VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

(Approved by AICTE, Autonomous, Accredited by NAAC at "A+" Grade & ISO 21001:2018 Certified, Affiliated to JNTUK) Vijavawada – 520 007

SCHEME OF INSTRUCTION AND SYLLABUS B.Tech in INFORMATION TECHNOLOGY VR23 REGULATIONS

w.e.f 2023-2024



Department of Information Technology (B. Tech. IT Programme Accredited by NBA)

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(An Autonomous, ISO 9001:2015Certified Institution) (Approved by AICTE, Accredited by NAAC with 'A' Grade, Affiliated to JNTUK, Kakinada) (Sponsored by Siddhartha Academy of General & Technical Education) Kanuru, Vijayawada Andhra Pradesh - 520007, INDIA. www.vrsiddhartha.ac.in

VR23



SCHEME OF INSTRUCTIONS AND SYLLABUS of FIRST AND SECOND YEAR B.TECH in INFORMATION TECHNOLOGY w.e.f 2023-2024 (VR23)



Department of Information Technology (B. Tech. IT Programme Accredited by NBA)

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(An Autonomous, ISO 9001:2015Certified Institution) (Approved by AICTE, Accredited by NAAC with 'A' Grade, Affiliated to JNTUK, Kakinada) (Sponsored by Siddhartha Academy of General & Technical Education) Kanuru, Vijayawada Andhra Pradesh - 520007, INDIA. www.vrsiddhartha.ac.in

INSTITUTE VISION

To nurture excellence in various fields of engineering by imparting timeless core values to the learners and to mould the institution into a centre of academic excellence and advanced research.

INSTITUTE MISSION

To impart high quality technical education in order to mould the learners into globally competitive technocrats who are professionally deft, intellectually adept and socially responsible. The institution strives to make the learners inculcate and imbibe pragmatic perception and proactive nature so as to enable them to acquire a vision for exploration and an insight for advanced enquiry.

DEPARTMENT VISION

To provide excellent information technology and computer science education by building strong teaching and research environment.

DEPARTMENT MISSION

To offer high quality graduate and post graduate programs in information technology and computer science education and to prepare students for professional career or higher studies. The department promotes excellence in teaching, research, collaborative activities and positive contributions to society.

PROGRAM EDUCATIONAL OBJECTIVES (B.TECH IN IT)

PEO 1: Excel in Professional Career and / or higher education by acquiring knowledge in mathematical, computing and engineering principles.

PEO 2: Analyse real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable.

PEO 3: Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adopt to current trends by engaging in life learning.

PROGRAM OUTCOMES

PO1 - Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 - Design/development of solutions: 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.

PO4 - Conduct investigations of complex problems: 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.

PO5 - Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6 - 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.

PO7 - Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - Communication: 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.

PO11 - Project management and finance: 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.

PO12 - Lifelong 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

PSO1	Apply the concepts of Data Science, Software Modeling and Networking for IT applications
PSO2	Discover mechanisms that would perform tasks related to Research, Education, Training and/or E-governance

SCHEME OF INSTRUCTIONS

DEPARMENT OF INFORMATION TECHNOLOGY

SCHEME OF INSTRUCTIONS FOR FOUR YEAR UG PROGRAM(VR23)

S.No.	Category	Title	L/D	Т	Р	Credits
1	BS&H	Basic Sciences and Humanities Course	2	0	0	2
2	BS&H	Basic Sciences and Humanities Course	3	0	0	3
3	BS&H	Basic Sciences and Humanities Course	3	0	0	3
4	ES	EngineeringScience Course	3	0	0	3
5	ES	Introduction to Programming	3	0	0	3
6	BS&H	Basic Sciences and Humanities Course Lab	0	0	2	1
7	BS&H	Basic Sciences and Humanities Course Lab	0	0	2	1
8	ES	Engineering Lab	0	0	3	1.5
9	ES	Engineering Science Lab	0	0	3	1.5
10	BS&H	Health and wellness, Yoga and Sports	-	-	1	0.5
Total				00	11	19.5

SEMESTER I

SEMESTER II

S.No.	Category	Title	L/D	Т	Р	Credits
1	BS&H	Basic Sciences and Humanities Course	3	0	0	3
2	BS&H	Basic Sciences and Humanities Course	3	0	0	3
3	ES	Engineering Science Course	3	0	0	3
4	PC	Professional Core Course	3	0	0	3
5	ES	Engineering Science Course	1	0	4	3
6	ES	Engineering Science Lab	0	0	2	1
7	BS&H	Engineering Physics Lab	0	0	2	1
8	ES	Engineering Science Lab	0	0	3	1.5
9	PC	Professional Core Lab	0	0	3	1.5
10	BS&H	NSS/NCC/Scouts & Guides/ Community Service	-	-	1	0.5
11	BS&H	Introduction to Design Thinking	2	0	0	-
		Total	13	00	15	20.5

S.No	Course	Course Category	Title	L	Т	Р	Credits
•	Code						
1	23HS3101	Humanities &	Engineering Economics &	2	0	0	2
		Science	Management				
2	23HS3102	Basic Science & Humanities	Universal Human Values 2	2	1	0	3
			Understanding				
0	225022020		Harmony	•	1	0	2
3	23ES3303C	Engineering Science	Digital Logic and Computer Organization	2	1	0	3
4	23IT3304	Professional Core	Advanced Data Structures & Algorithms	2	1	0	3
5	23IT3305	Professional Core	Object Oriented Programming Through Java	3	0	0	3
6	23TP3106	Skill Enhancement Course	Logic & Reasoning	0	0	2	1
7	23IT3651	Skill Enhancement Course	Python Programming Lab	0	0	2	1
8	23IT3552	Professional Core	Advanced Data Structures Lab	0	0	3	1.5
9	23IT3553	Professional Core	Object Oriented Programming Through Java Lab	0	0	3	1.5
Total	Fotal					10	19

SEMESTER III

SEMESTER IV

S.No	Course Code	Category	Title	L	Т	Р	Credi ts
1	23BS4101B	Engineering Science	Discrete Mathematical Structures	3	0	0	3
2	23ES4102B	Engineering Science	Probability & Statistics	3	0	0	3
3	23IT4303	Professional Core	Operating Systems	2	1	0	3
4	23IT4304	Professional Core	Database Management Systems	2	1	0	3
5	23IT4305	Professional Core	Software Engineering	3	0	0	3
6	23TP4106	Soft Skills	English for Professionals	0	0	2	1
7	23MC3107	Audit Course	Environmental Science	2	0	0	
8	23IT4651	Skill Enhancement course	Python with DJango	0	0	2	1
9	23ES4152	Engineering Science	Design Thinking & Innovation	1	0	2	2
10	23IT4353	Professional Core	Operating Systems & Software Engineering Lab	0	0	3	1.5
11	23IT4354	Professional Core	Database Management Systems Lab	0	0	3	1.5
Tota	l			16	2	12	22

SEMESTER V

S.No.	Category	Title	L	Т	Р	Credits
1	Professional Core	Advanced Java	3	0	0	3
2	Professional Core	Computer Networks	3	0	0	3
3	Professional Core	Automata Theory & Compiler Design	3	0	0	3
4	Professional Elective-I	 Object Oriented Analysis and Design Cyber Security Artificial Intelligence Microprocessors & Microcontrollers Data Warehousing & Data Mining 	3	0	0	3
5	Open Elective- I		3	0	0	3
6	Professional Core	Advanced Java Lab	0	0	3	1.5
7	Professional Core	Computer Networks Lab	0	0	3	1.5
8	Skill Enhancement course	Full Stack Development-1	0	1	2	2
9	Engineering Science	Tinkering Lab	0	0	2	1
10	Evaluation of Community Service Internship		-	-	-	2
		Total	15	1	10	23

S.No.	Category	Title	L	Т	Р	Credits		
1	Professional Core	Cloud Computing	3	0	0	3		
2	Professional Core	Cryptography & Network Security	3	0	0	3		
3	Professional Core	Machine Learning	3	0	0	3		
4	Professional Elective-II	 Software Testing Methodologies Augmented Reality & Virtual Reality DevOps Embedded Systems 12 week MOOC Swayam/NPTEL course recommended by the BoS 	3	0	0	3		
5	Professional Elective-III	 Software Project Management Mobile Adhoc Networks Natural Language Processing Distributed Operating System 12 week MOOC Swayam/NPTEL course recommended by the BoS 	3	0	0	3		
6	Open Elective – II		3	0	0	3		
7	Professional Core	Cloud Computing Lab	0	0	3	1.5		
8	Professional Core	Machine Learning Lab	0	0	3	1.5		
9	Skill Enhancement course	Soft skills OR IELTS	0	1	2	2		
10	Audit Course	Technical Paper Writing & IPR	2	0	0	-		
	Total 20 1 08 23							
	Mandatory Industry	Internship of 08 weeks duration	during s	summe	r vacat	ion		

SEMESTER VI

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VR23

S.No.	Category	Title	L	Т	P	Credits
1	Professional Core	Blockchain Technology	3	0	0	3
2	Management Course- II	Human Resource Management	2	0	0	2
3	Professional Elective-IV	 Software Architecture & Design Pattern Deep Learning Computer Vision Internet of Things 12 week MOOC Swayam/NPTEL course recommended by the BoS 	3	0	0	3
4	Professional Elective-V	 Agile methodologies Metaverse Big Data Analytics Cyber Physical Systems 12 week MOOC Swayam/NPTEL course recommended by the BoS 	3	0	0	3
5	Open Elective-III		3	0	0	3
6	Open Elective-IV		3	0	0	3
7	Skill Enhancement Course	Prompt Engineering	0	1	2	2
8	Audit Course	Constitution of India	2	0	0	-
9	Internship	Evaluation of Industry Internship	-	-	-	2
		Total	19	1	02	21

SEMESTER VII

SEMESTER VIII

S.No.	Category	Title	L	Т	P	Credits
1	Internship &	Full semester	0	0	24	12
	Project Work	Internship & Project Work				

Note : Student need to do at least ONE MOOC Course (of 3 credits out of 160 credits) to meet the mandatory requirement (11^{th} criteria, as per R23 Regulations

- Students who are desirous of pursuing their special interest areas other thanthe chosen discipline of Engineering may opt for additional courses in minor specialization groups offered by a department other than their parentdepartment
- A student shall be permitted to register for Minors program at the beginning of 4th semester subject to a maximum of two additional courses per semester, provided that the student must have acquired \geq 7.75 CGPA (Cumulative Grade point average) up to the end of 2nd semester without any history of backlogs.
- A student shall earn additional 20 credits in the specified area to be eligible for the award of B. Tech degree with Minor. Out of the 20 Credits, 16 credits shall be earned by undergoing specified courses by the department. In addition to the 16 credits, students must pursue at least 2 courses through MOOCs.

MINOR COURSES OFFERED BY INFORMATION TECHNOLOGY DEPARTMENT

S.No	Course code	Course Name	Offered in	L	Т	Р	Credits			
			Semester							
Elective – Opt anyone of the course										
1	20ITM4701A	Fundamentals of Data	IV	3	0	2	4			
		Science								
2	20ITM4701B	Data Science With R	IV	3	0	2	4			
		Software								
	Elective – Opt anyone of the course									
3	20ITM5701A	Data Warehousing and	\mathbf{V}	3	0	2	4			
		mining								
4	20ITM5701B	Machine Learning	V	3	0	2	4			
		Elective – Opt anyon	e of the cours	se		•				
5	20ITM6701A	Big Data	VI	3	0	2	4			
6	20ITM6701B	Cloud Computing	VI	3	0	2	4			
		Elective – Opt anyon	e of the cours	se						
7	20ITM7701A	Data Visualization	VII	3	1	0	4			
8	20ITM7701B	Business Intelligence	VII	3	1	0	4			
9	Self Learning	-		-	-	-	2			
	course - 1									
10	Self Learning	-		-	-	-	2			
	course - 2									

MINOR DEGREE IN INFORMATION TECHNOLOGY (DATA SCIENCE)

S.No	Course code	Course Name	Offered in	L	Т	P	Credits
			Semester				
1	20ITM4702	Software Engineering	IV	3	0	2	4
2	20ITM5702	Agile Software Development	V	3	0	2	4
3	20ITM6702	Software Quality and Testing	VI	3	0	2	4
4	20ITM7702	Software Project Management	VII	3	0	2	4
9	Self Learning course - 1	-	-	-	-	-	2
10	Self Learning course - 2	-	-	-	-	-	2

MINOR DEGREE IN INFORMATION TECHNOLOGY (SOFTWARE ENGINEERING)

Curricular Framework for Honors Program

- Students of a Department/ Discipline are eligible to opt for Honors Program offered by the same Department/ Discipline.
- A student shall be permitted to register for Honors program at the beginning of 4th semester provided that the student must have acquired ≥ 8 CGPA without backlogs upto end of 2nd semester without any backlogs
- Student shall earn 20 additional credits to be eligible for the award of B. Tech (Honors) degree
- Of the 20 additional Credits to be acquired, 16 credits shall be earned by undergoing specified courses listed as pools, with four courses, each carrying 4 credits. The remaining 4 credits must be acquired through two MOOCs, of domain specific, each with 2 credits and with a minimum duration of 8/12weeks as recommended by the Board of studies.

Honors Degree offered by IT Department

S.No	Course code	Course Name	Offered in	L	Т	Р	Credits
			Semester				
1	20ITH4801A	Data Analytics	IV	4	0	0	4
2	20ITH5801A	Web and Text Mining	V	4	0	0	4
3	20ITH6801A	Social Media Mining	VI	4	0	0	4
4	20ITH7801A	Financial Analytics	VII	4	0	0	4
		(MOOCs - Self L	earning)				
5	20ITH5811	Advanced Data Science	V	-	-	I	2
6	20ITH7812	Machine Learning	VII	-	-	-	2
		Engineering for					
		Production					

Honors in AI & Data Science

Honors	in	Cyber	Security
		- ,	

S.No	Course	Title of the course	Offered in	L	Т	Р	Credits
	Code		Semester				
1	20ITH4801B	Introduction to Security:	IV	4	0	0	4
		Cyberspace, Cybercrime and					
		Cyber Security					
2	20ITH5801B	Cyber Physical Systems	V	4	0	0	4
3	20ITH6801B	Penetration Testing and	VI	4	0	0	4
		Vulnerability Assessment					
4	20ITH7801B	Cloud Security	VII	4	0	0	4
		MOOCs - SELF LEARNIN	IG COURSE	S			
	1	1	1	r	r	r	1
1	20ITH5811B	Information Security and	V	-	-	-	2
		Cyber Forensics					
2	20ITH7812B	Online privacy	VII	-	-	-	2

SEMESTER III

	4	5115	5101-	LIU				LC									
Course Categor	y:		Huma Scien	anities ces	s a	und	Soci	al (Crec	lits:					2		
Course	Туре	:	Theor	ſy]	Lect	ure-T	utori	al-Pr	actice	:	2-0-0		
Prerequ	isites	:	-	·				(Con	tinuo	us Eva	aluati	on:		30		
								,	Sem	ester	End I	Evalu	ation:		70		
								r.	Fota	l Ma	rks:				100		
Course			Upon	succe	essf	ul co	omple	etion	oft	he cou	urse, tl	he stu	dent w	vill be	able to:		
Outcom	es	-	CO1	Unc	lers	tand	vari	ous f	orm	s of o	rganiz	ations	and p	rincip	les of		
				mar	nage	emer	nt				U		1	1			
			CO2	CO2 Understand the various aspects of business economics.													
		-	CO3	CO3 Perceive the knowledge on Human resources and Marketing functions													
		-	CO4	CO4 Evaluate various alternatives economically.													
Contrib	ution	of C	ourse	Outc	com	es to	owar	ds ac	chiev	vemer	nt of F	rogra	am Oı	itcom	es(1-Lov	v. 2-	
Medium	1, 3- I	High)	(h)														
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CO3	3				-							3		3			
CO4	3				3							3		3			
Course		UN	IT I:				I		1		I	L		L			
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		Intr Ana Lav Der Der Der Sup	 UNIT II: Introduction to Economics: Introduction to Basic Economic Concepts, Utility Analysis: Marginal Utility and Total Utility, Law of Diminishing Marginal Utility, Law of Equi Marginal Utility. Demand Analysis: Theory of Demand: Demand Function, Factors Influencing Demand, Demand Schedule and Demand Curve, Shift in Demand, Elasticity of Demand: Elastic and Inelastic Demand, Types of Elasticity. Supply Analysis: Supply Schedule and Supply Curve, Factors Influencing Supply, Supply Function. 														

23HS3101- ENGINEERING ECONOMICS AND MANAGEMENT

	UNIT III:
	Human Resource Management: Meaning and difference between Personnel Management and Human Resource Management, Functions of Human Resource
	Management.
	Marketing Management: Concept of Selling And Marketing – Differences, Functions of Marketing, Product Life Cycle, Concept of Advertising, Sales Promotion, Types of Distribution Channels, Marketing Research, Break-Even Analysis
	UNIT IV:
	Financial Management: Functions of Financial Management, Time value of money with cash flow diagrams, Concept of Simple and Compound Interest. Depreciation: Causes of depreciation, Factors influencing depreciation, common methods of Depreciation: Straight Line Method, Declining Balance Method, Sum of Year's Digits Method. Problems
	Economic Alternatives: Methods of Evaluating Alternatives under Present worth method, Future worth method, Annual Equivalent method - Problems.
Text books	Text Book(s):
and	[1] M. Mahajan Industrial Engineering and Production Management Dhanpat
Reference	Rai Publications, 2 nd Edition.
books	[2] Martand Telsang" Industrial & Business Management" S.Chand
	publications
	Reference Books:
	[1] R.Paneerselvam "Production and Operations Management" PHI [2] Dhilin Katlan & Carry Armstrong "Dringinlag of Marketing", geograph
	prentice Hall New
	Delhi.2012 Edition.
	[3] IM Pandey, "Financial Management" Vikas Publications 11 th Edition
	[4] B.B Mahapatro, "Human Resource Management"., New Age International
	,2011
E-resources	[1] <u>https://www.toppr.com/guides/fundamentals-of-economics-and-</u>
and other	management/supply/supply-function/
uigitai material	[2] <u>hups://keyannerences.com/annerence-between-personnen-management-and-</u> human-resource-management.html
111att1 läl	[3] http://productlifecyclestages.com/
	[4] https://speechfoodie.com/cash-flow-diagrams/

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Prerequisite	es:	Value	es-I	durin	g i	nduc	tion	Con	tinu	ous E	Ivalu	ation	:		
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Outcomes	CO1	Unde	Understand and aware of themselves and their surroundings (family.											society	
		and r	and nature).											•	
	CO2	Hand	Handle problems with sustainable solutions, while keeping											human	
		relati	relationships and human nature in mind.												
	CO3	Exhi	Exhibit critical ability and become sensitive to their commitment to												owards
		their	their understanding of human values, human relationship and											human	
		society.													
	CO4	Apply what they have learnt to their own self in different day												-to-day	
	004	settings in real life.												to day	
Contributi		Settin	1 <u>5</u> 5 III I		D	Р	Р	Р	Р	Р	Р	Р			
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towards	$\frac{CO1}{CO2}$			2			1								
towarus	C02			3			2								
achievenie nt of	0.05						2		2				2		
									3				2		
Program															
Outcomes	CO4														
(1-LOW, 2-															
Medium,															
3- High)			<u> </u>	•					•						
Course	UN	II-I:	Cours	e intr	oduc	tion,	neec	i, bas	sic gu	ideli	nes, o	conte	ent an	d	
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	app	raisal	of the	curre	nt sce	enaric	, Me	thod	to fu	Itill t	ne ab	ove	huma	n aspi	rations:
	und	erstan	ding a	nd liv	ing in	harn	nony	at va	rious	leve	ls.				
	(Practi	ce ses	sions a	are to	be in	nclude	ed to	discu	iss n	atura	I acce	eptan	ce in	humai	n being
	as the	innat	e acc	eptano	ce for	r livi	ing v	with	respo	nsibi	lity	(livir	ig in	relati	onship,
	harmo	ny and	l co-ez	xisten	ce) ra	ather	than	as a	rbitra	rines	s in c	choic	e bas	ed on	liking-
	dislikiı	1g).													

23HS3102 -UNIVERSAL HUMAN VALUES-2: UNDERSTANDING HARMONY

UNIT-II: Understanding Harmony in the Human Being – Harmony in Myself: Part-1: Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' – happiness and physical facility, Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Part-2: Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Health.

(Practice sessions are to be included to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs. dealing with disease).

UNIT–III: Understanding Harmony in the Family and Society – Harmony in Human-Human Relationship:

Part-1: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship.

Part-2: Understanding the harmony in the society (society being an extension of family); Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals, Visualizing a universal harmonious order in society–Undivided Society, Universal Order–from family to world family.

(Practice sessions are to be included to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education, etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives).

UNIT – IV:

Part-1: Understanding Harmony in Nature & Existence – Whole existence as Coexistence: Understanding the harmony in the Nature, Inter-connectedness and mutual fulfillment among the four orders of Nature – recyclability and selfregulation in nature, Understanding Existence as Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

Part-2: Implications of the above Holistic Understanding of Harmony on **Professional Ethics:** Natural acceptance of human values, Definitiveness of ethical human conduct, Basis for humanistic education, humanistic constitution and humanistic universal order, 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, Case studies of typical holistic technologies, management models and production systems, Strategy for transition

	from the present state to Universal Human Order: a) at the level of individual: as socially and ecologically responsible engineers, technologists and managers, b) at the level of society: as mutually enriching institutions and organizations. (Part-1: Practice sessions are to be included to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources
	and role of technology, etc. Part-2: Practice exercises and case studies are to be taken up in practice (tutorial) sessions eg. to discuss the conduct as an engineer or scientist, etc.)
Text	Text Book(s):
books and	[1] A Foundation Course in Human Values and Professional Ethics, R. R. Gaur,
Reference books	R. Sangal and G. P. Bagaria, Excel Books Private Limited, New Delhi (2010).
	 [2] A Foundation Course in Human Values and Professional Ethics, R. R. Gaur, R. Asthana and G. P. Bagaria, 2nd revised edition Excel Books Private Limited, New Delhi (2019).
	Reference Books:
	[1] Jeevan Vidya: Ek Parichaya, A. Nagaraj, Jeevan Vidya Prakashan, Amarkantak (1999)
	[2] Human Values, A. N. Tripathi, New Age International Publishers, New Delhi (2004).
	[3] The Story of Stuff: The impact of overconsumption on the planet, our communities, and our health and how we can make it better, Annie Leonard, Free Press, New York (2010).
	[4] The story of my experiments with truth: Mahatma Gandhi Autobiography, Mohandas Karamchand Gandhi, B. N. Publishing (2008)
	[5] Small is beautiful: A study of economics as if people mattered, E. F. Schumacher, Vintage Books, London (1993)
	[6] Slow is beautiful: New Visions of Community, Cecile Andrews, New Society Publishers, Canada (2006).
	[7] Economy of Permanence, J. C. Kumarappa, Sarva-Seva-Sangh Prakashan, Varanasi (2017).
	[8] Bharat Mein Angreji Raj, Pandit Sunderlal, Prabhath Prakashan, Delhi (2018).
	[9] Rediscovering India, Dharampal, Society for Integrated Development of Himilayas (2003).
	[10] Hind Swaraj or Indian Home Rule, M. K. Gandhi, Navajivan Publishing House, Ahmedabad (1909).
	[11] India Wins Freedom: The Complete Version, Maulana Abul Kalam Azad, Orient Blackswan (1988).
	[12] The Life of Vivekananda and the Universal gospel, Romain Rolland, Advaitha Ashrama, India (2010).
	[13] Mahatma Gandhi: The Man who become one with the Universal Being, Romain Rolland, Srishti Publishers & Distributors, New Delhi (2002).
Е-	[1] Textbook-1: https://dokumen.pub/a-foundation-course-in-human-values-
resources	and-professional-ethics-firstnbsped-9788174467812.html
and other	[2] AICTE – SIP Youtube Channel:
digital	https://www.youtube.com/channel/UCo8MpJB aaVwB4LWLAx6AhQ
material	[3] AICTE – UHV Teaching Learning Material: https://fdp-si.aicte-
	india.org/download.php#1

Course Category:]	Enginee	0	Credit	ts:					3						
Course Typ	e: ′	Theory						T	ectu	re-Tı	itoria	al-Pr	actic	e:	2-1	-0
Prerequisit	ites: -								Conti		30					
-											nd E	valua	ation	:	70	
										Marl	ks:			•	100)
Course	Upon	success	uccessful completion of the course, the student will be able to:													
Outcomes	CO1	Understand the digital logic design principles, register transfer op												bera	tions,	
		CPU & Memory organizations and Computer organization fundament												enta	ls.	
	CO2	CO2 Design the hardwired and micro-programmed control units.														
	CO3 Demonstrate the Fixed Point Arithmetic Operations and various Ad												ddre	essing		
	Modes.															
	CO4	Analyze different ways of communication with I/O devices and standard I/O interfaces.													rd I/O	
Contribut	PO PO PO P P P P P P P P P P P P P P P														DSO	
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Program																
Outcomes																
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3. High)																
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	Digit	al Com	poner	nts: D	ecod	ers,	Multi	plexe	ers, R	legist	ers,	Shift	Reg	isters	s, E	Binary
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	Basic	: Comp	uter O	rgani	zatio	n an	d De	sign:	Instr	uctio	n cod	es, C	ompi	iter F	Reg	isters,
	Com	outer In	structi	ons, T	imin	g an	d Co	ntrol,	Insti	uctio	on cy	cle, I	Memo	ory-F	Refe	erence
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	Com	outer - C	CISC C	Charac	terist	ics, F	ISC	Chara	acteri	stics.						

23ES3303C-DIGITAL LOGIC AND COMPUTER ORGANIZATION

	UNIT IV:
	Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms,
	Division Algorithms
	Memory Organization: Memory Hierarchy, Associative Memory, Cache Memory
	Input-Output Organization: Input-output Interface, Asynchronous Data Transfer,
	Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA).
Text	Text Book(s):
books and	[1].M.Morris Mano, "Computer System Architecture, Revised Third Edition,
Reference	Pearson publications, 2020.
books	[2].Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization",
	Sixth Edition, McGraw Hill Publication, 2002.
	Reference Books:
	[1].J.P.Hayes, "Computer Architecture and Organization" TMH, International
	Second Revised Edition, 1998
	[2]. William Stallings, "Computer Organization and Architecture", Ninth
	Edition, Pearson/PHI, 2013
	[3]. Andrew S. Tanenbaum, "Structured Computer Organization", Fifth Edition,
	PHI/Pearson, 2009
E-	[1]. Prof. D. Roychoudhury, Department of Computer Science and
resources	Engineering, IITK haragpur, "Lecture Series on Digital Systems", Nov
and other	2008
digital	https://www.youtube.com/watch?v=wXnVAcvJWDk
material	[2]. Prof. S. Raman CSE Department, IIT Madras. Computer Organization
	lecture series, NPTEL videos
	http://www.nptelvideos.com/course.php?id=396
	[3]. Prof. Kamakoti, IIT, Chennai, May 2017
	https://www.youtube.com/watch?v=MIWTxHbPBA0
	[4]. Prof. Anshul Kumar, Department of Computer Science and Engineering, IIT
	Delni. September 2008
	nttp://www.infocobulid.com/education/audio-video-courses/computer-
	<u>science/computer-architecture-kumar-iit-deini.ntmi</u>
	[5]. FIOLP.K. BISWAS, Department of Electronics and Electrical
	Communication Engineering, 111 Knaragpur. Introduction to Digital
	Computer Organization, 2009, Sep 24
	$\Pi(LDS)//WWW, VOULUDE, COIII/WALCII (V=1H9Nd-KdVHS)$

Course		Progr	amme	Core				(Credi	its:					3	
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Course	CO1	Succe					e cou	rse, u	ie stu		WIII (be ab		nform		a of
Outcomes	COI	 CO1 Design an Algorithm and estimate the asymptotic performance of algorithms CO2 Synthesize design techniques and choose appropriate technique to solve problems. CO3 Analyze algorithm design techniques to provide optimal solution for given problem. 														
	CO^{2}															
	02															
	CO3															
	005															
	CO4	CO4 Understand various operations on advanced tree data structures and														
	007	asymptotic performance of algorithms.														
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Course Cate	e Category: Programme Core														3
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Prerequisite	s:	Problem Solving Continuous Evaluati										tion:		30	
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			Semester end									Evalu	ation	:	70
			Total Marks:												100
Course	Upon s	succes	accessful completion of the course, the student will be able to:												
Outcomes	CO1	Unde	Understand object-oriented programming principles to build class												
		creat	reate objects												
	CO2	Anal	Analyze exception handling techniques to debug correctness and har												ndle run
		time	ime errors												
	CO3	Appl	Apply the knowledge of generics, collections and multi-threading												to solve
		the p	the problems												
	CO4	Dem	Demonstrate the knowledge of lambda expressions and strea												ım API
		opera	operations to solve the problems												
Contributi		PO	PO	PO	P	P	P	P	P	P	P	P	PO	PSC) PSO
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towards	CO2	1	2	3								2	1	2	
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Course	UNIT	I:							I					1	
Content	Introd	uctior	n: An (Overv	iew o	f java	a, Dat	ta typ	bes, va	ariab	les ar	nd arr	ays.		
	Classe	s and	l Obj	ects:	Class	fun	dame	ntals	, dec	larin	g ob	jects	, assi	gning	g object
	referen	ice vai	riables	, intro	oducii	ng m	ethod	ls, co	onstru	ctors	, this	s key	word,	, ove	rloading
	method	ds, Un	derstai	nding	Static	and	Intro	ducin	ıg fina	al key	wor	ds.			
	String	hand	ling: T	The str	ring c	onstr	uctor	s, stri	ing to	keniz	zer cl	ass.			
	UNIT	II:													
	Inheri	tance:	Inhe	ritanc	e bas	sics,	using	g sup	per, o	creati	ing a	i mu	ltilev	el hi	erarchy,
	method	1 over	riding	, dyna	amic	meth	od d	ispate	cn, u	sing	abstr	act c	lasses	s, usi	ng final
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	except	ions.	using	trv a	nd ca	tch.	multi	ple of	catch	clau	ses.	throw	v, thr	OWS.	finally.
	creatin	g your	own e	except	tion s	ubcla	sses.	r		- 1000	,		,	,	·
	UNIT	III:		Ľ			-								
	Gener	ics: A	Gener	ric cla	lss wi	th tw	o typ	e par	ramet	ers, t	he ge	eneral	l from	n of a	generic
	class, l	Bound	ed type	es				_							
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. 23IT3305 - OBJECT ORIENTED PROGRAMMING THROUGH JAVA

	Multithread Programming: The Java thread model, creating a thread,								
	implementing runnable, extending thread, creating multiple threads, thread priorities								
	Collections Framework: Collections overview, the Collection interfaces:								
	Collection, List and Set.								
	Collection Classes: ArrayList, LinkedList, HashSet, TreeSet								
	UNIT IV:								
	Lambda Expressions: Lambda Expression fundamentals, function interfaces, some								
	lambda expression examples, Block lambda expressions, Passing lambda								
	expressions as arguments.								
	Method References: Method References to static methods, Method References to								
	instance methods, Method References with generics.								
	Stream API: Stream Basics: Stream interfaces, how to obtaining a Stream, A								
	simple Stream examples, Reduction Operations, Using Parallel Streams, Mapping,								
	Collecting, Iterators and Stream.								
Text	Text Book:								
books and	[1]. Herbert Schildt, "Java The Complete Reference", 12 th Edition, McGraw-								
Reference	Hill, New Delhi, 2022.								
books	[2].Debasis Samanta, "Joy with JAVA, Fundamentals of Object-Oriented								
	Programming", Monalisa Sarma, Cambridge, 2023.								
	Reference Books:								
	[1]. Kathy Sierra & Bert Bates, Head First Java, Second edition,								
	Shrott/OSRotlly/2000								
	$[2] D = \{ (1,1), (2,1), (2,1), (2,1), (3,1$								
	[2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension								
	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 								
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	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Duration Hall Decreare Education 2011. 								
	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Prentice-Hall, Pearson Education, 2011. [4] Timothy Budd, "Understanding Object Oriented Programming with Java" 								
	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Prentice-Hall, Pearson Education, 2011. [4]. Timothy Budd, "Understanding Object Oriented Programming with Java", undeted adition. Pearson Education, 2013. 								
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E-	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Prentice-Hall, Pearson Education, 2011. [4]. Timothy Budd, "Understanding Object Oriented Programming with Java", updated edition, Pearson Education, 2013. [4] Prof. I. Sengupta. (19-05-2021), Department of Computer Science & Engineering, LLT Kharagpur, "Internet Technologies", NPTEL 								
E- resources	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Prentice-Hall, Pearson Education, 2011. [4]. Timothy Budd, "Understanding Object Oriented Programming with Java", updated edition, Pearson Education, 2013. [4] Prof. I. Sengupta. (19-05-2021), Department of Computer Science & Engineering, I.I.T.,Kharagpur, "Internet Technologies", NPTEL, http://mptal.ac.in/video.php?subjectid=106105084 								
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E- resources and other digital material	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Prentice-Hall, Pearson Education, 2011. [4]. Timothy Budd, "Understanding Object Oriented Programming with Java", updated edition, Pearson Education, 2013. [4] Prof. I. Sengupta. (19-05-2021), Department of Computer Science & Engineering, I.I.T.,Kharagpur, "Internet Technologies", NPTEL, <u>http://nptel.ac.in/video.php?subjectid=106105084</u> [5] Mia Minnes, Leo Porter, Christine Alvarado, University of California, San Diego (19-05-2021) Object Oriented Programming In Java Available: <u>https://www.coursera.org/learn/object-oriented-java</u> 								
E- resources and other digital material	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Prentice-Hall, Pearson Education, 2011. [4]. Timothy Budd, "Understanding Object Oriented Programming with Java", updated edition, Pearson Education, 2013. [4] Prof. I. Sengupta. (19-05-2021), Department of Computer Science & Engineering, I.I.T.,Kharagpur, "Internet Technologies", NPTEL, <u>http://nptel.ac.in/video.php?subjectid=106105084</u> [5] Mia Minnes, Leo Porter, Christine Alvarado, University of California, San Diego (19-05-2021) Object Oriented Programming In Java Available: https://www.coursera.org/learn/object-oriented-java [6] Cav Horstmann, Cheng-Han Lee, Sara Tansey, San Jose State University 								
E- resources and other digital material	 [2]. Berbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension Introduction, Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2013. [3]. Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program, 9th Edition, Prentice-Hall, Pearson Education, 2011. [4]. Timothy Budd, "Understanding Object Oriented Programming with Java", updated edition, Pearson Education, 2013. [4] Prof. I. Sengupta. (19-05-2021), Department of Computer Science & Engineering, I.I.T.,Kharagpur, "Internet Technologies", NPTEL, http://nptel.ac.in/video.php?subjectid=106105084 [5] Mia Minnes, Leo Porter, Christine Alvarado, University of California, San Diego (19-05-2021) Object Oriented Programming In Java Available: https://www.coursera.org/learn/object-oriented-java [6] Cay Horstmann, Cheng-Han Lee, Sara Tansey, San Jose State University, (19-05-2021) Intro to Java Programming Available: 								

Course		Institutional Core								Credits:					1	
Category:		.	• •	<u> </u>											0	<u> </u>
Course Type	:	Learr	ning by	y Doin	g				Lectu	ire-T	utori	ial-P	ractio	ce:	0	- 0 - 2
Prerequisites	5:							(Continuous Evaluation:					10)0	
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<u>C</u>	TLAR			1 .	4:	- f (1-		<u> </u>	otal	Mar	<u>'ks:</u>	1. 1	1		10	00
Course		succe	ssiul c	oson l		$\frac{01 \text{ the}}{11 \text{ tr}}$		rse, th	e stu		$\frac{\text{wm}}{\text{v}}$	be ab	le to:			
Outcomes	C01	Δn	alvze	given ²	infor	ny m natio	n to f	ind co	orrec	t solu	1 Ition					
	CO2		reduc	e the n	nistak	tes in	dav	to day	v acti	vities	$\frac{1}{\sin n}$	racti	cal lif	fe		
	CO4	De	evelop time management skills by approaching different shortcut									t				
	001	me	ethods										···			
	CO5	Use	e mathematical based reasoning to make decisions													
			6													
	CO6	Ap	ply log	gical tl anies a	ninki and ir	ng to 1 othe	solve er cor	prob	lems	and	puzzl	es in	quali	ifying	g ex	kams
Contributi		P	Do		P	P	P	Do	P	P	Р	Р	Р	DC	0	Dao
on of		0	PO	PO 2	0	0	0	PO 7	0	0	0	0	0	PS0	0	PSO
Course		1	Δ	5	4	5	6	7	8	9	10	11	12	1		L
Outcomes towards	CO1						2									
achieveme	CO2		2													
nt of Program	CO3								2							
Outcomes	CO4									2						
(1-Low, 2-	CO5	2														
Medium, 3-	CO6	1														
High)	TINIT															
Content	UNII	1.														
Content	[1].Seri	es Coi	npletio	on,											
	[2	.Cod	ing-D	ecodin	g,											
	[3].Bloo	od Rel	ation,												
	[4].Puzz	zles te	st												
	TINIT	г тт .														
	[]	l.Dire	ection	sense 1	test.											
	[2].Log	ical Ve	enn dia	igran	ıs,										
	[3].Nun	nber te	est, ran	king	test,										
	[4].Mat	hemat	ical op	erati	ons										
	UNI	III:														
	[1]. Arit	hmetic	cal Rea	asoni	ng,										
	[2].Inse	rting r	nissinį	g cha	racte	r,									
	[3].Syll	ogism	•												
	[4].Bina	ary log	gic.												
	[5	J.Data	a suffi	ciency												

23TP3106 - LOGIC & REASONING

	UNIT IV:
	[1]. Water images,
	[2]. Mirror images,
	[3]. Paper folding,
	[4]. Paper cutting,
	[5]. Embedded Figures,
	[6]. Dot situation,
	[7].Cubes & Dice
Text books	Text Book(s):
and	[1].R. S. Aggarwal, "Verbal and non-verbal reasoning", Revised Edition, S
Reference	Chand publication, 2017 ISBN:81-219-0551-6,
books	[2]. Reasoning Guru Verbal & Non-Verbal Reasoning by Vikramjeeth,
	Multilingual Edition-2023. ISBN :978-9358706000
	Reference Books:
E-	
resources	
and other	
digital	
material	

Course Cate	egory:	Skill	Enhar	iceme	nt Co	urse			Credits:					1		
Course Typ	e:	Learn	ning by	y Doir	ıg				Lecture-Tutorial-Practice:						0-0-2	
Prerequisite	es:	-							Conti	inuo	us Ev	alua	tion:		100	
-									Seme	ster	end I	Evalu	ation	:	_	
								'	Total Marks: 100						100	
Course	Upon s	succes	sful co	mplet	ion o	f the	cours	se, th	e stud	lent v	vill b	e able	e to:			
Outcomes	CO1	Deve	evelop python programs on control flow statements and strings.													
	CO2	Desig	esign solutions to a variety of problems using python built-in								in Data					
		Struc	uctures.													
	CO3	Appl	bly object-oriented concepts, error handing mechanisms in python.								n.					
	CO4	Anal	alyze and visualize using NumPy, Pandas and Matplotlib in python.								on.					
Contributi		DO		DO	Р	Р	Р	P	Р	Р	Р	Р	DO			
on of			PO	PO 2	0	0	0	0	0	0	0	0	PO 12	PS(
Course		1	Z	3	4	5	6	7	8	9	10	11	12	1	2	
Outcomes	CO1	2			2	2				1	1	2				
towards	CO2	2	1			2				1	1	2				
achieveme	CO3	2	2		1	2				1	1	2				
nt of																
Program																
Outcomes	CO4	3	3		3	3				3	2	2	3			
(1-Low, 2-																
Medium,																
S- Higil)	TINIT	т.														
Content	Basics	ı. of Pu	thon	Progr	amm	ing.	Feat	ires	Histo	nrv f	inture	of n	vthon	wri	ting and	
Content	execut	ing fir	st pyt	hon r	rogr	am I	itera	1 cot	istant	ny, i sva	riable	es an	id ide	, wii ntifie	ers data	
	types.	input	opera	non r	com	ment	s. re	serve	d wo	ords.	inde	ntati	on. o	perat	ors and	
	expres	sions,	expres	sions.	Type	e con	versio	on.		,			- , -	1		
	Decisi	on co	ontrol	stat	emer	nts:	Intro	duct	ion,	Sele	ction/	cond	itiona	l bi	anching	
	statem	ents, E	Basic le	oop st	ructu	res/ite	erativ	ve sta	temer	nts, N	Veste	d loo	ps, br	eak, o	continue	
	and pa	ss stat	ements	5.												
	String	s: Co	ncaten	ating,	appe	ending	g and	1 mu	ltiply	ing s	string	s, in	nmuta	bility	, String	
	format	ting op	perator	, built	t-in st	ring	meth	ods a	nd fu	nctio	n, slio	ce op	eratio	n.		
		II:			T .			c .		1		1	1 0		c	
	Funct	ions al	na IVIO		: Intr		10n, 1		10n d		ation	and	defini	10n,	function	
	functio	1011, 10	nction	nack	varia	in put	hon	and i	netm	ie, ti	le Tell		latem	-m, 1	ecursive	
	Lists		s and	, pack	ages ate v	ni pyr values	in	lists	nest	ed a	nd c	lonin	o list	ts h	asic list	
	operati	ions. I	ist m	ethod	s. usi	ng li	sts a	s Sta	ack a	nd O	na e nene	s lis	t con	inreh	ensions	
	loping	in lists	5. S.	etnou	5, u 51	<u>6</u>	515 U	5 54	ien u		ueue	5, 11 5	t con	pron	e mbromb,	
	Tuple	Creat	ing tu	ple, u	tility	of tu	ples,	acce	ssing	valu	es in	a tur	ole, ur	odatir	ig tuple,	
	deletin	g elen	nents i	n tuple	e, bas	ic tur	ble or	erati	ons.			I	<i>,</i> 1		~ I)	
	Sets: (Creatin	g a Se	t and	set op	peration	ons									
	Dictio	naries	: Crea	ating	a dic	tiona	ry, a	ccess	sing v	alue	s, ad	d, m	odify	dele	ete, sort	
	items i	n a dic	tionar	y, loo	ping	over a	a dict	ionaı	cy.							
	UNIT	III:	a		_											
	Classe	s and	Obj€	ects:]	Introc	luctio	n, cl	asses	and	obje	ects,	class	meth	iod a	nd self-	
	argum	ent, in	ut() m	ethod	, clas	ss an	d ob	ject	variał	oles,	del()	met	hod,	other	special	

23IT3651 – PYTHON PROGRAMMING LAB

	methods, public and private data members, private methods, calling a class method
	from another class method, built-in class attributes, garbage collection, class and
	static methods, operator overloading.
	Inheritance: Introduction, inheriting classes in python, types of inheritance,
	composition/containership/complex objects, abstract classes and interfaces, Meta
	class.
	Error and Exception Handling: Introduction to errors and exceptions, handling
	exceptions, multiple except blocks, multiple exceptions in a single block, except
	block without exception, the else clause, raising exceptions, built-in and user-
	defined exceptions, the finally block.
	UNIT IV:
	NumPy Basics: Introduction to numpy, The NumPy ndarray: A Multidimensional
	Array Object, Universal Functions: Fast Element-wise Array Functions.
	Getting Started with pandas: Introduction to Pandas Data Structures, Essential
	Functionalities, Summarizing and computing descriptive statistics.
	Plotting and Visualization: A brief Matplotlib API Primer, Plotting with Pandas
	and seaborn.
Text	Text Book(s):
books and	[1]. ReemaThareja, "Python Programming Using Problem Solving Approach", Oxford
Reference	University Press, 2019.
books	[2]. Wes McKinney, "Python for Data Analysis", Oreilly, Second Edition, 2017.
	Reference Books:
	[1]. Zed Shah, "Learn PythonThe Hard Way", Third edition, Addison-Wesley, 2013.
	[2]. Charles Severance, "Python for Informatics- Exploring Information", 1st edition
	Shroff Publishers, 2017.
	[3]. John V. Guttag, "Introduction to Computation and Programming Using Python",
	[4] W Chun "Core Puthon Programming" 2nd Edition Prentice Hall 2006
	[4]. W.Chur, Core I ython Programming, 2nd Edition, Frence Han, 2000. [5] Vamsi Kurama "Python Programming, A modern approach" Pearson, 2018
Е-	[1]. Charles Severance: University of Michigan. Python for Everybody [COURSERA].
resources	(05-01-2021), Available: https://www.coursera.org/
and other	[2]. Prof. SudarshanIyengar, IIT Ropar, Prof. Yayati Gupta, IIIT Dharwad, The Joy Of
digital	Computing Using Python [NPTEL], (05-01-2021),
material	[3]. Available:https://nptel.ac.in/courses/106/106/106106182/#
material	[4]. Prof KannanMoudgalya, Professor, IIT Bombay, Python 3.4.3, [SWAYAM],(05-
	01-2021), Available: https://onlinecourses.swayam2.ac.in/aic20_sp33/preview.
	[5]. Corey Schater, Python OOP Tutorials - Working with Classes, (05-01- 2021),
	Available: Python OOP Lutorials - Working with Classes - You Lube
	[0]. FIOL Kagunathan Kengasamy, III Madras, Python for Data Science [NPTEL], Available: https://onlinecourses.pptel.ac.in/nee22_cs22/proview
	Avanable. https://onniceourses.nptel.ac.m/noc22_cs32/preview

Course	Progr	am c	ore					Cre	dits:					1.5		
Category:	T 1							-						0.0.0		
Course Type:	Lab Lecture-Iutoriai-Practice:								ce:	0-0-3						
Prerequisit	23PC2104 - Data StructuresContinuous Evaluation:									30						
es:	Progr	amm	ing la	nguag	ge			Sem	nester	end	Eval	uatio	1:	70		
								Tota	al Ma	arks:				100		
Course	Upon successful completion of the course, the student will be able to:															
Outcomes	CO1	D	Demons	strate	the div	vide a	nd cor	nquer	techni	ique w	vith tir	ne cor	nplexi	ity		
	CO2	Γ	Demon	strate	the	divide	e and	conq	uer t	echni	que v	vith ti	me c	omplex	kity	
	CO3	Ĩ	Design	the	algor	ithms	s for	optir	nizati	on p	roble	ns us	sing g	greedy	or	
		d	ynam	ic pro	gram	ming										
	CO4	Γ	Demon	strate	back	track	ing te	chnic	que						_	
	CO5	P	Perform	n ope	ratior	ns on	balan	ced d	ata st	ructu	res - A	AVL a	and B	-trees		
	CO6	S	olve a	scena	rio ba	ased	proble	ems i	ising	appro	opriat	e dat	a stru	icture	and	
		d	esign	techn	ique	_					_		_		_	
Contributi		Р	P	P	P	P	P	Р	P	P	Р	P	Р	PS	P	
on of		0	0	0	0	0	0	0	0	0	0	0	0	01	S	
Course		1	2	3	4	5	6	7	8	9	10	11	12		0	
Outcomes	CO	2	2	1										2	2	
achievemen	1	L	2	1										3		
t of	CO	2	2	1										1	2	
Program	2															
Outcomes	CO	2	1	1										2	2	
(1-LOW, 2- Modium 3	3	2	2	2										2	1	
High)	4	Z	Z	2										3	1	
	CO	2	1	1										1	2	
	5															
	CO	2	3	3									2	2	2	
C	6	1 T						•4	A 1	• •						
Course	vv еек		rogra	ams o		ne co	mple	XILY A	Analy	SIS CE	cnnie	ques	1	41		
Content		a.	Desig	gn an Noviti	aigo	runn bo ala	l IOF	the g	iven	probl	em a	na an	latyze	the th	me	
		h	Desig	on an	algo	rithm	for	the o	iven	probl	em a	nd an	alvze	the ti	me	
		0.	comp	olexity	y of th	he alg	orith	m.	1,1,0,11	proor	enn u	ina an	lui y 20	the th	ine	
			1	-	, 	C										
	Week	2&3	3: Pro	gran	ns on	Divio	le An	d Co	nque	r Tec	hniq	ue				
		a.	Sorti	ng teo	chniqu	ues: N	Лerge	Sort	and (Quick	Sort					
		b.	Find	the m	ninim	um ar	nd ma	ximu	m in a	a give	en arra	ay of	eleme	ents		
		c.	Desig	gn exp	perim	ent u	sing I	Divide	e and	Conq	uer T	'echni	que			
	Wool	1 2-1	5. Due			Cras	dy M	athe	А							
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		а.	mpl			ional	inia	sack	hron.							

23IT3352 - ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

	b. Find minimum cost spanning tree using Prims and Kruskals										
	Algorithms										
	c. Implement Single Source Shortest Path problem										
	d. Implement job sequencing with deadlines problem										
	Week 6: Programs on Dynamic Programming										
	a. Implementation of all Pairs shortest path problem.										
	b. Implementation of travelling salesperson Problem.										
	c. Implementation of 0/1 Knapsack Problem										
	Week / &8: Programs on Backtracking										
	a. Implement N-Queens Problem										
	b. Implement sum of subsets problem										
	d Implement Hemiltonian avala problem										
	Week 0: AVL tree and applications										
	a Implementation of AVI tree operations										
	b Design experiment using AVI -Tree										
	Week 10.B. tree and annlications										
	a. Insert and delete operations on B-tree										
	b. Design experiment using B-Tree										
	Week 11: Design experiments/scenario based problem solving using Advanced										
	Data structures										
	Week 12: Design experiments/scenario based problem solving using										
	Algorithm Design Strategies										
Text books	Text Book(s):										
and	[1]. Horowitz Sahni and Anderson-Freed, "Fundamentals of Data Structures										
Reference	in C", 2nd edition, Universities Press, 2011.										
books	[2]. Mark Allen Weiss, "Data structure and Algorithm Analysis in C", 2nd										
	edition, Addison Wesley Publication, 2010.										
	eution, Addison wesley Publication, 2010.										
	Reference Books:										
	Reference Books: [1] Vedidvahl angsam, Moshe, I. Augenstein and Aaron M. Tenenbaum										
	Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++" 2nd edition Pearson Education										
	Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1000										
	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2] Data Structures A Developed A Angeographic Control Edition, D. E. 										
	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. 										
	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning 										
E-	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. 										
E- resources	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> 										
E- resources and other	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT 										
E- resources and other digital metarial	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT Delhi, Lecture Series on Data Structures and Algorithms [NPTEL], 										
E- resources and other digital material	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT Delhi, Lecture Series on Data Structures and Algorithms [NPTEL], (26, May, 2021) 										
E- resources and other digital material	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT Delhi, Lecture Series on Data Structures and Algorithms [NPTEL], (26, May, 2021) Available: <u>https://nptel.ac.in/courses/106/102/106102064/</u> 										
E- resources and other digital material	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT Delhi, Lecture Series on Data Structures and Algorithms [NPTEL], (26, May, 2021) Available: <u>https://nptel.ac.in/courses/106/102/106102064/</u> [3]. Data Structures and applications on, [Geeksforgeeks], (25, May, 2021) 										
E- resources and other digital material	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT Delhi, Lecture Series on Data Structures and Algorithms [NPTEL], (26,May,2021) Available: <u>http://ocu.nut.edu/</u> [3]. Data Structures and applications on, [Geeksforgeeks], (25, May, 2021) Available: https://www.geeksforgeeks.org/data-structures/ 										
E- resources and other digital material	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT Delhi, Lecture Series on Data Structures and Algorithms [NPTEL], (26,May,2021) [3]. Data Structures and applications on, [Geeksforgeeks], (25, May, 2021) Available: <u>https://www.geeksforgeeks.org/data-structures/</u> 										
E- resources and other digital material	 Reference Books: [1]. YedidyahLangsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd edition, Pearson Education, 1999. [2]. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning [1]. Erik Demaine, Advanced Data Structures, [MIT- OpenCourseWare]. (26, May, 2021). Available: <u>http://ocw.mit.edu/</u> [2]. Dr. Naveen Garg, Department of Computer Science & Engineering ,IIT Delhi, Lecture Series on Data Structures and Algorithms [NPTEL], (26,May,2021) Available: <u>https://nptel.ac.in/courses/106/102/106102064/</u> [3]. Data Structures and applications on, [Geeksforgeeks], (25, May, 2021) Available: <u>https://www.geeksforgeeks.org/data-structures/</u> [4]. Data Structures and challenges [Hacker rank], (25,May,2021) Available: <u>https://www.beckerenk.com/domains/data_structures/</u> 										

Course Category:	Prog	gramn	ne Co	re				Credits:						1.5		
Course Type:	Lab							Lect	ture-'	Tuto	rial-P	racti	ce:	0-0-3		
Prerequisit	23E	S1103	3-Prog	gramr	ning		for	Con	tinuc	ous E	valua	tion:		30		
es:	Prot	olem S	Solvir	ng				Sem	lester	end	Eval	uatio	n:	70		
	2311	2104	- Da	la Str	ucture	es		Tota	al Ma	rks:				100		
Course	Upon	succ	essful	com	pletio	n of t	he co	urse,	the st	udent	will	be ab	le to:			
Outcomes	CO1	CO1 Design solutions to applications using object-oriented approa								bach us	sing					
	CO2	CO2 Implement java technology to solve runtime errors and								l test the						
		correctness of programs using exception handling														
	CO3]	Devel	op ja	va ap	oplica	tions	to m	nake 1	use o	f col	lectio	ns fra	amewo	rks	
		8	and S	Strean	n API	to so	olve re	eal wo	orld p	roblei	ms					
	CO4]	Desig	n graj	phical	l user	inter	face a	pplic	ations	s usin	g Java	a Swi	ngs		
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t of	CO		2	3								2		3	1	
Outcomes	$\frac{2}{CO}$		2	2						3		2	2	2	2	
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Medium, 3-	CO		2	2						2		1	3	2	3	
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	S	etEm	ploye	e() -	to set	the v	alues	to the	e emp	loyee)					
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	4. V	Write	a cla	ss cal	led B	ank v	with t	he dat	ta me	mber	s acn	o, act	ype, 1	name, l	bal,	
	ſ	vieiiii		IICUOI	15											

23IT3353- OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Insert CustomerDetails()- method to insert the values to the variables
Deposit Amount()-ask the user to enter the amount to deposit and add the
amount entered to the bal
Withdraw Amount() - ask the user to enter the amount to withdraw and
undate the amount entered to the b
update the amount entered to the b.
Week 2:
1. Write a program to implement method overloading to compute area of
Rectangle, square and triangle
2. Write a program to implement function overloading to read the employee
details like eno, esal, eaddress and display the information.
3. Write a program to implement constructor overloading to compute area
of Rectangle, square and triangle.
4. Define a class to represent a bank account. Include the following Data
Member
a. Name of the depositor
b. Account Number
C. Type of Account
Member Functions
e. To assign Initial value using constructor overloading
f To deposit an amount
g. To withdraw amount after checking the balance
h. To display name and balance.
Week 3:
1. A travel agent book tickets in rail to Mumbai to its customers. Create a
class Railway with the variables pass_name, age,no_ot_tickets, price, total
amount. The Manager of the travel agent wants to know how many tickets
and how many customers the agent has booked.
2. Write a java program for For MOVIE HICKET RESERVATION
assuming that movie is A rated movie and it shouldn't allow the children
below 18 and identify the current status of the seats available and should
also display when the nouse is full.
5. write a java program for movie ticket reservation. Assuming that the
availability of tickets. The determombers are name, maying name
availability of tickets. The datamenders are name, movie name,
Write a java program to count the number of object created using static
4. Write a java program to count the number of object created using static.
Week 4:
1. Create a program that reads the string "object-oriented programming using
Java". Find the number of words/tokens in the string. Also print all the
tokens that presents in the string.
2. Create a program that reads a string "It sometimes, happens that, while
using, Microsoft Word you, hicave to transfer, copied table, to normal line
- you need, to have your words, in one line separated, by let's say
commas. While this procedure, would require, lot of clicking, and manual
deleting, Microsoft Word possesses, a function that allows, you to do this

automatically disregarding how many words you need to transform"
3 Create a program that asks the user to enter the two string with different
lengths and check whether the two strings are equal or not. Also check the
last index and first index of the strings
4 Write a Java program to check if two strings are anagrams of each other or
not
not.
Week 5
1 Create a class person with the filed firstname lastname Use
parameterized method to set the values to the variables at runtime. Create
sub class Employee with the variable eno edent esal Create
parameterized method for setting the data and default method for display
the information
2 Create a class named Employee with the following details Data members:
(a) name (b) address (c) age (d) gender
(a) hand (b) address (c) age (d) gender Methods:
(a) Display() to show the employee details
Create another class FullTimeEmployee that inherits the Employee class
a Data members : Salary Designation
Method:
Display() to show the salary and designation along with other employee
details
3 Write a java program for the bank which provides different interest rates
for different time periods for the costumers. If the time limit is <2 years
the interest is 5% per annum. If the time limit is between 2 and 4 years the
interest rate is 8% per annum. If the time limit is >4 years the interest rate
is 10% per annum. Identify the inheritance and also use method over riding
for display method and a parameterized constructor.
4. Create a Abstract class called shaped use this class to store two double
data type values that could be used to compute the area of figures. Drive
two specific class called triangle and rectangle from the base class shape.
Week 6:
1. Write a program to access the methods of one package methods in another
packages: Create a bank class and implement the methods of deposit() and
withdraw(). Access these in another package.
2. Create an interface called Vehicle with the methods set Vehicle(int, String,
String, double), display(). Create a subclass Veh with the members vehno,
vehname, vehprice. Implement the interface to the class. Create three
objects to the class.
3. Create an interface A with the methods sum(int, int), mul(double, double,
double). Create a subclass B which implements only sum(int, int). Create
a subclass C which implements mul (double, double, double). Display the
sum and multiplication values.
4. Write a java program having an interface called figure in the abstract
method area. Design a class called diagram with 3 data members length,
breadth and height. Write a program to calculate the perimeter and volume
of the figure using the interface. Derive a class dimensions that
implements interface figure and class diagram and display the area,

perimeter and volume using Multiple Inheritance concept.5. Create a class Bank with deposit and withdrawal method. Derive two class hdfc bank and sbi bank and override the methods using dynamic method dispatcher.
Week 7: 1 Create a class that reads an array of integers to holds the marks of student in
five subjects. Display the values of array upto the array index 6.
2. Create a class that can raise ArithmeticException and ArrayIndexOutOfBoundsException. Use try, catch; try,catch use try and multiple catch use pested try(try, try, catch)catch
 Create a class that reads sno, sname, javamarks, totalmarks. Compute the % of marks obtained by the user. Paise the exception in case of total
marks is 0. Print the sname character by character. Raise an exception by
 Create a class Emp with eno, ename,esal. If esal is <1000 then raise an exception that" he will not clicible for promotion." Otherwise print the
employee details.
Week 8:
1. Implement generic class which will take list of numbers or names and sort them.
 Create multiple threads Hello and Welcome which prints "Hello Java" and "Hello Dotnet" using Runnable interface for 10 and 20 times. Create a thread using Thread class to print "java programming Lab" for every 1 Second. Check the Status of the thread before and after. Write a program to access the methods of one package methods in another
packages:a. Create two classes IT and CSE which extends Thread class each. Inside each of the class, print Hello IT and Hello CSE for 5 and 10
times. b. Create multiple threads that display welcome to it and welcome to seca
for every 5 and 10 seconds. Also write a for loop to print welcome to vrsec forevery 15 secs
Week 9:
1. Write a java program to push the elements from back into a Linked List and sort them in ascending order
 Write a java program clone an ArrayList to another ArrayList in Java? Write a java program clone an ArrayList to another ArrayList in Java?
 Write a java program to perform various operations on Deques. Write a program that creates a LinkedList object of 10 characters, then
creates a second LinkedList object containing a copy of the first list, but in reverse order.

	W/l- 10-
	1. Develop a program using label (swing) to display the message "GFG
	WEB Site Click"
	2. Write a program to create three buttons with caption OK, SUBMIT, CANCEL.
	3. Program to create a translucent frame and control its translucency with
	the help of a JSlider.
	4. Write a program to create JComboBox and Swing Menus.
	Week 11:
	1. Write a program to Check if a String Contains Only Alphabets in Java
	2 Write a program to Converting ArrayList to HashMap in Java 8 using a
	Lambda Expression
	3. Write a program to Perform area of Rectangle using Lambda
	4. Write a program to Perform Linear search using Lambda expressions
	Week 12:
	 Write a program demonstrates a static method reference. Write a program demonstrate string operations using a method reference to
	an instance method
	3. Write a java program to print the Fibonacci values upto the given integer
	using streams.
	between 0 and 100, limits the stream to 10 numbers, and prints them.
	Case Studies:
	 Simulate the bank, conege, notary applications using java Develop GUI based application using handle events raised by the
	application
	3. Develop GUI based application using java swings to various
	applications bank, college, library.
Text books	Text Books:
and	[1].Herbert Schildt, "Java The Complete Reference", 11th Edition,
Reference	McGraw-Hill Education, New Delhi, 2019.
DOOKS	[1] Kethy Sierra & Bert Bates, Head First Java, Second edition
	Shroff/O'Reilly, 2009
	[2] Herbert Schildt, Dale Skrien, "Java Fundamentals: A Comprehension
	Introduction", Special Indian Edition, McGraw-Hill Education India
	Pvt. Ltd, 2013.
	[5] Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program", 9 th Edition Prentice-Hall Pearson Education 2011
	[4] Timothy Budd, "Understanding Object Oriented Programming with
	Java", Updated edition, Pearson Education, 2013.

E-	[1]. Prof. I. Sengupta. (19-05-2021), Department of Computer Science												
resources	& Engineering, I.I.T., Kharagpur, "Internet Technologies", NPTEL,												
and other	http://nptel.ac.in/video.php?subjectId=106105084												
digital	[2]. Mia Minnes, Leo Porter, Christine Alvarado, University of California,												
material	San Diego (19-05-2021) Object Oriented Programming in Java												
	Available: https://www.coursera.org/learn/object-oriented-java												
	[3].Cay Horstmann, Cheng-Han Lee, Sara Tansey, San Jose State												
	University, (19-05-												
	2021) Intro to Java Programming Available												
	https://eu.udacity.com/course/intro-to- java-programmingcs046												

SEMESTER IV

Course	Eng	ginee	ring S	Sciend	ce				Cr	redits	5:					3	
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	CO4	Ana	lvze	the pr	opert	$\frac{1}{1}$ ies ty	vnes a	nd a	ann	olicati	ons	f gra	nhs				
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towards	CO1	3	3			3					3						
achievement	CO2	3	3			3					3						
of Program	CO3	3	3			1					1						
Outcomes	CO4	3	1								1						
(1-Low, 2-																	
Medium, 3-																	
Hign)	LINIT	т.															
Course UNIT I: Content The Foundations: Logic and Proofs-Propositional Logic Propositional																	
Content The Foundations: Logic and Proofs -Propositional Logic, Propositional equivalences, Predicates and Ouantifiers. Rules of inference. Introductions to proofs.																	
equivalences, Predicates and Quantifiers, Rules of inference, Introductions to proofs. Normal forms(PDNF, PCNF).																	
	Count	ing	Tech	nique	es: B	sasics	of	cou	ntir	ng, I	Pigeo	nhole	prir	nciple	, Ge	ner	alized
	permut	ation	s and	com	binati	ons.				U,	U		1	1			
	UNIT	II:															
	Advan	ced	Coun	ting	Tech	nique	es: Re	cur	ren	ce R	elatio	ns- S	olvin	g Lin	ear re	ecui	rrence
	relation	ns-So	lving	hon	noger	neous	recu	rrer	ice	rela	tions	witl	h coi	nstant	coe	ffic	cients-
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and Deference	[2]	Mat	hond	ucian	s, 2 nd khoro	eaitio	on, Pl	11. 'mo-	20***	voth:	Dia	oroto	Moth	amat		л.	2010
books	[2] Refere	. 18.C nce l	nanu Rook	aone s	KIIdl'd	in and	1 IVI.U	ma	Jar	vauiii	, DIS	crete	wiath	emati	US , PI	11 4	2010
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	[[-]	McC	Fahil	1	,	_ 10							rr		, 0		43

23ES3102- DISCRETE MATHEMATICAL STRUCTURES

	[2]. Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, 4 th
	edition(2003), Pearson education
E-resources	[1]. Kamala Krithivasan, IIT Madras, Discrete Mathematical Structures
and other	[NPTEL], (26,may,2021)Available:
digital	http://nptel.ac.in/syllabus/syllabus.php?subjectId=106106094
material	[2]. DominikScheduer, Assistant Professor, Department of CSE, Shanghai Jiao
	Tong University Discrete Mathematics [COURSERA].,(26,may,2021)
	Available: https://www.coursera.org/learn/discrete-mathematics
	[3].Dr. Kamala Krithivasan, IIT Madras, Discrete Mathematical
	Structures, [NPTEL], (26, may, 2021) http://www.infocobuild.com/education/au
	dio-video-courses/computerscience/DiscreteMathematicalStructures-IIT-
	Madras/lecture-16.html

Course Cate	gory:	Eng	Engineering Science						Credits:						3	
Course Type	e:	The	ory	<u> </u>]	Lecture-Tutorial-Practice:						3-0-0	
Prerequisite	s:	-						(Continuous Evaluation:						30	
								5	Seme	ster e	end E	valu	ation:		70	
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Course	Upon s	uccess	ful co	mpleti	on of	the c	ourse	, the	stude	nt wil	ll be a	able to	0:			
Outcomes	CO1	Exan	nine Pr	obabi	lity di	stribı	itions	with	rand	om va	ariabl	es.				
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	CO3	Infer	the Hy	pothe	esis co	ncerr	ning v	varian	ice an	d pro	porti	ons.				
	CO4	Exan Statis	nine that the stical structure of the st	e Qua kills	ality i	mpro	veme	ent, c	ontro	l cha	rts ar	nd rel	liabilit	y to	improve	
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Outcomes	CO1	3	3	-	2											
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3- High)																
Course	UNIT	I														
Content	Proba	obability Distributions: Random Variables (discrete and continuous), Expectation,														
	Varian	ce and	Stand	lard d	eviati	on of	f disc	rete	rando	m va	riable	e, Bii	nomia	l dist	ribution,	
	Poisso	n distr	ibution	n. Exp	pectat	ions,	Vari	ance	and	stand	lard	devia	tion o	of co	ntinuous	
	randon	ı vari	ables,	Norn	nal d	istrib	ution	, No	ormal	appi	roxim	ation	to	the I	Binomial	
	distribu	ition.		T	1:		- D:		1	G		_				
	JOINUT	IISULID II	uuon:	Joint	aistrit	bution	18-D18	screte	and	Conti	nuou	S.				
	Samp	11 ing Di	strihu	tions	Intro	ducti	on Pa	าทมไล	tions	and S	amnl	es				
	Infere	nces C	oncer	ning N	Mean	: Poir	t Esti	imatio	on- In	terva	l Esti	matio	on			
	Test of	Нуро	thesis -	– Null	Нуро	othesi	s and	Test	s of H	Iypot	hesis	– Hy	pothe	sis		
	concer	ning of	ne mea	n - R	elatio	n betv	ween	tests	and C	Confic	lence	inter	vals –	Oper	ating	
	charact	eristic	curves	s - Inf	erence	es coi	ncerni	ing tv	vo me	eans.						
	ΙΙΝΙΤΤ	ш.														
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	one va	iance-	Hvno	thesis	conce	ernino	r two	varia	nces	ai iail	CC3- I	туро		COLO	Anng	
	Infere	nce (Concei	ming	Pro	porti	ons:	Est	imatio	on d	of P	ropor	tions-	H	pothesis	
	concer	ning of	ne Pro	portio	n- Hy	pothe	esis co	oncer	ning	sever	al Pro	oporti	ions –	The	Analysis	
	of r x c	Table	s- Goo	dness	of fit	•			C			•			÷	
	UNIT	IV:														
	The St	atistic	al Cor	ntent	of Qu	ality	Impr	oven	nent l	Progi	rams	: Qua	lity C	ontro	1-	
	Contro	l Char	ts for N	Aeasu	remer	nts - C	Contro	ol Ch	arts fo	or Att	tribut	es.	_			
	Applic	ations	to l	Reliat	oility	and	Life	e Te	esting	: Re	liabi	lity -	- Fai	lure	– Time	

23ES4102B - PROBABILITY & STATISTICS

	Distributions – The Exponential Model in Reliability.
Text books	Text Book(s):
and	[1]. Probability and Statistics for Engineers Eighth edition by Richard A. Johnson
Reference	Prentice Hall of India.
books	Reference Books:
	[1]. Probability & Statistics for Engineers & Scientist by R.E. Walpole,
	R.H.Myers&S.L.Myers, Sixth Edition, Prentice Hall of India / Pearson
	Education.
	[2]. Probability and Statistics, Purna Chandra Biswal, Pearson Education Prentice
	Hall of India 2007.
	[3]. Probability and Statistics by T.K.V. Iyengar, B.Krishna Gandhi,
	S.Ranganatham, M.V.S.S.N.PrasadS.Chand.
E-	[1].probweb.berkeley.edu/teaching.html
resources	[2].statsci.org/teaching.html
and other	[3].video lectures.nptel.iitm.ac.in
digital	
material	

Course Cate	gory:	Prog	gramm	e Core	e			(Credi	ts:					3
Course Type	2:	The	ory]	Lectu	re-T	utori	al-Pr	actice	:	2-1-0
Prerequisite	s:	20E Prot	S1103 olem So	: Prog olving	gramn	ning f	or	(Conti	nuou	ıs Eva	aluat	ion:		30
									Seme	ster e	end E	valua	ation:		70
								,	Total	Mar	ks:				100
Course	Upon s	uccess	ful con	npleti	on of	the c	ourse	, the	stude	nt wil	l be a	ble to	o:		
Outcomes	CO1	Outli	ne the	conc	epts o	of op	eratir	ig sy	stem	servi	ces,]	Proce	ess, M	lultith	reading,
		file, o	lirecto	ry and	RAI	D stru	icture	es.							
	CO2	Appl	y Page	e Rep	lacem	ent, (CPU	schee	duling	g algo	orithn	ns an	d Dis	k Scł	neduling
		algor	ithms												
	CO3	Develop appropriate solutions to solve problems related to primary, secondary memory management. Inter process communication and deadlocks													
		mem	ory ma	nager	nent,	Inter	proce	ss co	mmu	nicati	on ar	d dea	udlock	.s	
	CO4	Ident	ify suit	table	file al	llocat	ion, f	ree s	pace 1	nana	geme	nt and	d secu	irity n	neasures
~		tor a given scenario Po Po Po Po Po Po Po Po													
Contributi		РО	O PO PO P P P P P P P P P P P P P P P P P P O O O P P P P P P P O<												
on of		1	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$												
Course	CO1	2													
towards	C01	2	$\begin{array}{c c c c c c c c c c c c c c c c c c c $												
achieveme	CO_2	3 1	2											$\frac{2}{2}$	1
nt of	005	1	5											2	1
Program															
Outcomes															
(1-Low, 2-	CO4	2	2											1	1
Medium,															
3- High)															
Course	UNIT	Ι	•						•						
Content	Introd	uction	: Ope	rating	Syst	em -	– Us	er V	iew,	Syste	em V	iew,	Oper	ating	System
	Operat	ions, C)perati	ng-Sy	stem S	Struct	ture, (Opera	ating-	Syste	m Se	rvices	s, Sys	tem C	Calls.
	Proces	s Con	cept:	Proce	ss Co	oncep	t, Pr	ocess	Sche	edulir	ng, O	perat	ions	on Pr	ocesses,
	Inter P	rocess	Comm	nunica	tion.	_									
	Multit	hread	ed Pro	gram	ming	: Ov	vervie	w, M	lultico	ore Pi	ogra	mmin	g, Mi	ılti-Tl	nreading
	Models	s, Thre	ading	lssues	•										
		II 12 Sobe	dulina	Dog		noont	a Sal	odul	ing C	nitani	Sak	aduli	ng 11	aorith	ma
	Synch	s Stilt roniza	tion.	3. Das Racko		iicepi 1 Th	s, SCI	itical	Ing C. Secti	on P	i, SCI roble	m P	ng Ai eterso	goriir m's S	lills Solution
	Synchr	onizat	ion H	Iardw:	are	, m Mute	x L	ocks.	Ser	naph	ores	Clas	ssic	Probl	ems of
	Synchr	onizat	ion.			1.10000		,	201		,	0100		1001	••••••••
	ÚNIT	III:													
	Deadlo	ocks:	Syster	n Mo	odel,	Dead	dlock	Cha	aracte	rizati	on,	Meth	ods t	for H	Iandling
	Deadlo	cks, D	eadloc	k Pre	ventio	n, De	eadlo	ck Av	voidai	nce, I	Deadl	ock E	Detect	ion, R	ecovery
	from D	eadloc	ek.												
	Memo	ry M	anagei	nent	Strat	tegies	s: Ba	ckgro	ound,	Swa	apping	g, Co	ontigu	ous	Memory
	Allocat	tion, S	egmen	tation	, Pagi	ng.		-	F	-	ь ·	~			
	Virtua	I Men	nory N	lanag	gemen	it: Ba	ackgr	ound	, Den	nand	Pagin	ig, Co	opy-o	n-Wri	te, Page
	Keplac	ement	-fifO,	LKU	, 021	IMA	L, Th	rashi	ng.						
	UNII Filo S-	IV:	File C	00000	t Aa		Jotha	de T)iroot	1111 0*	d D:	sk €+-	not ne	9	
	Imploy	sielli: nontir		Sveto	ι, ACC	255 N	ation	us, L Math		луаI Free		5K SU 5 Mar	actuf	C. Ant	
	mhia	nentil	ig rine	aysit	1113. /	MOC	auon	INICII	ious, I	100-	space	, ivial	iageill	un.	

23IT4303- OPERATING SYSTEMS

	Mass-Storage Structure: Overview of Mass-Storage Structure, Disk Scheduling,
	RAID Structure.
	Security- Protection Goals, Access Matrix, Access Control, Revocation of Access
	rights.
Text books	Text Book(s):
and	[2]. Abraham Silberschatz, Peter B. Galvin and Greg Gagne, "Operating System
Reference	Concepts", 9thed, John Wiley &Sons (Asia) Pvt. Ltd, 2018.
books	Reference Books:
	[1]. Dhananjay M. Dhamdhere, "Operating Systems: A Concept-Based Approach",
	3 rd edition, McGraw-Hill Education India Pvt. Ltd, 2017.
	[2]. William Stallings, "Operating System: Internals and Design Principles", 8 th ed,
	Prentice Hall ,2014.
	[3]. Andrew S. Tanenbaum, "Modern Operating Systems", 4th ed, Pearson, 2016.
E-	[1]. Prof. Chester Rebeiro Department of CSE, IITM "Introduction to Operating
resources	Systems" [NPTEL] dated 08 th Sep 2016
and other	https://nptel.ac.in/courses/106/106/106106144/
digital	[2]. Mythili Vutukuru, Dept of CSE, IITB "Lectures on Operating Systems" dated
material	14thMar 2018 https://www.cse.iitb.ac.in/~mythili/os/
	[3]. Prof. P.K. Biswas, Dept of EEC, IITK "Operating Systems" dated 06 th Apr 2013
	http://www.satishkashyap.com/2013/02/video-lectures-on-operating-systems-
	<u>by.html</u>

Course Cate	e Category: Professional Core						(Credits:						3		
Course Type	2:	Th	eory]	Lecture-Tutorial-Practice:						2-1-0	
Prerequisite	s:	23F	PC2104	4 - Da	ta Str	uctur	es	(Continuous Evaluation:						30	
								5	Seme	ster e	end E	valu	ation:	,	70	
								r	Total		100					
Course	Upon s	uccess	ful co	mpleti	on of	the c	ourse	, the	stude	nt wi	ll be a	able to	0:			
Outcomes	CO1	Deve	lop scł	iemas	using	g data	mod	els fo	r a gi	ven a	pplic	ation	requi	ement		
	CO^2	Cons	onstruct queries using SQL and Relational algebra on a given database													
	CO3	Desig	esign normalized databases for a given application by incorporating various													
	005	const	constraints and normal forms.													
	CO4	Analy	Analyze different forms of transactions and concurrency control mechanisms													
		to ma	to maintain data consistency in a multi user environment.													
Contributi		DO	De De De P P P P P P P P P P P													
on of		PO	$\begin{array}{c c c c c c c c c c c c c c c c c c c $													
Course		1	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$													
Outcomes	CO1	2	2 2 1 2 1 1													
towards	CO2		2			2									2	
achieveme	CO3			2								2		2		
nt of																
Program																
Outcomes	CO4												1	2	1	
(1-Low, 2-																
Mealum,																
S- Iligii) Course	UNIT															
Content	Databases And Database Users: Introduction, characteristics of the database															
content	approa	Databases And Database Users: Introduction, characteristics of the database approach actors on the scene workers behind the scene advantages of using the														
	DBMS	appro	ach		~	,					,				8	
	Databa	se Sys	stem (Conce	pts A	nd A	rchite	ectur	e: Da	ta mo	odels,	sche	mas, a	nd		
	instanc	es, thr	ee sch	ema a	archite	ecture	e and	data	indep	pende	ence,	Data	base 1	angua	ges and	
	interfac	es, Th	e data	base s	ystem	ı envi	ronm	ent								
	Relatio	nal D	ata M	odel A	And R	Relati	onal	Data	base	Cons	train	ts: R	elation	nal		
	Model	Conce	pts, Re	elatior	nal Mo	odel (Const	raints	and	Relat	ional	Datal	base S	chema	ıs	
						1.5			a	• • •	C			0.01	р :	
	SQL:	SQL I	Jata L	efinit	ion ai	nd D	ata T	ypes,	Spec	cifyin	ig Co	onstra	ints ii	i SQL	, Basic	
	Ketriev More		Com	SQL	, Insei	$\mathbf{T}, \mathbf{D}\mathbf{e}$	iete a	na U and (paate Sobor	State	ement Lodifi	is in S iontio	NQL	lora C	omplay	
	SOI R	etrievs	ol Ouer	ies V	Views	co, v. (Virt	news nal T	allu i ablec) in S		Scher	na Ch	nn . IV Nange	Stater	omplex ents in	
	SOL		II QUU	105, 1	10 10 5	(• 11	uur r	uoies) III S	QL, ,	Jener		lange	State	ients m	
	The R	elatio	nal A	lgebra	a: Un	arv	Relat	ional	Oper	ratior	s: S	ELEC	CT an	d PR	DJECT.	
	Relatio	nal Al	lgebra	Opera	ations	from	n Set	Theo	ry, B	inary	Rela	tiona	1 Ope	rations	: JOIN	
	and DI	VISIO	N	1									1			
	UNIT	III:														
	Data I	Model	ing U	sing '	The]	Entit	y-Rel	ation	nship	(ER) Mo	odel:	Using	g Hig	h-Level	
	Concep	tual E	Data M	Iodels	for I	Datab	ase I	Desig	n, En	tity 🛛	Гуреs	s, Ent	ity Se	ets, At	tributes	
	and Ke	eys, R	elatior	ship	types,	Rel	ations	hip S	Sets,	Role	s and	1 Stru	ictura	l Con	straints,	
	Weak I	Entity'	Types						-		o —	-				
	Databa	ise De	esign	l'heor	y An	d Me	ethod	ology	y: Ba	Sics	of Fu	inctio	onal I	Jepen	dencies	
	and \mathbf{N}	ormal	Izatio	n for	Kela	Dom	al Da	itaba	ses -	Info	ormal	Des	ign C	uldell	nes for	
	Relatio	n Sch	emas,	runct	ional	Depe	enden	cies,	Norn	nai to	orms	based	ı on I	rımar	у кеуs,	

23IT4304- DATA BASE MANAGEMENT SYSTEMS

	First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal
	Form, Multi valued dependency and Fourth normal form, Properties of Relational
	Decompositions.
	UNIT IV:
	Introduction to Transaction Processing Concepts And Theory : Introduction to
	Transaction Processing, Transaction and System Concepts, Desirable Properties of
	Transactions, Characterizing schedules based on Recoverability, Characterizing
	schedules based on Serializability.
	Concurrency Control Techniques: Two Phase Locking Techniques for concurrency
	control – Types of locks and system lock tables, Guaranteeing Serializability by Two-
	Fliase Lockling.
	NOSQL Databases : Infoduction to NOSQL systems - Emergence of NOSQL Systems Characteristics of NOSQL Systems Categories of NOSQL Systems
	Cranh Databasa · Introduction High level view of granh space. The Power of Granh
	Databases
Text books	Text Book(s).
and	[1] Elmasri and Navathe "Fundamentals of Database Systems" Ed 7
Reference	Pearson Education 2016
books	[2]. Jan Robinson, Jim Webber, Emil Efriem, "Graph Databases", OReilly
DOOLD	Media. 2015.
	Reference Books
	[1].Raghurama Krishnan, Johannes Gehrke, "Database Management
	Systems", 3rd Edition, TATA McGrawHill, 2008.
	[2].Silberschatz, Korth and Sudharshan. Data base System Concepts. Ed4.
	McGrawHill, 2009
E-	[1]. Prof Richard Holowczak, Professor, Baruch College, The Normalization,
resources	Feb 2023
and other	https://www.youtube.com/watch?v=GvxBqzWeGz0
digital	[2]. Prof PP Das,IIIKharagpur, DBMS. Dec 7, 2017
material	https://www.youtube.com/watch?v=IoL9Ve2SRwQ&list=PLIwC9bZ0rmjSkm
	<u>1VRJROX4vP2YMIf4Ebh</u>
	[3]. Jennifer widom,(09,05,2018). Introduction to Databases
	https://www.youtube.com/watch?v=ShjrtAQmIVg
	[4]. P. B. Mahanty,(09,05,2015). DBMS and RDBMS.
	http://nptel.iitm.ac.in/video.php?courseId=1128&v=7952RsbAx2w8

Course Cate	gory:	Pro	fession	nal Co	ore			(Credits:						3
Course Type	:	Th	eory]	Lectu	:	3-0-0				
Prerequisite	s:	23I	PC2104	4 - Da	ta Str	uctur	es		Conti	nuou	ıs Ev	aluat	ion:		30
								1	Seme	ster e	end E	zvalua	ation:	ŕ	70
								'	Total	Mar	ks:				100
Course	Upon s	uccess	ful con	mpleti	on of	the c	ourse	, the	stude	nt wil	ll be a	able to	o:		
Outcomes	CO1	Unde	erstand	the ba	asic fu	ından	nental	ls of t	the so	ftwar	e dev	elopr	nent l	ife cyc	ele.
	CO2	Appl	y proce	ess mo	dels a	and te	esting	tech	nique	s to r	eal ti	ne ap	plicat	ions.	
	CO3	Anal	Analyze requirements, specifications to build software design architecture.												
	CO4	Analyze the processes for identifying, assessing, and mitigating risks													
		associated with software maintenance and evolution.													
Contributi		DO	PO PO PO P P P P P P P P P P P P P P P												
on of		ΓU 1	$\begin{array}{c c c c c c c c c c c c c c c c c c c $												
Course		1	Z	3	4	5	6	7	8	9	10	11	12	1	2
Outcomes	CO1													3	1
towards	CO2	1			2						2			2	
achieveme	CO3		2								3	2			1
nt of				3							2	3		2	2
Program															
Outcomes	CO4														
(1-Low, 2-	00.														
Medium,															
3- High)															
Course	UNIT I: Introduction: Evolution Software development projects Evolutions stule of														
Content	Introduction: Evolution, Software development projects, Exploratory style of														
	softwar	e dev	lonme	ent pro	Ellier		e 01	SOIN	vare	engn	oring	ig, in	otable	e chai	iges in
	Softwa	cucve ro Iif		lo Me	ndale.	, CUI Raci		n Sys		ngnie starfa	ll m	,. odal	and it	c ovt	ansions
	Rapid a	nnlica	tion d	evelor	ment		le dev	elon	s, v.c menti	mode	1 Sn	iral m	anu n odel	IS CAU	
	A oility	• A oil	ity and	the (7ost c	, Agi of Ch	ange	Agil	e Pro	Cess	Fytr	eme I	Ouel.	mmin	σ (XP)
	Other A	Agile F	rocess	Mod	els. To	r c r	et for	the A	Agile 1	Proce	EXIT		10510		5 (m),
	UNIT	<u>-g</u> II:	100000	1.100	, 1	001.0			-8						
	Softwa	re P	roject	Ma	nagen	nent:	So	ftwar	e pro	oject	mai	nagen	nent	comp	lexities,
	Respon	sibilit	ies of	a sof	tware	proj	ect m	anag	er. M	letric:	s for	proje	ect siz	e esti	mation,
	Project	estim	ation to	echnic	jues, I	Empi	rical I	Estim	ation	techr	nique	s, CŎ	COM	O, Ha	lstead's
	softwar	e scier	nce, ris	sk mai	nagen	nent.									
	Requir	emen	ts Ana	alysis	And	Spe	cifica	tion:	Req	uiren	nents	gathe	ering	and a	nalysis,
	Softwa	re Rec	quirem	ents S	Specif	icatio	n (SI	RS), 1	Forma	al sys	stem	specit	ficatio	on, Ax	iomatic
	specific	cation,	Algeb	raic s	pecifi	catio	n, Exe	ecutal	ble sp	ecific	catior	and 4	4GL.		
	Softwa	re De	esign:	Ove	rview	of t	he do	esign	proc	ess,	How	to c	haract	erize	a good
	softwa	e des	sign?	Layer	red a	irrang	gemer	nt of	f mo	dules	, Co	ohesio	on ar	nd Co	oupling.
	approa	ches to	o softw	are de	esign										
	UNIT		P	•	-11	, · .	•	c	1	•	C	ъ			
	User II	iteria	te Des	Ign: (ICS O	r a go	od us	er int	CIU	е, ва	SIC CO	ncepts	, Types
	or user	inter	races,	Fund	ament	ais c	01 CO1	npon	ient-Da	ased	GUI	deve	lopm	ent, a	na user
	Coding	e desi	gn mei		ogy.	Cod	a roui	our 6	Softw	ara d	201100	ontot	on T	octina	Plack
	box to	s Alla	White		testi:		e revi	ew, 2 aina	DIIWa Dr		n or	entati alveic		estillg, a Inte	DidUK-
	testing	Sung, Teeti	ng ob	iect_o	riente	ig, L d pro	oram	ging, « C+	, ri noke	tectiv	n all ng a	arysis nd Sv	nuoli nme o	o, IIItt Jeneral	jsenee
	associa	ted wi	th testi	ing.		a pro	-51 am	5, 51	IOKC	coul	15, а			,enera	155005

23IT4305 - SOFTWARE ENGINEERING

Software Reliability And Quality Management: Software reliability. Statistical
testing, Software quality, Software quality management system, ISO 9000. SEI
Capability maturity model. Few other important quality standards, and Six Sigma
UNIT IV:
Computer-Aided Software Engineering (Case): CASE and its scope, CASE
environment, CASE support in the software life cycle, other characteristics of CASE
tools, Towards second generation CASE Tool, and Architecture of a CASE
Environment.
Software Maintenance: Characteristics of software maintenance, Software reverse
engineering, Software maintenance process models and Estimation of maintenance
cost.
Software Reuse: reuse- definition, introduction, reason behind no reuse so far, Basic
issues in any reuse program, A reuse approach, and Reuse at organization level.
Text books:
[1]. Fundamentals of Software Engineering, Rajib Mall, 5th Edition, PHI,2018.
[2]. Software Engineering A practitioner's Approach, Roger S. Pressman, 9th Edition, Mc-
Graw Hill International Edition.
References:
[1]. Software Engineering, Ian Sommerville, 10th Edition, Pearson.
[2]. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
[1], PTOL N.L. Sarda, PTOL Ullesin Bellur, PTOL R.K. Joshi and PTOL Shashi Kelkar, Department of Computer Science & Engineering, IIT Rembay, Oct 8, 2008, NDTEL
Lecture Series on Software Engineering by
[2], https://www.pptelvideos.com/lecture.php?id=7041
[3]. Prof. Umesh Bellur. Computer Science & Engineering. Indian Institute of Technology.
Bombay, Software engineering: Requirements Engineering/Specification NPTEL pdf,
2008 Available by
https://drive.google.com/file/d/1DC6FXZfYeQ42PODWTNfB4mkIE5WnTSDM/view
Kenneth W T Leung, Assistant Professor of Engineering Education, The Hong
Kong University of Science and Technology, Software Engineering Specialization
Coursera 2022. Availble by <u>https://www.coursera.org/specializations/software-</u>
engineering [4] Don Durhook Donortmont of Computer Science Creducts Studies of Stanford
LiniversityDecember 1999 on Software Engineering Methodologies by
http://infolab.stanford.edu/~burback/watershuice/watershuice.html

Course Category:	Soft Sk	ills –	2					1						
Course Type:	Practic	al					L	0-0-	2					
Prerequisites:	Basic u	nders	tandin	g of tł	ne			Со	ntinuo	us Eva	luation:	100		
	languag	ge skil	ls viz	Lister	ning,			0						
	Speakii	ng, ke	ading	and v	vriting.					Total	Marks:	100		
	Unon	ances	sful c	omnle	tion of	the co	urse f	he stu	dent w	ill he s	able to	,		
Course Outcomes		Und	erstan	d hov	v to lis	ten. re	eflect.	and sp	eak w	hile co	mmuni	cating	with	
	COI	othe	rs.			,	,	·· · · I				0		
	CO2	Reca	all the	funda	amenta	ls of la	inguage	e in ter	ms of	gramn	nar and	vocab	oulary	
	02	in co	ommu	nicatio	on.									
	CO3	App	ly Eng	glish la v and	anguag	e skills	s in var	rious sp	eaking	conte	xts to p	oresent	ideas	
	CO4	Ana	lvze tl	<u>y anu</u> he diff	erent n	-y. arts in	Versar	nt Test	and and	wer th	em			
Contribution of	04	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	
Course Outcomes		1	2	3	4	5	6	7	8	9	10	11	12	
towards														
achievement of	CO1													
Program		2									3		3	
Outcomes	CO2													
(1 - Low,		2								2	3		3	
2 - Medium,	CO3	2												
5– nigil)	CO4	2									3		3	
Course Content	1 Con	CO4 Image: CO4 Image: CO4 1 Conversation Starters												
	Offerin Conver 2. Fun roducinş Introdu 3. Gra Verbs - 4. Just roductio	$m = \frac{1}{2}$ g He sation ctiona g Self ction - Tens - Tens c A Mi n - Si - Conf	elp – a with al Cor – In – Intro r ses – S inute ignific	Expr Expr a Strat troduc oducin	tions tions ing Ot g a For ce Strue	Than Practic hers – mal Se ctures –	ks – e. Starti etting – – Spott	ng a Conve - Praction ing the ace – A	Group ce Exer Errors	Introd Introd rcises.	uction rs – Co	– Iceb	ing a oreaker	
	 5. Voc Idioms 6. Eloc finition and Ge 7. Externoductio Confide 	 4. Just A Minute oduction – Significance – Fluency – Coherence – Avoiding Errors – Communication Skills – Confidence – Practice. 5. Vocabulary Idioms – Phrases – Significance – Meanings – Usage – Practice. 6. Elocution inition – Importance – Key Components – Voice Modulation – Articulation – Posture and Gestures – Practice. 7. Extempore oduction – Significance – Developing Quick Thinking – Communication Skills – 												

23TP3206 : ENGLISH FOR PROFESSIONALS

	8. Debate roduction – Understanding the Structure – Purpose of a Debate – Developing Basic Debating skills – Do's and Don'ts – Practice.
	9. Versant Test rerview of the Versant Test – Purpose and Importance – Format of the Test – Types of Questions – Practice.
	10. Story Telling Know Your Audience – Choose a Story – Set the Scene – Introduce the Characters – Build Suspense – Describe the Conflict – Show the Resolution – Share the moral/message – Use Vivid Language – Practice Delivery – Invite Reflection/Discussion – Follow Up.
Text books and Reference books	Text Book(s): [1] English for Professionals Lab Manual Reference Books
	 [1] Wren & Martin. <i>English Grammar and Composition</i>. S.Chand & Company, 2023. [2] Dale Carnegie. <i>The Quick and Easy way to Effective Speaking</i>. Rupa Publications, 2016.
	 [3] Richard A. Spears. McGraw-Hill's Dictionary of American Idioms and Phrasal Verbs. McGraw Hill, 2005. [4] Kamalesh Sadanand. A Spoken English. VOL 1&2, Orient BlackSwan, Second Edition, 2014.
E-resources and other digital material	 [1] <u>https://www.pearson.com/languages/hr-professionals/versant.htmlSoftx</u> [2] <u>https://www.ted.com/talks</u> [3] <u>https://shortstoryproject.com/</u>

Course Cate	gory:	Au	dit Co	urse			_ 1_ 1		<u>Credi</u>	its:					-
Course Type	<u>801)</u>	Th	eorv						Lectu	. .	2-0-0				
Proroquisito	c.		cory						Conti	nuar	ic Fy	aluat	ion.		100
Trerequisites	3.								Somo	aton		aiuat	otion.		100
								_	Seme Total	Mor	ena E	valu			-
Course	Unon		f.1	malat	on of	tha a	011000	tha	10tal		KS:	hla t	~ •		100
Course	CO1	Ident	ful col	inpieti		the c	ing d	, the	Stude	of po			0:	ad Ca	mtmol
Outcomes	COI	Maga	iiy vai	ious i	actors	caus	mg u	egrac	iation	01 112	uurai	resot	ince a		muoi
	CO2	Ident	ify yor	y various ecosystem and need for biodiversity											
	CO_2	Dooli	ily val	e and explore the problems related to environmental pollution and its											
	COS	Reall	ze and explore the problems related to environmental pollution and its												
	CO4	Appl	y the information and technology to analyze social issues use acts												
	C04	Appi	ciated with environment												
Contributi		assoc													
on of		PO	PO	PO	PO								PO	PSC) PSO
		1	2 3 4 5 6 7 8 9 10 11 12 1 2											2	
Outcomes	CO1	1													
towards	CO_2	1	1	1					1		1			1	
achieveme	CO3														
nt of	000														
Program							-	-	-					1	
Outcomes	004														
(1-Low, 2-	CO4														
Medium,															
3- High)															
Course	UNIT	[:													
Content	The M	Iultidi	sciplin	ary l	Nature	e of	Env	ironn	nental	Stu	dies	Defi	nition	, sco	ope and
	importa	ance N	leed fo	r publ	ic awa	arene	ss.								
	Natura	l Reso	ources	:											
	Renew	able	and 1	Non-r	enew	able	Res	ource	es: N	Jatura	al re	sourc	es ar	nd as	ssociated
	probler	ns.													
	(a)For	est re	source	es: U	se an	d ov	er-ex	ploita	ation.	defo	restat	ion.	Timb	er ex	traction,
	mining	. dams	and th	neir ef	fects	on foi	rests :	and ti	ribal r	eople	e.				,
	(h)Wa	ter re	source	s: Us	e and	love	r-ntili	zatio	n of	surfa	ce an	d ora	ound '	water	floods
	drough	t conf	licts or	ver we	ater d	ame_	henef	ïte ar	n or nd pro	blem	c un	- BI	Juna	ii utoi	, 1100 u b,
	(a)Min	arol r			lici, u	d ovr		tion	onvir	onmo	o. mtol	offoot	a of a	vtroo	ting and
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	(d)F00	d res	ources	5: Wo	orld 1	tood	prob	lems	, cha	nges	caus	sed t	by ag	ricult	ure and
	overgra	azing,	effects	of mo	odern	agric	ulture	e, fert	tilizer	-pesti	icide	probl	ems, v	vater	logging,
	salinity														
	(e)Ene	rgy re	esourc	es: G	rowin	g ene	ergy	needs	s, rene	ewab	le an	d nor	n-rene	wable	e energy
	sources	s, use o	of alter	nate e	nergy	sour	ces.								
	(f)Lan	d reso	urces:	Land	as a i	resou	rce, l	and d	legrad	lation	, mar	n indu	iced la	andsli	ides, soil
	erosion	and d	lesertif	icatio	n. Ro	le of	an in	divid	ual in	cons	servat	ion o	f natu	ral re	sources.
	Equitat	ole use	of res	ource	s for s	ustai	nable	lifest	tyles.						

23MC3107 – ENVIRONMENTAL SCIENCE

UNIT II:

Ecosystems

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 and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem

(d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation

Introduction, definition: genetic, species and ecosystem diversity. Biogeographically classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT III:

Environmental Pollution

Definition, Causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards

Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.

Disaster management: Floods, earthquake, cyclone and landslides.

UNIT IV:

Social Issues and the Environment:

From unsustainable to sustainable development. Urban problems related to energy.

Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns.

Environmental ethics Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products.

Environment Protection Act

Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation.

Public awareness

Human Population and the Environment, Population growth, variation among nations, Population explosion—Family Welfare Programme.

Environment and human health

Human rights, Value education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in environment and human health.

Field Work/ Case Studies

Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain. Visit to a local polluted site—Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds. Study of simple ecosystems—pond, river, hill slopes, etc.

Text books	Text Book(s):
and	[1].ErachBharucha. 2004, Environmental Studies for undergraduate courses,
Reference	University Grants Commission, New Delhi, Bharati Vidyapeeth Institute of
books	Environment Education and Research.
	Reference Books:
	[1] AnjaneyuluY. Introduction to Environmental sciences, B S Publications PVT
	Ltd, Hyderabad
	[2] Anjireddy.M Environmental science & Technology, BS Publications PVT Ltd,
	Hyderabad.
	[3] Benny Joseph, 2005, Environmental Studies, The Tata McGraw-Hill
	publishing company limited, New Delhi.
	[4] Principles of Environmental Science. & Engg. P.Venu GopalaRao, 2006,
	Prentice-Hall of India Pvt. Ltd., New Delhi.
	[5] Ecological and Environmental Studies – Santosh Kumar Garg, Rajeswari Garg
	(or) RajaniGarg, 2006, Khanna Publishers, New Delhi.
	[6] Essentials of Environmental Studies, Kurian Joseph & R Nagendran, Pearson
	Education publishers, 2005.
	[7] A.K Dee – Environmental Chemistry, New Age India
	Publications.BharuchaErach- Biodiversity of India, Mapin Publishing Pvt.Ltd
Е-	[1]. ErachBharucha. 2004, Environmental Studies for undergraduate courses,
resources	University Grants Commission, New Delhi, BharatiVidyapeeth Institute of
and other	Environment Education and Research.
digital	https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf
material	[2]. NPTEL Courses - Environmental Studies By Dr. Tushar Banerjee Devi
	AhilyaViswavidyalaya, Indore.

Course Cate	gory:	Skill	kill Enhancement CourseCredits:2												
Course Type	e:	Learr	ning by	doing	5			1	Lectu	re-T	utori	al-Pr	actice	e:	0-1-2
Prerequisite	S:	23IT: Lab	3651: I	Pythor	n Prog	gramr	ning		Conti	nuou	ıs Ev	aluat	ion:		-
								1	Seme	ster e	end E	valu	ation:		-
								'	Total	Mar	ks:				100
Course	Upon s	success	ful con	mpleti	on of	the c	ourse	, the	studer	nt wil	l be a	able to	0:		
Outcomes	CO1	Deve	lop py	thon p	orogra	ms o	n con	trol f	low st	atem	ents a	and st	rings.		
	CO2	Desig	gn sol	utions	to	a va	riety	of	proble	ems	using	g pyt	hon	built-	in Data
		Struc	tures.	res.											
	CO3	Appl	y objec	ct-orie	nted o	conce	pts, e	rror l	nandir	ng me	echan	isms	in pyt	hon.	
	CO4	Anal	yze and visualize using NumPy, Pandas and Matplotlib in python.												
Contributi			DO	PO PO PO P P P P P P P P PO PSO PSO											
on of		PO 1	PU 2	2		0	0	0	0	0	0	0	PO	PSC	J PSU
Course		1	Z	3	4	5	6	7	8	9	10	11	12	1	Z
Outcomes	CO1	2			2	2				1	1	2			
towards	CO2	2	1			2				1	1	2			
achieveme	CO3	2	2		1	2				1	1	2			
nt of															
Program															
Outcomes	CO4	3	3		3	3				3	2	2	3		
1-LOW, 2- Modium															
Medium,															
S- Iligii)	UNIT	 Т.													
Content	Pythor	1. 1 lihra	raries for web development												
Content	Collect	ions-C	raries for web development : s-Container datatypes Tkinter-GUI applications Requests-HTTP requests												
	Beauti	fulSou	p4-wel	b scra	ning.	Scra	pv. Z	appa	. Das	h. Cl	herry	Pv. T	urbo	Gear	s. Flask.
	Web2F	v. Bot	tle. Fal	lcon.	Cubic	Web	. Oui	xote.	Pvran	nid.		,			s, 1 mon,
	UNIT	II:		,				,	,						
	Introd	uction	to Dj	ango]	Fram	ewor	k								
	Unders	tandin	g Dja	ngo e	nviro	nmen	it, Fe	ature	s of	Djan	go a	nd D	jango	arch	nitecture,
	MVC	and M	TV, U	Jrls a	nd Vi	ews,	Map	ping	the v	iews	to U	RLs,	Djan	go T	emplate,
	Templa	ate inh	eritanc	e Dja	ngo I	Mode	ls, Cr	eatin	g mo	del fo	or site	e, Co	nverti	ing th	ne model
	into a	table,	Fields	in N	Iodel	s, Int	egrat	ing I	Bootst	rap i	nto I	Djang	o, Cr	eating	g tables,
	Creatin	ng grid	s, Crea	ting c	arous	els.									
	UNIT	III:													
	Integra	ating A	Accour	nts &	Auth	entic	ation	on I	Djang	D					
	Introdu	iction	to Dja	ingo	Authe	ntica	tion S	Syste	m, Se	ecurit	y Pr	oblen	n & 1	Solut	ion with
	Django	o Crea	ting R	legistr	ation	Form	n usi	ng D	jango	, Ad	ding	Ema	il Fie	ld in	Forms,
	Config	uring	email	settin	gs, So	endin	g em	ails	with	Djang	go, A	Addin	g Gri	d La	yout On
	Registi	ation I	Page, A	Adding	g Page	e Res	trictic	ons, L	ogin]	Funct	tional	ity T	est an	d Log	gout.
	Conne	cting S	SQLite	e with	Djan	igo									
	Databa	se Mi	gratior	ns, Fe	tch D	Data 🛛	From	Data	abase,	Dis	playi	ng D	ata O	n Te	mplates,
	Adding	g Cond	ition (On Da	ta,Ser	nding	data	from	url to	o viev	w, Se	nding	g data	from	view to
	templa	te													
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23IT4651– PYTHON WITH DJANGO

	Django, Four Important Pillars to Deploy, registering on Heroku and GitHub, Push project from Local System to GitHub, working with Django Heroku, Working with
	Static Root, Handling WSGI with gunicorn, setting up Database & adding users.
Text books	Text Book(s):
and	[1].Martin C.Brown, "Python: The Complete Reference Paper back", 4th Edition
Reference	2018, McGraw Hill Education.
books	[2].Reema Thareja, "Python Programming: Using Problem Solving Approach", 3 rd Edition 2017,Oxford.
	[3].Daniel Rubio, Apress, "Beginning Django Web Application Development and Deployment with Python", 2 nd Edition 2017, Apress.
	 Reference Books: [1]. Tom Aratyn, "Building Django 2.0 Web Applications: Create enterprise-grade, scalable Python web applications easily with Django 2.0", 2nd Edition 2018, Packt Publishing. [2]. Harry Percival, "Test-Driven Development with Python: Obey the Testing Goat: Using Django, Selenium and JavaScript", 2nd Edition 2019, Kindle Edition.
E-	[1]. <u>https://www.browserstack.com/guide/top-python-web-development-</u>
resources	frameworks
and other	[2].https://developer.mozilla.org/en-us/docs/learn/server-side/django/introduction
digital	[3]. <u>https://www.classcentral.com/course/youtube-django-authentication-user-</u>
material	management-full-tutorial-117030
	[4].https://www.youtube.com/watch?v=uipsnre6uwe

Course Cate	gory:	Engir	neering	Scier	nce			(Credits:						2
Course Type	:	Learr	ning by	' doing	2]	Lectu	e:	1-0-2				
Prerequisite	s:	-							Conti	nuou	is Eva	aluat	ion:		30
								5	Seme	ster e	end E	valu	ation:		70
								,	Total	Mar	ks:				100
Course	Upon s	uccess	ful con	npleti	on of	the c	ourse	, the	stude	nt wil	l be a	able to	o:		
Outcomes	CO1	Desci	ribe th	e fund	amen	tal co	ncept	s of l	Desig	n Thi	nking	g and	Innov	vation	l .
	CO2	Appl	y the d	ne design thinking techniques for solving problems in various sectors.											
	CO3	Analy	yze th	e the concepts of design thinking to work in a multidisciplinary											
	004	envir	onment.												
	CO4	Evalu	ate the value of creativity with design thinking concepts.												
Contributi		PO	PO	PO	PO	P	P	P	P	P	P	P	PO	PSC) PSO
On Ol		1	2	3	4	5	6	7	8	0	10	11	12	1	2
Outcomes	CO1	2			2	2	0	/	0	1	10	2			
towards	CO_2	2	1		-	2				1	1	2			
achieveme	CO3	2	2		1	2				1	1	2			
nt of	200		_		-	_				-	-	_			
Program															
Outcomes	CO4	3	3		3	3				3	2	2	3		
1-Low, 2-	0.04	5	5		5	5				5	2	2	5		
Medium,															
3- High)	TINIT	τ.													
Content	UNII	1:													
Content	Introd	uction	to De	sion 7	hink	inø									
	Introdu	iction	to eler	nents	and p	orinci	ples of	of De	esign,	basi	cs of	desig	gn-do	t, line	e, shape,
	form a	s fund	amenta	al desi	ign co	mpo	nents.	Prin	ciple	s of c	lesigr	n. Inti	roduct	tion to	o design
	thinkin	g, hist	ory of	Desig	n Thii	nking	, Nev	v mat	erials	in In	dustr	y.			
	UNIT	II:													
	Design	Think	king P	roces	S (~4 1 ~;		1	:da.	0		(:		ting the
	Design	in dr	ing pr	ocess	(emp	desig	e, and n thi	alyze	$\frac{10}{10}$	ı a j	inno	(ype),	, impi		iting the
	thinkin	σ - ner	son co	ostum	er ion	irnev	man	brair	s m s istorr	ning	prod	uct de	evelor	ment	i uesigii
	Activit	v: Eve	erv stu	dent n	resent	ts the	ir ide	a in t	hree	minut	tes. E	lverv	stude	nt car	n present
	design	proces	ss in t	he for	m of	flow	diag	ram o	or flo	w ch	art et	c. Év	very s	tuden	t should
	explain	about	produ	ct dev	elopn	nent.	U						•		
	UNIT	III:													
	Innor	tion													
	Art of	innova	tion I	Differe	nce h	etwe	en ini	novat	ion a	nd cre	aativi	tv ro	le of	creati	vity and
	innova	tion in	organ ³	ization	nce u	eativi	tv to	Innov	vation	nu ch Tea	ms fo	r inn	ovatio	on M	easuring
	the imr	act an	d valu	e of cr	eativi	tv.	., .0	UIIU	auton	. 104		×1 1111	5 ruil	, ii, ivi	cusuimg
	Activit	y: De	bate o	on inr	novati	on a	nd ci	eativ	vity, l	Flow	and	plan	ning	from	idea to
	innova	tion, D	ebate	on val	ue-ba	sed in	nnova	tion	-			•	U		

23ES4152-DESIGN THINKING & INNOVATION

	UNIT IV: Product Design
	Problem formation, introduction to product design, Product strategies, Product value,
	Product planning, product specifications. Innovation towards product design Case
	studies.
	Activity: Importance of modeling, how to set specifications, Explaining their own
	product design.
	Design Thinking in Business Processes
	Design Thinking applied in Business & Strategic Innovation, Design Thinking
	principles that redefine business – Business challenges: Growth, Predictability,
	Change, Maintaining Relevance, Extreme competition, Standardization. Design
	thinking to meet corporate needs. Design thinking for Startups. Defining and testing
	Business Models and Business Cases. Developing & testing prototypes.
	Activity: How to market our own product, about maintenance, Reliability and plan for
Torrt boole	startup.
Text Dooks	1 Tim Drown Change by design 1/2 Harmer Balling 2000
anu Doforonoo	1. This Brown, Change by design, 1/e, Harper Bohnis, 2009.
books	2. Idris Mootee, Design Thinking for Strategic Innovation, I/e, Adams Media,
DUOKS	2014.
	Reference Books:
	1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
	2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
	3. William lidwell, Kritinaholden, &Jill butter, Universal principles of design, 2/e,
	Rockport Publishers, 2010.
	4. Chesbrough.H, The era of open innovation, 2003
Е-	• https://nptel.ac.in/courses/110/106/110106124/
resources	 https://nptel.ac.in/courses/109/104/109104109/
and other	https://swayam.gov.in/ndl_noc10_mg60/preview
digital	https://swayani.gov.ii/htt_not_not/>_ingoo/picvicw
material	• <u>nups://onlinecourses.nptel.ac.in/noc22_de16/preview</u>

<u> </u>			1						1.					1 7	
Course Category:	Profes	5510	nal core	•				Cre	dits:					1.5	
Course Type:	Lab							Lect	ture-7	e:	0-0-3				
Prerequisites:	Data S	Stru	ictures					Con	tinuo	us Ev	valuat	tion:		30	
-	Progra	amı	ning lar	iguag	e			Sem	ester	end l	Evalu	ation	:	70	
				Total Marks:											
Course	Upon	SUC	cessful	ul completion of the course, the student will be able to:											
Outcomes	CO1		Practice	ice Unix Commands for creating and operating data in files and											
			director	ctories											
	CO2		Illustrat	trate semaphore based solution to Synchronization problems											
	CO3		Implem	lement Memory management methods nonstrate different CPU Scheduling and Page Replacement algorithms a given reference string											
	CO4		Demon												ithms
			for a gi												
	CO5		Apply diagram	ly Object Oriented Analysis and Design concepts and various UML grams to real time applications.											
	CO6		Genera	te U	ML	diagr	ams	illust	rating	botl	h the	stat	ic ai	nd dvr	namic
			compor	nents	of sof	tware	, and	utiliz	e thes	e diag	grams	to de	velop	project	.s.
Contribution		PO	O PO	PO	PO	PO	PO	PO	PO	РО	PO	PO	PO	PSO	PSO
of Course		1	2	3	4	5	6	7	8	9	10	11	12	1	2
Outcomes	CO1	1	1											1	1
towards	CO2	1	3											2	1
achievement	CO3	1	3											2	1
Outcomes	CO4	3	2											2	1
(1-Low, 2-	CO5														
Medium, 3- High)	CO6														
Course															
Content	OPE	RA	TING S	SYST	EMS										
	Weel	x 1:	Practic	ing of	f Basi	c UN	IX Co	omma	nds. V	Vrite	progra	ams u	sing t	he	
		fo	ollowing	UNI	Х оре	erating	g syste	em ca	lls						
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	Weel	K 2: 1- 2	Simula	te UN	IX C	omma	nds li	ke op	endir	and r	eaddii	cp, I	s, gre	ep, etc.,	
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			.,	0,00			, . , 1								
	Wee	k 4	: Write	a pro	gram	to sol	ve pro	oduce	r-cons	sumer	prob	lem			
		_	usin	g Ser	napho	ores.									
	Wee	k 5	: Implei	nent	the fo	llowii	ng me	mory	alloc	ation	metho	ods fo	r		
	TT 7 -	I. 7	fixed	l parti	tion a) Firs	t fit b) W01	st fit	c) Bes	st fit	• ~			
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23IT4353 - OPERATING SYSTEMS & SOFTWARE ENGINEERING LAB

B. Tech in Inform	mation Technology	VR23
Text books and Reference books	 Week 7: Demonstrate fundamentals of DFD and buildir Week 8: Develop Structural diagrams for modeling con Week 9: Develop Behavioural diagrams for modeling con Week 10: Describe SRS and test cases for any real time a) Online Library Management System b) Online Banking System, etc Week 11: Implement white box and black box testing r applications. Text Book(s): [1]. Abraham Silberschatz, Peter B. Galvin and Greg G Concepts", 9thed, John Wiley &Sons (Asia) Pvt. Ltd [2]. Yashavant Kanetkar, "Unix Shell Programming", 12003. [3].I. Somerville "Software Engineering" 6 edition:Pear [4]. Grady Booch, James Rumbaugh, Ivar Jacobson, Language user guide", Tenth Edition, Pearson, 2011 Reference Books: [1]. RajibMall,"Fundamentals of Software Engineering" PHI. 	ng blocks of UML. nplex systems. complex systems. e application. nethods for real-time agne, "Operating System l, 2018. 1 st ed, BPB Publications, cson Education. "The Unified Modeling ",Second Edition
E-resources and other digital material	 [1]. Prof. Chester Rebeiro Department of CSE,IITM "In Systems" [NPTEL] dated 08thSep 2016 <u>https://nptel.ac.in/courses/106/106/106106144/</u> [2]. Software engineering NPTEL. Available: 	ntroduction to Operating

http://nptel.iitm.ac.in/video.php?courseId=1076

Course Cate	gory:	Labo	ratory	7					Credi	its:					1.5
Course Type		Prog	ram Č	ore					Lectu	re-T	utori	al-Pr	actice	:	0-0-3
Prerequisite	s:	Data	Struct	tures	Lab				Conti	nuou	ıs Eva	aluat	ion:		30
									Seme	ster e	end E	valu	ation:		70
			Total Marks:												100
Course	Upon s	uccess	ful coi	npleti	on of	the c	ourse	, the	stude	nt wil	l be a	ble to	0:		
Outcomes	CO1	Exect	ute adv	vance	d que	ries s	uch a	as re	lation	al co	nstrai	nts, d	operat	ors, jo	oins, set
		opera	tions,	aggre	gate fi	inctio	ons, v	iews	in SQ	QL.					
		Appl	y SQL	comm	nands	to cr	eate r	elatio	onal d	ataba	ses a	nd ex	tract i	nform	nation to
	~~	satisf	y busir	ness re	eporti	ng reo	quests	<u> </u>							
	CO2	Desig	gn, cre	eate a	and in	mpler	nent	relat	tional	data	base	syste	ems f	or re	al time
	CO^{2}	appli		A-		. t.a1		1	1	ED	1:		1		latabaaa
	COS	Use	various software's to design and build ER diagrams for related database											latabase	
	CO4	Deve	lon ani	licati	on nr	oran	<u>ne 11ei</u>	ησ Ρ		[
Contributi	0.04			p application programs using i L/SQL											
on of		PO	PO	PO	PO	0	0	0	0	0	0	0	PO	PSO	PSO
Course		1	2	3	4	5	6	7	8	9	10	11	12	1	2
Outcomes	CO1	2	2	1		2	1							1	
towards	CO2		2			2									2
achieveme	CO3			2								2		2	
nt of															
Program															
Outcomes	004												1	2	1
(L-Low, M-	CO4												1	2	1
Medium.															
H- High)															
Course	Week	1:												l	I
Content	a.	Introd	uction	to SQ	QL, RI	OBM	S.								
	b.	Comp	are vai	ious	RDB	MS so	oftwa	res							
	с.	Differ	ent dat	a type	es and	its ir	npler	nenta	ation						
	d.	Imple	ment L	Data L	efinit	ion la	ingua	ge		.					
	e.	Арріу	Integr	ny C	onstra	ants,	, anas	ing c	on rela	uions					
	Week	2:													
	a.	Imple	ment I	Data N	Ianipu	ilatio	n Lar	iguag	ge on]	Relati	ional	Mode	el.		
	b.	Imple	ment q	ueries	using	g : Re	latio	nal O	perato	ors, L	ogica	l Ope	erators	s and	
		Comp	arison	opera	tors										
		-													
	Week a	5:					o# ~ :								
	Impien	A gar	ieries U	ising i inctio	NUL I	uncti	ons :								
	a. h	String	fincti	ons	115										
	с.	Date/1	time fu	nctio	15										
	d.	Mathe	ematica	al fun	ctions										
	e.	Sortin	g												

23IT4354– DATABASE MANAGEMENT SYSTEMS LAB

	Week 4:
	Implement Nested Queries using operators
	a. Set comparison operators
	b Correlated sub queries
	c Set operators
	c. Set operators
	Week 5:
	Combining tables and execution of queries :
	a. Implement advanced queries using joins and grouping (Group by, Having)
	b Views creation and undation
	Week 6:
	a. Construct an ER-Diagram for the given information model by using appropriate
	tool.
	b. Convert entities and relationships to relation table for a given scenario
	Week 7.
	Implementation of socurity by assigning privilages to detabase users .
	Implementation of security by assigning privileges to database users .
	DCL : Understand the implementation of Grant, Revoke and views
	TCL : Understand the implementation of Commit, Rollback and Savepoint
	Week 8:
	PL/SOL programming: Blocks, Operators and Control structures, cursors
	Week 0.
	PL/SQL programming: Triggers, Functions and Procedures
	Week 10:
	Case Study on a given application: Refine the schemas up to 4th normal form. (Mini
	Project).
	Week 11:
	Installing Configuring and Execution of MongoDB NoSOI
	instanting, contracting and Execution of MongoDD 1005QE
	Week 12.
	Design and Develop MongoDB Queries using CRUD operations. (Use CRUD
	operations, SAVE method, logical operators)
Text books	Text Book(s):
and	[1]. Elmasri and Navathe. "Fundamentals of Database Systems", Ed 7.
Reference	Pearson Education, 2016
books	[2]. Ian Robinson, Jim Webber, Emil Efriem, "Graph Databases". OReilly
	Media. 2015.
	Reference Books
	[1] Daghurama Krishnan Jahannas Cahrles "Datahasa Maragamant
	[1]. Kagnurania Krisinian, Johannes Genrke, Database Management
	Systems ⁺ , 3rd Edition, 1A1A McGrawHill, 2008.
	[2].Silberschatz, Korth and Sudharshan. Data base System Concepts. Ed4.
	McGrawHill, 2009
E-	[1]. Prof Richard Holowczak, Professor, Baruch College, The Normalization,
resources	Feb 2023
and other	https://www.youtube.com/watch?v=GvxBqzWeGz0

digital	[2]. Prof PP Das,IIIKharagpur, DBMS. Dec 7, 2017
material	https://www.youtube.com/watch?v=IoL9Ve2SRwQ&list=PLIwC9bZ0rmjSkm
	<u>1VRJROX4vP2YMIf4Ebh</u>
	[3]. Jennifer widom, (09, 05, 2018). Introduction to Databases
	https://www.youtube.com/watch?v=ShjrtAQmIVg
	[4]. P. B. Mahanty,(09,05,2015). DBMS and RDBMS.
	http://nptel.iitm.ac.in/video.php?courseId=1128&v=7952RsbAx2w8