learning

Lecture: 45 Periods	Tutorial: 0 Periods	Total: 45 Periods
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TE	EXT BOOKS
1	"Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig - fourth edition, was released in 2020.
2	"Artificial Intelligence: Structures and Strategies for Complex Problem Solving" by George F. Luger - 6th Edition 2018.
3	"Artificial Intelligence: Foundations of Computational Agents" by David L. Poole and Alan K. Mackworth - 2nd Edition 2017.
4	"Artificial Intelligence: A Guide to Intelligent Systems" by Michael Negnevitsky- 3rd Edition
5	"Artificial Intelligence: A Philosophical Introduction" by Jack Copeland - 2nd Edition 2018

REF	ERENCE BOOKS
1	Artificial Intelligence: A Modern Approach Stuart Jonathan Russell, Peter Norvig, Ernest Davis Prentice Hall, 2010
2	Architects of Intelligence: The Truth about AI from the people building it by Martin Ford
3	Deep Learning Illustrated: A Visual, Interactive Guide to Artificial Intelligence Authors: John Krohn, Grant Beyleveld, and Aglae Bassens
4	Super intelligence Author: Nick Bostrom.
5	"Artificial Intelligence For Dummies (2nd Edition)" Authors: Luca Massaron, John Mueller

E-	E-RESOURCES					
1	https://www.youtube.com/watch?v=ONzEBrsZ2jA					
2	https://www.youtube.com/watch?v=2R2Fxq_eEIA					
3	https://www.youtube.com/watch?v=9IgscYw7BnY					
4	https://www.youtube.com/watch?v=EG8eDEGIDGQ					
5	https://www.youtube.com/watch?v=K5IgvclblDg					

	COURSE OUTCOMES (CO)						
After	After Successful completion of the course, the students should be able to <b>RBT Level Unit</b>						
CO1	Understand the basic concepts of Artificial Intelligence and its intelligent agents	К2	CO1				
CO2	Apply the problem solving methods	K3	CO2				
CO3	Demonstrate the Logical agents in AI	K3	CO3				
<b>CO</b> 4	Outline the knowledge representation and planning concepts in AI	K4	CO4				
CO5	Infer the learning and expert systems in AI	K4	CO5				
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 –							

Analyzing; K5 – Evaluating; K6 - Creating

CO WISE DIRECT ASSESSMENT PATTERN										
	Accessments	Maximum Marks				Total	Marks			
Assessments			CO1 CO2 CO3 CO4 CO5			Marks	Conversion			
		Part A	8	8	4			20		
	CATI	Part B	32	32	16			80		
		Total (a)	40	40	20			100	200	<u>CIA:</u> 40
	CAT II	Part A			4	8	8	20	- to _ <b>30</b> -	
CIA		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40	40 to <b>10</b>	
		Part A	4	4	4	4	4	20		<u>ESE:</u> 60
FSF	End Semester	Part B	16	16	16	16	16	80	100 to	
	- Theory	Total (d)	20	20	20	20	20	100	<b>60</b>	
Total Marks (a + b + c + d)				68	68	68	68	340	1	00

INDIRECT ASSESSMENT

**COURSE END SURVEY** 

Sem	Programme	Course Code	Course Name		т	Ρ	с
			FUNDAMENTALS OF INTERNET OF THINGS	3	0	0	3

**PRE-REQUISITES** COMPUTER NETWORKS

#### **COURSE OBJECTIVES**

1	To provide a foundational understanding of IoT, its core concepts, and its real-world applications.
2	Learn the different layers of IoT architecture and their functions.
3	Gain the knowledge of Networking security levels.
4	They are also able to design & develop IoT Devices.
1	Understand the FC Networks

**5** Understand the 5G Networks.

# **COURSE CONTENT**

#### Unit – I **INTRODUCTION OF IOT** 9 + 3 Introduction to Internet of Things - Definition and Characteristics of IoT, Physical Design of IoT - IoT communication models, Iot Communication APIs, IoT enabled Technologies -, Cloud Computing, Big data analytics, IoT Levels and Templates, Domain Specific IoTs -Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle. Unit – II **IOT ARCHITECTURE AND TECHNOLOGIES** 9 + 3 IoT Architecture and its Layers - Sensors and Actuators - IoT Protocols - Communication Protocols Embedded Systems and Micro controllers Unit –III **IOT DATA AND NETWORKING** 9 + 3 Data Acquisition and Processing -Cloud Computing for IoT - Network Security: IP Addressing and Networking basics - Wireless Sensor Networks. Unit – IV **IOT PROGRAMMING AND DEVELOPMENT** 9 + 3 Programming Languages for IoT - IoT Development Platforms -Interfacing Sensors and Actuators - Basic Web Interfaces for IoT - Programming - Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins. Unit - V **5G NETWORKS** 9 + 3 Overview of 5G Broadband Wireless Communications - Evolution of mobile technologies 1G to 4G (LTE, LTEA, LTEA Pro), An Overview of 5G requirements, Regulations for 5G, Spectrum Analysis and Sharing for 5G.

Lecture: 45 Periods

**Tutorial: 15 Periods** 

**Total: 60 Periods** 

1	Jonathan Rodriguez, "Fundamentals of 5G Mobile Networks", John Wiley & Sons.
2	Amitabha Ghosh and Rapeepat Ratasuk "Essentials of LTE and LTE-A", Cambridge University Press.
3	Athanasios G. Kanatos, Konstantina S. Nikita, Panagiotis Mathiopoulos, "New Directions in Wireless Communication Systems from Mobile to 5G", CRC Press.
4	Theodore S. Rappaport, Robert W. Heath, Robert C. Danials, James N. Murdock "Millimeter Wave Wireless Communications", Prentice Hall Communications.
5	Veerarajan T., "Engineering Mathematics - I & II ", Tata McGraw-Hill, New Delhi, 2014 & 2015.

## **REFERENCE BOOKS**

1	Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2	Bali N.P and Manish Goyal., "A Text Book of Engineering Mathematics", Laxmi Publications(P) Ltd, 2011.
3	Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, New Delhi, 9th Edition, 2011.
4	Ramana B.V., "Higher Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2010.
5	Bahaa E. A. Saleh and Malvin Carl Teich, "Fundamentals of photonics", 2012, 1st edition, John Wiley, New York.

# E-RESOURCES 1 https://www.youtube.com/watch?v=LlhmzVL5bm8 2 https://www.youtube.com/watch?v=iQeaK0NGMnA 3 https://www.youtube.com/watch?v=My7mBrk7hks 4 https://www.youtube.com/watch?v=OTjWSUw8h0o&list=PLgwJf8NK-2e6AVNI0dpIFsrNjsGGf-qLu 5 https://onlinecourses.nptel.ac.in/noc22\_cs53/preview

COURSE OUTCOMES (CO)								
After	RBT Level	Unit						
CO1	Able to understand building blocks of Internet of Things and characteristics.	K2	1					
CO2	To understand the Basic Architecture of IoT	К3	2					
CO3	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.	К3	3					
CO4	Able to understand the application areas of IoT.	K2	4					
CO5	To Complete idea of 5G networks.	К3	5					
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating								

CO WISE DIRECT ASSESSMENT PATTERN										
Assessments			Maximum Marks					Total	Marks	
			CO1	CO2	CO3	CO4	CO5	Marks	Conversion	
CIA	CAT I	Part A	8	8	4			20	200 to <b>30</b> 40 to <b>10</b>	
		Part B	32	32	16			80		
		Total (a)	40	40	20			100		
	CAT II	Part A			4	8	8	20		<u>CIA:</u> 40
		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
	End Semester Examinations – Theory	Part A	4	4	4	4	4	20	100 to <b>60</b>	<u>ESE:</u> 60
ESE		Part B	16	16	16	16	16	80		
		Total (d)	20	20	20	20	20	100		
Total Marks (a + b + c + d)		68	68	68	68	68	340	10	00	

INDIRECT ASSESSMENT

COURSE END SURVEY

# **B.TECH.IT**

Code		Code
CLOUD TECHNOLOGY         3         0         0	CLOUD TECHNOLOGY         3         0         0         3	

**PRE-REQUISITES** 

#### **COURSE OBJECTIVES**

To learn the basic concepts of the cloud. 1

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- 2 To be familiar with the architecture and virtualization of cloud.
- To describe the key elements of Cloud Platform and Thread Programming. 3
- 4 To explore the concepts of Map Reduce Programming.
- 5 To design intelligent Cloud services and Applications.

## **COURSE CONTENT**

#### **INTRODUCTION**

9 + 3

Introduction to Cloud Computing - Definition of Cloud - Evolution of Cloud Computing -Underlying Principles of Parallel and Distributed Computing - Cloud Characteristics -Elasticity in Cloud – On demand Provisioning.

#### Unit – II

Unit – I

#### **CLOUD ENABLING TECHNOLOGIES**

9 + 3

Service Oriented Architecture - REST and Systems of Systems - Web Services -PublishSubscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU – Memory – I/O Devices –Virtualization Support and Disaster Recovery

#### Unit – III **CLOUD APPLICATIONS AND CLOUD STORAGE**

9 + 3

Moving Applications to the Cloud: Applications in the Cloud-Functionality Mapping-Application Attributes-Cloud Service Attributes-System Abstraction-Cloud Bursting-Cloud APIs-Working with Cloud-Based Storage: Cloud Storage Definition-Provisioning Cloud Storage-Cloud Backup Types-Cloud Backup Features-Cloud Data Management Interface (CDMI)-Open Cloud Computing Interface (OCCI)

#### Unit – IV **CLOUD SECURITY FUNDAMENTALS**

9 + 3

Cloud Information Security Objectives-Cloud Security Services-Cloud Security Design Principles-Secure Cloud Software Requirements: Secure Development Practices-Approaches to Cloud Secure Software Requirements Engineering-Cloud Computing and Business Continuity Planning/Disaster Recovery

#### Unit - V **CLOUD RISK MANAGEMENT**

Cloud Computing Risk Issues: The CIA Triad-Threats to Infrastructure, Data and Access Control-Cloud Service Provider Risks-Cloud Computing Security Challenges: Security Policy Implementation- Virtualization Security Management.

Lecture: 45 Periods		Tutorial: 15 Periods		Total: 60 Periods
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9 + 3

TE	EXT BOOKS
1	Rajkumar Buyya, Christian Vecchiola and Thamari Selvi S, "Mastering in Cloud Computing", McGraw Hill Education (India) Private Limited, 2019.
2	Thomas Erl, ZaighamMahood, Ricardo Puttini, "Cloud Computing, Concept, Technology and Architecture", Prentice Hall, 2020.
3	The Cloud Computing Book: The Future of Computing Explained by <u>Douglas Comer</u> Hardcover – Import, 1 July 2021.
4	The Basics of Cloud Computing: Understanding the Fundamentals of Cloud Computing in Theory and Practice by Derrick Rountree and Ileana Castrillo was published in 2013 by Syngress.
5	Cloud Computing For Dummies by Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Fern Halper was published in 2009.

# REFERENCE BOOKS

- 1 Anthony T Velte, "Cloud Computing: A Practical Approach", Tata McGraw Hill, 2009
- <sup>2</sup> Halper Fern, Kaufman Marcia, Bloor Robin, Hurwit Judith, "Cloud Computing for Dummies", Wiley India, 2009.
- RajkumarBuyya, James Broberg, Andrzej M. Goscinski, "Cloud Computing Principles Books and Paradigms", Wiley, 2014.
- 4 Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing ,2009
- 5 Dr. Kumar Saurabh, "Cloud Computing Unleashing Next Gen Infrastructure to Application", Willey, 2014.

## **E-RESOURCES**

- 1 https://www.geeksforgeeks.org/cloud-computing/
- 2 https://www.youtube.com/watch?v=M988\_fsOSWo
- 3 https://www.youtube.com/watch?v=RWgW-CgdIk0
- 4 https://www.youtube.com/watch?v=64-1ymY2xaw
- 5 https://aws.amazon.com/what-is-cloud-computing/

#### COURSE OUTCOMES (CO) RBT After Successful completion of the course, the students should be able to Unit Level The students will be able to recall and describe cloud Platform and K2 **CO1** 1 Technology The students will be able to describe and Implement Virtualization K3 **CO2** 2 Technologies. The students will be able to develop and manage cloud applications K3 3

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CO5	The students will be able to design Web Based Applications for	K4	5					
	various Corporate.		1					
RBT Levels: K1 – Remembering; K2 – Understanding; K3 – Applying; K4 – Analyzing; K5 – Evaluating; K6 - Creating								

CO WISE DIRECT ASSESSMENT PATTERN										
Assossments			Maximum Marks					Total	Marks	
		CO1	CO2	CO3	<b>CO4</b>	CO5	Marks	Conv	Conversion	
CIA		Part A	8	8	4			20		<u>CIA:</u> 40
	CAT I	Part B	32	32	16			80	200 to <b>30</b> 40 to <b>10</b>	
		Total (a)	40	40	20			100		
	CAT II	Part A			4	8	8	20		
		Part B			16	32	32	80		
		Total (b)			20	40	40	100		
	Other Assessment	Total (c)	8	8	8	8	8	40		
	End Semester Examinations – Theory	Part A	4	4	4	4	4	20	100 to <b>60</b>	<u>ESE:</u> 60
ESE		Part B	16	16	16	16	16	80		
		Total (d)	20	20	20	20	20	100		
Total Marks (a + b + c + d)		68	68	68	68	68	340	1	00	

INDIRECT ASSESSMENT

COURSE END SURVEY