B. Tech.

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

(B.Tech Scheme upto 2nd Year Syllabus)



Offered by

Department of Computer Science and Engineering

VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE (An Autonomous, ISO 9001:2015 Certified 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 pro-active nature so as to enable them to acquire a vision for exploration and an insight for advanced enquiry.

DEPARTMENT VISION

The department vision is clearly defined and is in line with the college's vision. The vision of the department is:

"To evolve as a centre of academic excellence and advanced research in Computer Science and Engineering discipline."

DEPARTMENT MISSION

This mission of the Department is concise and supports the College's mission. The mission of the Computer Science and Engineering Department is:

"To inculcate students with profound understanding of fundamentals related to discipline, attitudes, skills, and their application in solving real world problems, with an inclination towards societal issues and research."

Program Educational Objectives(UG)

We have program educational objectives for our Artificial Intelligence and Machine Learning Program. Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Our program educational objectives are:

The graduates of the Program will:

I. Have knowledge and analytical skills, including mathematics, science and basic engineering.

II. Have in-depth learning skills to function productively as leadership role or as supportive members in multidisciplinary teams with effective communication

III. Have extensive knowledge in state-of the- art frameworks in Artificial Intelligence to design industry accepted AI solutions using modern tools for allied domains with realistic constraints or pursue higher studies and continue to develop their professional knowledge.

IV. Practice the profession with ethics, integrity, leadership and social responsibility

PROGRAM OUTCOMES

On successful completion of the B.Tech (AI&ML) programme the student will be able to :

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering, Machine learning fundamentals, and artificial intelligence to solve complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems to create solutions using the first principles of mathematics, engineering sciences, and data science.

PO3: Design/development of solutions: Design 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: Apply research methods including design of experiments, statistical analysis and business interpretation of data, and synthesis of the information to provide valid conclusions.

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

PO6: The engineer and society: Apply reasoning using contextual knowledge to assess the needs of societal, health, safety, legal and

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cultural issues and the consequent responsibilities relevant to Machine learning engineering practice.

PO7: Environment and sustainability: Understand the impact of artificial intelligence solutions in societal and environmental contexts, and demonstrate the knowledge for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and to execute responsibilities and adhere to norms of the engineering profession.

PO9: Individual and team work: Execute professional functions effectively as an individual, as well as a leader or member in diverse multidisciplinary teams.

PO10: Communication: Communicate effectively with the engineeringcommunity and with society in solving complex problems in terms of being able to comprehend and write effective reports, make effective presentations, as well as execute and receive clear instructions.

PO11: Project management and finance: Demonstrate an ability to use management principles and apply these to one's own work, as a member and lead projects and build cost models in an interdisciplinary professional setting.

PO12: Lifelong learning: Recognize the need for and develop learning mechanisms and inculcate the ability to prepare for lifelong learning in the context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO1: Develop AI based software applications/solutions as per the needs of Industry and society

PSO2: Adopt new and fast emerging technologies in Artificial Intelligence and Machine Learning

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING) SCHEME OF INSTRUCTION FOR FOUR YEAR UG PROGRAMME [VR20]

	SEMESTE	RI	CONTA	СТ НО	DURS	5:26	
S.No	Course Code	Course Category	Course Name	L	Τ	Р	Credits
1.	20BS1101B	Basic Science	Mathematics for Machine Learning	3	0	0	3
2.	20BS1102A	Basic Science	Applied Physics (CSE/IT/AI&DS,AI&ML)	3	0	0	3
3.	20ES1103	Engineering Science	Programming for Problem Solving	3	0	0	3
4.	20ES1104	Engineering Science	Basics of Electrical Engineering	3	0	0	3
5.	20HS1105	Humanities and Social Science	Technical English and Communication Skills	2	0	0	2
6.	20BS1151A	Basic Science	Engineering Physics Laboratory	0	0	3	1.5
7.	20ES1152	Engineering Science	Programming for Problem Solving Laboratory	0	0	3	1.5
8.	20HS1153	Humanities and Social Science	Technical English and Communication Skills Laboratory	0	0	3	1.5
9.	20ES1154	Engineering Science	Computing and Peripherals Laboratory	0	0	2	1
10.	20MC1106	Mandatory Course	Technology and Society	1	0	0	-
Total			15	0	11	19.5	
11.	20MC1107	Mandatory Course	Induction Program				-

SEMESTER II

CONTACT HOURS: 27

S.No	Course Code	Course Category	Course Name	L	Т	Р	Credits
1.	20BS2101B	Basic Science	Probability and Statistics for Machine Learning	3	0	0	3
2.	20BS2102	Basic Science	Engineering Chemistry	3	0	0	3
3.	20ES2103C	Engineering Science	Programming Essentials in Python	3	0	0	3
4.	20ES2104A	Engineering Science	Basic Electronics Engineering	3	0	0	3
5.	20ES2105	Engineering Science	Engineering Graphics	3	0	0	3
6.	20BS2151B	Basic Science	Engineering Chemistry Laboratory	0	0	3	1.5
7.	20ES2152C	Engineering Science	Programming Essentials in Python Laboratory	0	0	3	1.5
8.	20ES2153	Engineering Science	Engineering Workshop	0	0	3	1.5
9.	20MC2106	Mandatory Course	Professional Ethics and Practice	1	0	0	-
	•	•	Total	14	0	13	19.5

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE &MACHINE LEARNING) SCHEME OF INSTRUCTION FOR FOUR YEAR UG PROGRAMME [VR20]

SE	MESTER III		CONTACT HOURS: 28				
S.No	Course Code	Course Category	Course Name	L	Т	Р	Credits
1.	20BS3101A	Basic Science	Discrete Mathematics	3	0	0	3
2.	20ES3102	Engineering Science	Digital Logic and Computer Design	3	0	0	3
3.	20AI&ML3303	Program Core	Artificial Intelligence	3	0	0	3
4.	20AI&ML3304	Program Core	Java Programming	3	0	0	3
5.	20AI&ML3305	Program Core	Data Structures	3	0	0	3
6.	20AI&ML3351	Program Core Lab 1	Artificial Intelligence Lab	0	0	3	1.5
7.	20AI&ML3352	Program Core Lab 2	Java Programming Lab	0	0	3	1.5
8.	20AI&ML3353	Program Core Lab 3	Data Structures Lab	0	0	3	1.5
9.	20TP3106	Soft Skills – 1	Logic and Reasoning	0	0	2	1
10.	20MC3107A	Mandatory Course (AICTE suggested)	Environmental Studies	2	0	0	-
			Total	17	0	11	20.5

SEMESTER	IV

CONTACT HOURS: 30

S.No	Course Code	Course Category	Course Name	L	T	Р	Credits			
1.	20BS4101G	Basic Science	Numerical Methods for Data Analysis	3	0	0	3			
2.	20AI&ML4302	Program Core	Design and Analysis of Algorithms	3	0	0	3			
3.	20AI&ML4303	Program Core	Advanced Java Programming	3	0	0	3			
4.	20AI&ML4304	Program Core	Computer Networks	2	0	0	2			
5.	20HS4105	Humanities and Social Sciences	Universal Human Values	3	0	0	3			
6.	20AI&ML4309	Program Core	Operating Systems	2	0	0	2			
7.	20AI&ML4351	Program Core Lab 1	Design and Analysis of Algorithms Lab	0	0	2	1			
8.	20AI&ML4352	Program Core Lab 2	Advanced Java Programming Lab	0	0	3	1.5			
9	20AI&ML4353	Program Core Lab 3	Computer Networks Lab	0	0	2	1			
10	20TP4106	Soft Skills – 2	English for Professionals	0	0	2	1			
11	20AI&ML4607	Skill Oriented Course -1	Industry Standard coding practice-1	1	0	2	2			
12	20MC4108B	Mandatory Course (AICTE suggested)	Indian Constitution	2	0	0	-			
	Total					11	22.5			
	Summer Internship 6 weeks (Mandatory) during summer vacation (EPICS)									
Ho	nors/Minor Cour	ses (the hours distributio	n can be 4-0-0, 3-0-2 or 3-1-0 also)	3	1	0	4			

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE &MACHINE LEARNING) SCHEME OF INSTRUCTION FOR FOUR YEAR UG PROGRAMME [VR20]

	SEMESTER	V	CONTACT HOURS: 33					
S.No	Course Code	Course Category	Course Name	L	Т	Р	Credits	
1	20AI&ML5301	Program Core	Database Systems	3	0	0	3	
2	20AI&ML5302	Program Core	Machine Leaning - I	3	0	0	3	
3	20HS5103	Humanities and Social Sciences	Engineering Economics and Management	2	0	0	2	
4	20AI&ML5404	Program Elective 1	Program Elective 1	3	0	0	3	
5	20AI&ML5205	Open Elective1	Open Elective1	2	0	2	3	
6	20AI&ML5351	Program Core Lab 1	Database Systems Lab	0	0	3	1.5	
7	20AI&ML5352	Program Core Lab 2	Machine Leaning - I Lab	0	0	3	1.5	
8	20HS5153	Humanities and Social Sciences	English Communication Skills Laboratory	0	0	2	1	
9	20TP5106	Soft Skills – 3	Personality Development	0	0	2	1	
10	20AI&ML5354	Internship / Project (6 weeks)	EPICS	0	0	3	1.5	
11	20AI&ML5607	Skill Oriented course -2	Industry Standard Coding Practice - II	1	0	2	2	
12	20MC5108A	Humanities Elective (AICTE suggested)	Biology for Engineers	2	0	0	-	
	Total					17	22.5	
Ho	nors/Minor Course	es (the hours distribution	can be 4-0-0, 3-0-2 or 3-1-0 also)	3	1	0	4	

SEMESTER VI

CONTACT HOURS: 28

S.No	Course Code	Course Category	Course Name	L	T	Р	Credits
1	20AI&ML6301	Program Core	Machine Learning - II	3	0	0	3
2	20AI&ML6302	Program Core	Natural Language Processing	3	0	0	3
3	20AI&ML6303	Program Core	Software Engineering	2	0	0	2
4	20AI&ML6404	Program Elective 2	Program Elective 2	3	0	0	3
5	20AI&ML6205	Open Elective 2	Open Elective 2	2	0	2	3
6	20AI&ML6351	Program Core Lab 1	Machine Learning - II Lab	0	0	2	1
7	20AI&ML6408	Program Core Lab 2	Natural Language Processing Lab using OpenCV and Python	2	0	0	2
8	20AI&ML6352	Program Core lab 3	Software Engineering Lab	0	0	3	1.5
9	20TP6106	Soft Skills –4	Quantitative Aptitude	0	0	2	1
10	20AI&ML6554	Internship / Project	Mini Project – I	0	0	2	1
11	20MC6107B	Mandatory Course (AICTE suggested)	Innovation, IPR & Entrepreneurship	2	0	0	0
	Total						20.5
	Industrial	Research Internship siz	x weeks (Mandatory) during summer va	cation			
I	Ionors/Minor Courses	(the hours distribution	can be 4-0-0, 3-0-2 or 3-1-0 also)	3	1	0	4

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE &MACHINE LEARNING) SCHEME OF INSTRUCTION FOR FOUR YEAR UG PROGRAMME [VR20]

SEMESTER VII

CONTACT HOURS: 29

S. No	Course Code	Course Category	Course Name	L	T	Р	Credits
1	20AI&ML7301	Program Core	Automata & Compiler Design	3	0	0	3
2	20AI&ML7402	Program Elective 3	Program Elective 3	3	0	0	3
3	20AI&ML7403	Program Elective 4	Program Elective 4	3	0	0	3
4	20AI&ML7404	Program Elective 5	Program Elective 5	3	0	0	3
5	20AI&ML7205	Open Elective 3	Open Elective 3	0	0	0	3
6	20AI&ML7206	Open Elective 4	Open Elective 4	0	0	0	3
7	20AI&ML7607	Advanced Skill Course	Corporate Readiness Skills	1	0	2	2
8	20AI&ML7551	Internship / Project	Mini Project - II	0	0	3	1.5
9	20AI&ML7552	Internship / Project	Industrial / Research Internship	0	0	3	1.5
	Total					12	23
Honors	/Minor Courses (t	he hours distribution can b	e 4-0-0, 3-0-2 or 3-1-0 also)	3	1	0	4

Note: Open Elective Courses 3 and 4 are self-learning. Students may opt from any MOOCs platform. They have to submit the certificate before the last instruction day of VII semester. Course selection for MOOCs is subject to approval by the Head of the Department.

	SEMESTER VIII CO			ONTACT HOURS: 24				
S.No	Course Code	Course Category	Course Name	L	Τ	Р	Credits	
1	20AI&ML8551	Internship / Project**	Major Project and Internship (6 Months)	0	0	24	12	
			Total	0	0	24	12	

** The student should undergo internship and simultaneously he/she should work on a project with welldefined objectives. At the end of the semester the student should submit an internship completion certificate and a project report.

** If any of our associated company comes forward to offer an emerging course that will be offered as an industry offered course in V, VI or VII semesters under program elective with the approval of BoS. This is incorporated to enhance student skills and Employability in cutting edge technologies.

LIST OF PROGRAM ELECTIVES

Streams:

- 1. Medical Intelligence
- Computational Intelligence
 Computer Networks & Cyber Security(CNCS)
- 4. Embedded AI
- 5. Data Processing
- 6. Full Stack Web Development (FS)
- 7. Industry Offered Course (IoC)

SEMESTER V (Program Elective I)

S.No	Course Code	Stream	Subject	L	Т	Р	Credits
1.	20AI&ML5404A	Medical Intelligence	Convolutional Neural Networks	3	0	0	3
2.	20AI&ML5404B	Computational	Natural Language Processing with	3	0	0	3
		Intelligence	Python				
3.	20AI&ML5404C	CNCS	Cryptography and Network Security	3	0	0	3
4.	20AI&ML5404D	Embedded AI	Micro Processor and Microcontrollers	3	0	0	3
5.	20AI&ML5404E	Data Processing	Cloud Computing	3	0	0	3
6.	20AI&ML5404F	FS	Front End Technologies	3	0	0	3
7.	20AI&ML5404G	IoC	Industry Offered Course	3	0	0	3

SEMESTER VI (Program Elective II)

S.No	Course Code	Stream	Subject	L	Т	Р	Credits
1.	20AI&ML6404A	Medical Intelligence	Bio-Inspired Artificial Intelligence	3	0	0	3
2.	20AI&ML6404B	Computational	Soft Computing	3	0	0	3
		Intelligence					
3.	20AI&ML6404C	CNCS	Cyber Threat Intelligence				
4.	20AI&ML6404D	Embedded AI	Sensors and Actuators	3	0	0	3
5.	20AI&ML6404E	Data Processing	Big Data Analytics	3	0	0	3
6.	20AI&ML6404F	FS	MEAN Technologies				
7.	20AI&ML6404G	IoC	Industry Offered Course	3	0	0	3

SEMESTER VII (Program Elective III)

S.No	Course Code	Stream	Subject	L	Т	Р	Credits
1.	20AI&ML7402A	Medical Intelligence	Medical Image Analysis	3	0	0	3
2.	20AI&ML7402B	Computational	Computer Vision for Assistive	3	0	0	3
		Intelligence	Technologies				
3.	20AI&ML7402C	CNCS	Block chain technologies	3	0	0	3
4.	20AI&ML7402D	Embedded AI	Artificial Intelligence of Things (AIoT)	3	0	0	3
5.	20AI&ML7402F	Data Processing	UI&UX design	3	0	0	3
6.	20AI&ML7402F	FS	Backend Technologies	3	0	0	3
7.	20AI&ML7402G	IoC	Industry Offered Course	3	0	0	3

SEMESTER VII (Program Elective IV)

S.No	Course Code	Stream	Subject	L	Т	Р	Credits
1.	20AI&ML7403A	Medical Intelligence	Bio-Informatics	3	0	0	3
2.	20AI&ML7403B	Computational	Audio/Video Forensics	3	0	0	3
		Intelligence					
3.	20AI&ML7403C	CNCS	Crypto Currency	3	0	0	3
4.	20AI&ML7403D	Embedded AI	Intelligent Robots and Drone	3	0	0	3
			Technology				
5.	20AI&ML7403E	Data Processing	Logical AI And Automated Reasoning	3	0	0	3
6.	20AI&ML7403F	FS	Framework & Micro services	3	0	0	3
7.	20AI&ML7403G	Others	Agile Project Management				
8.	20AI&ML7403H	IoC	Industry Offered Course	3	0	0	3

SEMESTER VII (Program Elective V)

S.No	Course Code	Stream	Subject	L	Т	Р	Credits
1.	20AI&ML7404A	Medical Intelligence	Nature Inspired Computing	3	0	0	3
2.	20AI&ML7404B	Computational	Mobile Commerce	3	0	0	3
		Intelligence					
3.	20AI&ML7404C	CNCS	AI in Cyber Security	3	0	0	3
4.	20AI&ML7404D	Embedded AI	Internet of Medical things (IoMT)	3	0	0	3
5.	20AI&ML7404E	Data Processing	Logical AI And Automated Reasoning	3	0	0	3
6.	20AI&ML7404F	IoC	Industry Offered Course	3	0	0	3

LIST OF OPEN ELECTIVES

SEMESTER V (OE I)

S.No	Course Code	Course	Subject	L	Т	Р	Credits
1.	20AI&ML5205A	Open Elective I	Web Programming for Artificial Intelligence	2	0	2	3
2.	20AI&ML5205B	Open Elective I	Android Application Development	2	0	2	3
3.	20AI&ML5205C	Open Elective I	Introduction to MATLAB for Artificial Intelligence *For the students of Non CSE/IT branches only	2	0	2	3
4.	20AI&ML5205D	Open Elective I	Fundamentals of Data Structures *For the students of Non CSE/IT branches only	2	0	2	3

SEMESTER VI (OE II)

S.No	Course Code	Course	Subject	L	Т	Р	Credits
1.	20AI&ML6205A	Open Elective II	Agile Process Management	2	0	2	3
2.	20AI&ML6205B	Open Elective II	Remote Sensing and GIS	2	0	2	3
3.	20AI&ML6205C	Open Elective II	R Programming *For the students of Non CSE/IT branches only	2	0	2	3
4.	20AI&ML6205D	Open Elective II	Introduction to Cyber Security *For the students of Non CSE/IT branches only	2	0	2	3

SEMESTER VII (OE III)

S.No	Course Code	Course	Subject	L	Т	Р	Credits
1.	20AI&ML7205A	Open Elective III		0	0	0	3
2.	20AI&ML7205B	Open Elective III		0	0	0	3
3.	20AI&ML7205C	Open Elective III		0	0	0	3
4.	20AI&ML7205D	Open Elective III		0	0	0	3
5.	20AI&ML7205E	Open Elective III	Any other course offered by MOOCS	0	0	0	3

SEMESTER VII (OE IV)

S.No	Course Code	Course	Subject	L	Т	Р	Credits
1.	20AI&ML7206A	Open Elective IV		0	0	0	3
2.	20AI&ML7206B	Open Elective IV		0	0	0	3
3.	20AI&ML7206C	Open Elective IV		0	0	0	3
4.	20AI&ML7206D	Open Elective IV		0	0	0	3
5.	20AI&ML7206A	Open Elective IV	Any other course offered by MOOCS	0	0	0	3



		M	20BS1101B MATHEMATICS FOR MACHINE LEARNING Course Category: Basic Science Credits: 3													
Cours	e Cat	tegor	V:	Bas	sic Sc	ience					Credi	ts:	3			
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COUF	RSE (OUT	COM	ES							BTL		PO	DI		
Upon	succe	essful	comj	pletio	on of	the co	ourse	, the	stude	ent w	ill be	abl	e to:			
CO1 Solve linear system of equations and determine K3 1.2.1																
CUI	eige	ies ar														
CO2	Solv	ve diff	ferent	ial eq		K3	2	2.6.3, 2	.8	.1						
	App	ly me	ean va	lues	theore	ems a	nd La	agran	ge's							
CO3	metł	nod o	fund	eterm	ined	multij	pliers	when	e eve	r	K3	5	.4.1, 5	4.	2	
	nece	essary														
CO1	Min	imize	and	maxir	nize 1	the lir	near p	orogra	ımmiı	ng	K4	5	.4.1,5.4	4.2	2	
UU4	prob	olems														
Contr	ibuti	on of	Cour	se O	utcor	nes to	owar	ds ac	hieve	men	t of P	rog	ram			
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CO1	1 3 2 1															
CO2	3	2			1											
CO3	3	2			1											
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CO4	3	2			1											

COURSE CONTENT

UNIT I

Matrices:

Rank of a Matrix-Consistency of Linear System of Equations- Linear-Transformations-Vectors, Eigen values and Eigen vectors- Properties of Eigen values- Finding Inverse and Powers of a Matrix by Cayley-Hamilton Theorem-Reduction to Diagonal form-Reduction of Quadratic form to Canonical form-Nature of a Quadratic form- Complex matrices.

UNIT II

Differential Equations:

Differential Equations of First Order and first degree-Exact Differential Equations-Equations Reducible to Exact Equations. Linear Differential Equations of Higher Order: Definitions- Operator D- Rules for finding the Complementary Function- Inverse Operator- Rules forfinding Particular Integral-Working Procedure.

UNIT III

Differential Calculus:

Fundamental Theorems-Rolle's Theorem- Lagrange's Mean Value Theorem-Cauchy's Mean Value Theorem and Taylor's Theorem- Expansions of functions-Maclaurin's Series and Taylor's Series. Curvature- Radius of Curvature-Maxima and minima of functions of Two variables-Lagrange's method of undetermined multipliers.

UNIT IV

Linear Programming:

Inroduction-Formulation of the problem-Graphical method-Some exceptional cases-General linear programming problem-Canonical and standard forms of LPP-Simplex method-Working Procedure of the simplex method-Artificial variable techniques-M-method-Two phase method-Exceptional cases-Degeneracy-Duality concept-Duality principle-Dual simplex method.

TEXT BOOKS

[1] Higher Engineering Mathematics, by B S Grewal ,Khanna Publishers, 44thEdition, 2019

REFERENCE BOOKS

[1] Erwin Kreyszig ,Advanced Engineering Mathematics,John Wiley & Sons, 10th Edition,2015.

[2] B.V.Ramana, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.[3].N.P.Bali, Dr.ManishGoyal, A Text Book of Engineering Mathematics, Laxmi Publications, 9thEdition, 2014.

[4] S.D.Sarma, Operations Research, KedarNath Ram Nath, Meerut.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] <u>www.nptel</u> videos.com/mathematics/

(Math Lectures from MIT, Stanford, IIT'S)

[2] nptel.ac.in/courses/122104017

[3] nptel.ac.in/courses/111105035

[4] Engineering Mathematics Open Learning Project.

www.3.ul.ie/~mlc/support/Loughborough%20website/

					AP	201 PLII	BS11 E D P	02A HYSI	ICS						
Cours	e Cat	egor	v:	Bas	sic Sc	ience				(Credi	ts: 3			
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Upon	succe	ssful	comj	pletio	on of	the co	ourse	e, the	stude	ent w	ill be	able	to:		
CO1	Und	Understand the importance of quantum mechanics. Analyse and understand various types of lasers and their applications													
CO2	Ana	lyse a	nd ur	nderst	and v	variou	is typ	es of	lasers	and	their	appli	cations		
CO3	Elab Supe	orate	diffe: ductiv	rent t	ypes	of op	tical	fibers	and u	under	stand	the c	concept	of	
CO4	Und	erstar	nd the	fabri	icatio	n of r	nanon	nateri	als ar	id car	bon l	Vanot	ubes.		
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COURSE CONTENT

UNIT I : Quantum Mechanics

Quantum Mechanics: Dual nature of light, Matter waves and Debroglie's hypothesis, Davisson-Germer's experiment, G. P. Thomson experiment, Heisenberg's uncertainty principle and its applications (Non existence of electron in nucleus, Finite width of spectral lines), One dimensional time independent and time dependent Schrödinger's wave equations, physical significance of wave function, Particle in a box (One dimension).

UNIT II :Lasers

Lasers: Introduction, Characteristics of laser, Basic Principles of lasers (absorption, spontaneous emission, stimulated emission), Requirements of lasers (pumping, population inversion, cavity resonance), Einstein's coefficients, different types of lasers: solid-state lasers (Ruby, Neodymium), gas lasers (He-Ne, CO₂), Semiconductor laser, applications of lasers in science, engineering and medicine

UNIT III : Fibre Optics and Superconductivity

Fibre Optics: Introduction, Fundamentals of optic fibre, Propagation of light through optical fiber, Types of optical fibers, Numerical aperture, Fractional Refractive Index change, Fiber optics in communication and its advantages.

Superconductivity: Introduction, Critical parameters, Flux quantization, Meissner effect, Types of Superconductors, BCS theory, Cooper pairs, London's equation- penetration depth, high temperature super conductors, Applications of superconductors.

TEXT BOOKS

[1] M.N. Avadhanulu & P.G. Kshirsagar, Engineering Physics, S. Chand publications, Revised Edition, 2014

[2] P.K. Palanisamy, "Applied Physics", Scitech Publications(INDIA) Pvt. Ltd., Fifth Print, 2008.

REFERENCE BOOKS

[1] B. K. Pandey and S. Chaturvedi, 'Engineering Physics' Cengage Learning', Delhi, 2012.

[2] O. Svelto, Principles of Lasers, 5th Edition, Springer, London, 2010

[3] M.R. Srinivasan, "Engineering Physics", New age international publishers, First Edition, 2011.

[4] Gaur and Gupta, Engineering Physics, Dhanpatrai publishers,8th edition 2008

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1]https://ocw.mit.edu/courses/physics/8-04-quantum-physics-i-spring-2013/lecture-videos/

[2]https://ocw.mit.edu/resources/res-6-005-understanding-lasers-and-fiberoptics-spring-2008/laser-fundamentals-i/

[3] http://nptel.ac.in/courses/112106198/19

https://www.peterindia.net/NanoTechnologyResources.html

20ES1103

	PROGRAMMING FOR PROBLEM SOLVING Course Category: Engineering Credits: 3														
Cours	e Cat	tegor	y:	Eng	gineer	ring				(Credi	ts:	3		
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CO1	CO1Understand the different types of problem solving approachesApply the selections, loops, arrays, and string														
CO2	CO2 Apply the selections, loops, arrays, and string concepts in C to solve problems.														
CO3	App solv	ly fur e prol	nction blems	s and	poin	ter co	oncep	ts in (C to						
CO4	App func	ly ent tions	um, st to So	tructu Ive p	roble	inions ms	s, and	file	handl	ing					
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COURSE CONTENT

UNIT I

Introduction to computer-based problem solving: Requirement of problem solving by computers, problem definition, Use of examples for problem solving, similarities between problems, Problem solving strategies, steps involved in problem solving.

Program design and implementation issues: programs and algorithms, topdown design and step-wise refinement, construction of loops-basic programming constructs, Implementation, programming environment.

Algorithms for problem solving: Exchanging values of two variables, Summation of a set of numbers, decimal to binary base conversion, reversing the digit of an integer, to find greatest common divisor (GCD) of two numbers, to verify whether an integer is prime or not, organize a given set of numbers in ascending order, find the square root of an integer, factorial of a given number, generate the Fibonacci sequence for n terms, evaluate sin(x) as sum of series, to find the value of the power of a number raised by another integer, reverse order elements of an array, find largest number in an array, print elements of upper triangular matrix, multiplication of two matrices, to compute to roots of a quadratic equation $ax^2+bx+c=0$.

UNIT II

Introduction to the C Language: Background of C program, Identifiers, Types, Variables, Constants, Memory Layout, Input/Output, Programming Examples.

Structure of a C Program: Logical Data and Operators, Expressions, Precedence and Associatively, Evaluating Expressions, Type Conversion, Statements, Storage Class.

Selection: Two-way Selection, Multiway Selection, More Standard Functions. **Repetition:** Concept of a Loop Loops In C, Loop Examples, Recursion, The Calculator Program.

Arrays: Array Concepts in C, Inter-Function Communication, Array Applications, Two Dimensional Arrays, Multidimensional Arrays.

UNIT III

Strings:String Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions, String- Data Conversion.

Functions: Functions in C, User Defined Functions, Call by Value, Call Value Reference, Inter-FunctionCommunication, Standard Functions, Scope.

Pointers: Introduction to Pointer, Pointers for Inter-Function Communications, Pointers to Pointers, Compatibility, Lvalue and Rvlaue.

Pointer Applications: Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocations Functions, Array of Pointers

UNIT IV

Enumerations: The Type Definition(Typedef), Enumerated Types: Declaring an Enumerated Type, Operations on Enumerated Types, Enumeration Type Conversion, Initializing Enumerated Constants, Anonymous Enumeration: Constants, Input/Output Operators.

Structures: Structure Type Declaration, Initialization, Accessing Structures, Operations on Structures, Complex Structures, Structures and Functions, Sending the Whole Structure, Passing Structures through Pointers.

Unions:Referencing Unions, Initializers, Unions and Structures, Internet Address, Programming Applications.

File Handling:Files, Streams, Standard Library Input/Output Functions, Formatting Input/output Functions and Character Input/Output Functions, Command-Line Arguments.

TEXT BOOKS

[1] Programming and Problem Solving Through "C" Language By HarshaPriya, R. Ranjeet · Firewall media 2006

[2] Behrouz A. Forouzan and Richard F. Gilberg, "Computer Science A Structured Programming Approach Using C", CENGAGE Learning, Third Edition

REFERENCE BOOKS

[1] Anil B. Chaudhuri, "Flowchart and Algorithm Basics: The Art of Programming", Mercury Learning & Information, 2020.

[2] R.G. Dromey, "How to Solve it By Computer", Prentice-Hall International Series in Computer Science, 1982.

[3] YashwantKanetkar, "Let us C", BPB Publications, 16th Edition 2017.

[4] Kernighan and Ritchie, "The C programming language", The (Ansi C Version), PHI, second edition.[5] Paul J. Dietel and Harvey M. Deitel, "C: How to Program", Prentice Hall, 8th edition (Jan 19, 2021).

[6] K.R.Venugopal, Sundeep R. Prasad, "Mastering C", McGraw Hill, 2nd Edition, 2015.

E-RESOURCES AND OTHER DIGITAL MATERIAL

- [1] Computer Science and Engineering Noc:problem Solving Through Programming in C. [online] <u>https://nptel.ac.in/courses/106/105/106105171/</u>
- [2] Computer Science and Engineering Noc:introduction To Programming in C [online] https://-nptel.ac.in/courses/106/104/106104128/

[3] C For Everyone: Structured Programming. [online]

https://www.coursera.org/learn/c-structured -programming

[4] Advanced C Programming CourseTim Academy-Jason Fedin. [online] <u>https://www.udemy.com/-</u> course/advanced-c-programming-course/

20ES1104 BASICS OF ELECTRICAL ENGINEERING

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COU	RSE	CON	TEN'	Т										
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UNIT I

Introduction to Electrical Engineering: Electric Current, Electromotive force, Electric power and energy, Basic circuit components- Resistors-Inductors-Capacitors. Electromagnetic Phenomenon and Related Laws, Kirchhoff's laws.

Network Analysis: Network sources-Ideal independent voltage source, Idealindependent current source, Dependent sources, Practical voltage and current sources, Source conversion, Voltage and Current division rule, series and parallel connection of R, L and C, Star-Delta or, Delta- Star transformation. Mesh andNodal Analysis (with independent sources only).

UNIT II

Alternating Quantities: Introduction, Generation of a.c. voltages, Waveforms and Basic Definitions, Relationship between frequency, speed and number ofpoles, Root Mean Square and Average values of alternating current and voltages,Form Factor and Peak Factor, Phasor representation of alternating quantities.

Magnetic Circuits: Introduction, Magnetic Circuits, Magnetic Field Strength (H),Magneto motive Force, Permeability, Reluctance, Analogy between Electric andMagnetic Circuits, Magnetic potential drop, Magnetic circuit computations, Selfand Mutual Inductance, Energy in Linear Magnetic Systems (Derivation for pure inductor).

UNIT III

DC Machines: Introduction, Construction of dc machines, Armature Windings, Generation of dc voltage and torque production in a dc machine, Operation of a dc machine as a generator, Operation of dc machine as a motor.

Induction Motors: Introduction, Constructional features of three-phase induction motors, Principle of operation of three-phase induction motor- Slip and rotor frequency, Voltage and current equations and equivalent circuit of an induction motor

UNIT IV

Measuring Instruments: Introduction, Classification of instruments, Operating Principles, Essential features of measuring instruments, Ammeters and Voltmeters, Measurement of power.

Solar photovoltaic Systems: Solar cell fundamentals, characteristics, classification, module, panel and array construction, Maximizing the solar PVoutput and load matching, Maximum Power Point Tracker Basic Algorithm and Flowchart, PV system components, solar PV systems and solar PV applications.

TEXT BOOKS

[1] T.K. Nagasarkar and M.S. Sukhja, "Basic Electric Engineering", 2nd ed.,Oxford University press 2011.

REFERENCE BOOKS

[1] B.H.Khan, "Non Conventional Energy Resources", 2nd ed., Mc.Graw HillEducation PvtLtd., New Delhi, 2013.

[2] AshfaqHussain, HaroonAshfaq, "Fundamentals of Electric Engineering" 4th ed., DhanpatRai& Co, 2014.

[3] I.J.Nagarath and Kothari, "Theoy and Problems of Basic Electric Engineering", 2nd ed., PHI Pvt. Ltd., 2016.

E-RESOURCES & OTHER DIGITAL MATERIAL

[1] http://nptel.ac.in/courses/108108076/

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Upon	Upon successful completion of the course, the student will be able to:																							
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Relation, Place-Monument Relation, Science- area of activity relation,

Profession- Tool relation, Gender relation, Diminutive relation, etc

Functional Grammar with special reference to Tense, Concord, Articles, pronoun-referent, Prepositions, use of Gerund ,Parallelism, etc (A Representative collection of 100 sentences)

## UNIT IV

## **Technical Communication skills:**

- Technical Proposal writing- Characteristics, Proposal Superstructure, Checklist, Formal Proposal
- > Technical Vocabulary- Basic explanations and Description

**Technical Report writing-** Informational Reports and Feasibility Report-Types, Components, Style and Formats.

## **TEXT BOOKS**

[1] Martin Cutts, Oxford guide to Plain English, 7th Impression, Oxford University Press, 2011

[2] M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill, New Delhi, 2005.

[3] John Langan, College Writing Skills, McGraw Hill, IX Edition, 2014.

[4] Eclectic Learning materials offered by the Department

## **REFERENCE BOOKS**

[1] Randolph Quirk, Use of English, Longman, I Edition (1968) Reprinted 2004.[2] Thomson A.J & A.V, Martinet, Practical English Grammar, III Edition, Oxford University Press,2001

[3] V.Sethi and P.V. Dhamija, A Course in Phonetics and Spoken English, II Edition, PHI, 2006

## **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] https://www.britishcouncil.org/english
[2] <u>www.natcorp.ox.ac.uk/Wkshops/Materials/specialising.xml?ID=online</u> https://www.uni-

marburg.de/sprachenzentrum/selbstlernzentrum/.../apps_for_esl.pdf

20MC1106												
Course Category.	<b>TECHNOLOGY</b> Mandatory	AND SOCIET	Y Credits:									
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COURSE OUTCOMES										-	BTL		POI	[
Upon successful completion of the course, the student will be able to:														
CO1	Understand the origins of technology and its role in the history of human progress.													
CO2	Know the Industrial Revolution and its impact on Society													
CO3	Interpret the developments in various fields of technology till Twentieth Century.													
CO4	CO4 Distinguish the impacts of Technology on the Environment and achievements of great scientists													
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## UNIT I

**Introduction**: Origins of technology, The Agriculture revolution, Technological contributions of ancient civilizations- Mesopotamians, Egyptians, Greeks, Romans, Indians and Chinese.

## UNIT II

**Industrial revolution**: The social and political background, The technical background, Steam: The power behind the Industrial Revolution, The revolution in Textile Industry, The Impact of Industrial Revolution on Society.

## UNIT III

**The Flowering of modern technology:** Manufacturing Technologies, Prim Movers, Internal Combustion Engines, Production of Metals and Alloys, The Birtl of Electrical Technology, Twentieth Century: The Flowering of modern technology like information technology and biotechnology, and its implications on society.

## UNIT IV

**Technology, Science and Society**: Impact of technology on society, The Impacts of Technology on the environment, Sustainable development.

## Achievements of famous scientists:

(World): Einestein, Newton, Faraday, Graham Bell, Edison, S.Hawking. (India): CV Raman, S.Chandrasekhar, Aryabhatta, Homi J Bhabha, Vikram Sarabhai, APJ Abdulkalam, S.Ramanujan, M.Visweswarayya.

## **TEXT BOOKS**

[1] Dr. R.V.G Menon, "Technology and Society", Pearson Education, 2011

## **REFERENCE BOOKS**

[1] Quan-Haase, A., "Technology and Society: Inequality, Power, and Social Networks", Oxford University Press, 2013.

EN	20BS11 GINEERING PHYS	51A ICS LABORATORY	
<b>Course Category:</b>	Basic Science	Credits:	1.5
Course Type:	Laboratory	Lecture -Tutorial- Practice:	0 - 0 - 3

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Upon successful completion of the course, the student will be able to:														
<b>CO1</b> Use function generator, spectrometer and travelling microscope in various experiments														
CO2	Test inter	opti feren	ical ce an	comp d diff	onen Fractio	ts us on of	sing light	princ	iples	of				
CO3	CO3Determine the V-I characteristics of solar cell and photo celland appreciate the accuracy in measurements													
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- 1. Photo cell-Study of V-I Characteristics, determination of work function
- 2. Newton's Rings-Radius of curvature of plano convex lens.
- 3. Compound pendulum-Measurement of 'g'

- 4. LCR circuit- Study of Resonance
- 5. AC Sonometer –Verification of vibrating laws
- 6. Solar cell–Determination of Fill Factor
- 7. Diffraction grating-Wavelength of laser light
- 8. Optical fiber-Study of attenuation and propagation characteristics
- 9. Diffraction grating-Measurement of wavelength of mercury source
- 10. Hall effect -Hall coefficient measurement
- 11. Figure of merit of a galvanometer
- 12. Variation of magnetic field along the axis of current-carrying circular coil

## **TEXT BOOKS**

[1] Madhusudhan Rao, "Engineering Physics Lab Manual", Isted., Scitech Publications, 2015

[2] Ramarao Sri, ChoudaryNityanand and Prasad Daruka, "Lab Manual of Engineering Physics"., Vth ed., Excell Books, 2010

## **E-RESOURCES**

[1] http://plato.stanford.edu/entries/physics-experiment

[2] http://www.physicsclassroom.com/The-Laboratory

[3] http://facstaff.cbu.edu/~jvarrian/physlabs.html

## VIRTUAL LAB REFERENCES

[1] http://vlab.amrita.edu/?sub=1&brch=201&sim=366&cnt=1

[2] http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1

[3] http://vlab.amrita.edu/?sub=1&brch=282&sim=879&cnt=1

### 20ES1152 PROGRAMMING FOR PROBLEM SOLVING LABORATORY

<b>Course Category:</b>	Engineering Science	Credits:	1.5
<b>Course Type:</b>	Laboratory	Lecture -Tutorial-	0 - 0 - 3

Prerec	erequisites: Every Series Semester end Evaluation: Total Marks:									ce:         us       3         on:       7         nd       1         on:       3         xs:       3	30 70 100			
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Upon successful completion of the course, the student will be able to:														
<b>CO1</b>	<b>CO1</b> Implement the use of programming constructs in a structural programming language.													
CO2	App conc	ly th cepts	e sel in C t	ection o solv	ns, lo ve pro	oops, oblem	array 1s.	rs, an	nd str	ing				
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CO3		1	3										3	
CO4	1 3 3 3													
COU	RSE	CON	TEN	<b>T</b>										

## WEEK – 1 : Introduction to C Programming

- a) The Structure of C Program with a sample program.
- b) Use identifiers, data types, format specifiers, constants, and variables declaration and initialization to write simple C programs.

c) Write simple C programs using preprocessor commands and simple I/O statements.

## WEEK – 2 : Data Types and Variable Declarations

- a) Use void, integral and floating point data types in different scenarios to write programs.
- b) Use various primitive data types for performing different mathematical operations.
- c) Programs to perform mathematical operations using various operators in C

## WEEK-3: Selection – Making Decisions

- a) Write programs using the if...else selection statements.
- b) Use nested if...else statement to solve problems that need multi-level selection making decisions.
- c) Write programs that use switch...case and else...if multi way statements to select one out of several options.

## WEEK – 4 : Looping Constructs and Their Applications

- a) To have a clear idea on loop initialization, validation and updation.
- b) Write programs using the while, for, or do...while loops.
- c) To understand the logic and adopt best looping construct for different kinds of problems.
- d) Design and develop programs based on Iterative loops using While, Do While, For, Nested For.

## WEEK – 5 : Unconditional Control Transfer Statements

- a) Write programs using of (break, and continue) unconditional control transfer statements.
- b) Use the goto statement to transfer the control from one part to another part of a program and the use of return statement to end the execution of a called function.
## WEEK – 6 : Arrays and Their Applications

- a) To utilize one dimensional and multi-dimensional arrays to solve problems that use set(s) of similar type input data.
- b) To write programs that perform multiple classical operations like searching, sorting, updation, or deletion on array elements.

# WEEK – 7 : Strings, String I/O and Manipulation Functions

- a) To write programs that work on read, write and manipulate fixed length and variable-length strings and/or arrays of strings
- b) To write programs that use predefined string I/O functions.
- c) To write programs that use string manipulation functions from the string library.

# WEEK – 8 : Concepts of User Defined Functions

- a) Design and develop programs depending on functions both user defined andstandard library functions in C with different approaches.
- b) To write a program using more than one function with or without parameters and function return type.

# WEEK – 9: Pointers and Their Applications

- a) Programs on declaration of pointers and their usage in C.
- b) Programs to relate between arrays and pointers and use them efficiently in a program.
- c) To pass pointers as an argument to a function, and use it efficiently in a program.
- d) To write programs using static and dynamic memory allocation.

# WEEK – 10 : Structure, Union, and Enumeration

- a) Programs to define, declare and access structure and union variables
- b) Design and develop programs to work with pointers to access data within a structure
- c) Programs to pass structure as an argument to a function
- d) To write C programs using enumeration data types, an easiest way of mapping symbolic names to integer values.

### WEEK – 11 : File Handling Operations

- a) Programs to open and close text and binary files using file I/O commands.
- b) Write programs to perform read and write operations using the formatting I/O and character I/O functions.
- c) Apply file positioning, status and system commands based on a problem requirements.

# WEEK – 12 : Command Line Arguments

- a) To use command line arguments to pass inputs in a single line while executing a program through the DOS command prompt or Linux terminal.
- b) To use atoi function to convert a default string value argument to an integer value inside the main function in a program.

c) To use atof function to convert a default string value argument to a float value inside the main function in a program.

# **TEXT BOOKS**

[1] Behrouz A. Forouzan and Richard F. Gilberg, "Computer Science A Structured Programming Approach Using C", CENGAGE Learning, Third Edition.

## **REFERENCE BOOKS**

- [1] Anil B. Chaudhuri, "Flowchart and Algorithm Basics: The Art of Programming", Mercury Learning & Information, 2020.
- [2] R.G. Dromey, "How to Solve it By Computer", Prentice-Hall International Series in Computer Science, 1982.
- [3] YashwantKanetkar, "Let us C", BPB Publications, 16th Edition 2017.
- [4] Kernighan and Ritchie,"The C programming language", The (Ansi C Version), PHI, second edition.
- [5] Paul J. Dietel and Harvey M. Deitel, "C: How to Program", Prentice Hall, 8th edition (Jan 19, 2021).

[6] K.R.Venugopal, Sundeep R. Prasad, "Mastering C", McGraw Hill, 2nd Edition, 2015.

# **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Computer Science and Engineering - Noc:problem Solving Through Programming in C. [online] <u>https://nptel.ac.in/courses/106/105/106105171/</u>  [2] Computer Science and Engineering - Noc:introduction To Programming in C. [online] <u>https://-nptel.ac.in/courses/106/104/106104128/</u>

[3] C For Everyone: Structured Programming. [online]

https://www.coursera.org/learn/c-structured -programming

[4] Advanced C Programming CourseTim Academy-Jason Fedin. [online] <u>https://www.udemy.com/-course/advanced-c-programming-course/</u>

#### 20HS1153

#### TECHNICAL ENGLISH AND COMMUNICATION SKILLS LABORATORY

Course	e Cate	egory	•	Hu Sci	manit ence			Credi	<b>ts:</b> 1	: 1.5				
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Upon	succe	ssful	com	pletio	on of	the c	ourse	, the	stude	ent w	vill be	able	to:	
CO1	Develop active and authentic listening comprehension skills relevant for the professional world.													
CO2	Execute web related(On-line) communication with felicity of expression													
CO3	App stan	ly 1 dard p	eleva pronu	nt nciati	speec ion	h p	oattern	ns i	nclud	ing				
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## **UNIT 1:**

# Listening Skills:

Exposure to structured and open talks- Active listening, Appreciative listening, Biased listening, Critical listening Empathetic listening, Judgmental listening

# Content-oriented Listening Skills :

Short Conversations- 5-10 minute duration- components, statistics, nominal and other references

Concept oriented/ purposive Listening skills:

Long Conversations- 10-30minute duration -

- Problems in comprehension & retention Note-taking practice Listening tests-
- Overcoming Barriers to listening: Physical & psychological Steps to overcome them with demonstration and practice

# <u>Unit-II</u>

# Professional and On-line drafting skills:

- Professional drafting skills : Circular, Notice, Executive summary
- **E-mail etiquette-** Awareness with Illustrations and practice
- Elements of Chat-room interaction- courtesy, techniques o argumentation
- Written Response to web-content- conciseness with accountability
- Data interpretation- compiling analytical, comparative and critica observations by interpreting graphs, charts, etc.

# UNIT III

# **Phonetics and Speech patterns:**

- Speech Mechanism Organs of speech and patterns of articulation of speech sounds.
- Vowels, Consonants and Diphthongs- Transcription using Internationa Phonetic Alphabet
- Word Stress and Rhythm- practice
- Intonation pattern practice- Tones , Tone group boundaries and Tonal variations
- Strong forms and weak forms in Connected speech Illustrations and Practice

# <u>UNIT IV</u>

#### Interpersonal Spoken communication skills:

- Fluency & accuracy in speech –Improving self-expression
- Listener oriented speaking Interpersonal Conversation- Manner and Temper
- Developing persuasive speaking skills- Role play
- Overcoming Barriers to speaking Building self-confidence– through Conversation practice
- Improving responding capacity Extempore speech practice

## **TEXT BOOKS**

[1] Garner, Bryan A, HBR Guide to Better Business Writing, Harvard Busines Review Press, Boston, Massachusetts, 2013.

[2] Exercises in Spoken English, Prepared by Department of Phonetics and Spoker English, CIEFL,(Currently English and Foreign Languages University) OUP, 21 Impression, 2003

## **REFERENCE BOOKS**

[1] Randolph Quirk, Use of English, Longman, I Edition (1968) Reprinted 2004.[2] Thomson A.J & A.V, Martinet, Practical English Grammar, III Edition,

Oxford University Press,2001

[3] V.Sethi and P.V. Dhamija, A Course in Phonetics and Spoken English, II Edition, PHI, 2006

## **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] ODll Language Learner's Software, Orell Techno Systems

[2] Visionet Spears Digital Language Lab software Advance Pro

[3] <u>www.natcorp.ox.ac.uk</u>, British National Corpus

#### 20ES1154 COMPUTING AND PERIPHERALS LABORATORY

<b>Course Category:</b>	<b>Engineering Sciences</b>	<b>Credits:</b>	1

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CO2	Able issue	troub	le sh	are										
<b>CO3</b>	Able to configure network settings to connect internet.													
CO4	Able sprea	e to cr ad she	eate o eets u	docur sing o	nents office	, pres e prod	entat luctiv	ions a ity to	und ols.					
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	43													

### PC Hardware/Software

Week 1 - Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Week 1**– Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also, students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 2 - Task 1: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 2 – Task 2: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 3 - Task 1: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 3 - Task 2: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

# Networks, Internet & World Wide Web

**Week 4:** Types of Network cables, connectors, crimping straight and crossover cables, identification of network devices (Hubs, Switches, Routers).

**Week 5:** Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally, students should demonstrate, to the instructor, how to access the websites and email.

Week 6: Wifi router configuration, connecting to internet, Static/Dynamic IP address configuration, DNS, Gateway, Security configuration.

# Productivity tools LaTeX and Word

**Week 7**– Word Orientation: The mentor needs to give an overview of Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in word – Accessing, overview of components of toolbars, saving files, Using help and resources, rulers, format painter.

**Week 8-** Latex: Using LaTeX to create project certificate. Features to be covered: Formatting Fonts, Drop Cap, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option in both LaTeX.

**Week 9:** Creating project abstract Features to be covered: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

### Excel

**Week 10 -** Task 1 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Week 10 – Task2: Calculating GPA -Features to be covered: Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

# Power Point or equivalent (FOSS) tool

Week 11– Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes: PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point

presentation which needs to be replicated (exactly how it's asked).

Week 12 - Task 3: Concentrating on the in and out of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topics covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide master, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

TEXT BOOKS

### **REFERENCE BOOKS**

[1] LaTeX Companion – Leslie Lamport, PHI/Pearson.

- [2] Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
- [3] Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education

[4] Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech

[5] IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.

[6] PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

# **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] <u>https://dsceme.files.wordpress.com/2016/08/workshop-practice-manual-2016-17-1.pdf</u>

[2] <u>https://www.protosystech.com/rapid-prototyping.htm</u>

[3] <u>https://www.arduino.cc/en/Tutorial/Foundations</u>

[4] <u>https://www.tutorialspoint.com/arduino/</u>

# **SEMESTER – II**

20BS2101B PROBABILITY AND STATISTICS FOR MACHINE LEARNING

47

Cours	e Cat	tegor	y:	Bas	sic Sc	ience	,	Credits					3		
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CO4	Ana	lyze r	ando	m pho	enom	ena o	f sam	ple to	o test	the	K4				
	hypo	othesi	s con	cerni	ng tw	o me	an an	d reg	ress10	on.					
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CO3	3	3		2	1										
<b>CO4</b>	3	3		2	1										

# UNIT I

## **Probability Theory:**

Sample Spaces and events -Counting – Probability-The Axioms of Probability-Conditional Probability -Bayes' Theorem.

# **Probability Distributions**

Random variables –Binomial distribution - Mean and Variance of a Probability Distribution- The Poisson Approximation to the Binomial Distribution-Poisson Processes.

#### UNIT II Probability Densities

Continuous random variables – The Normal Distribution – The Normal approximation to the Binomial Distribution

# **Other Probability Densities**

The Uniform Distribution – The Log Normal Distribution – The Gamma Distribution-The Beta D

## UNIT III Sampling Distributions

Populations and samples-sampling distribution of the mean-SD Known and Un known-the sampling distribution of the variance.

## **Inferences Concerning Mean**

Point Estimation- Interval Estimation-Maximum error of estimate-Tests of Hypothesis – Null Hypothesis and Tests of Hypothesis – Hypothesis concerning one mean distribution – The Weibull distribution.

#### UNIT IV Comparing Two treatments

Comparisons Two independent Large samples - Comparisons Two independent

small samples – Matched pair of comparisons.

**Regression Analysis** 

The method of least squares - Multiple Regression- Correlation

# **TEXT BOOKS**

[1] Probability and Statistics for Engineers Eighth edition by Richard A. Johnson Prentice Hall of India. 8 thedition.

# **REFERENCE BOOKS**

[1] Applied Statistics and probability for engineers by Douglas C.Montgomery and George C.Runger, Wiley Student Edition

[2] Probability & Statistics for Engineers & Scientist by R.E. Walpole, R.H.Myers&S.L.Myers, Sixth Edition, Prentice Hall of India / Pearson Education.

[3] Probability and Statistics, Purna Chandra Biswal, Pearson Education Prentice Hall of India 2007.

[4] Probability and Statistics by T.K.V.Iyengar, B.Krishna Gandhi, S.Ranganatham, M.V.S.S.N.PrasadS.Chand.

# **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] probweb.berkeley.edu/teaching.html

[2] statsci.org/teaching.html

[3] video lectures.nptel.iitm.ac.in

20BS2102
ENGINEERING CHEMISTRY

<b>Course Category:</b>	Basic Science	Credits: 3
	50	

Cours	е Тур	pe:		The	eory			Ι	lectu	re -T P	al- 3 ce:	<b>I-</b> 3 - 0 - 0		
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CO2	Apply the concept of phase equilibrium to different materials and the knowledge of working of electrodes and batteries in various technological fields.													
CO3	Eval prote	uate ection	corr meth	rosion nods.	n pr	rocess	ses	as v	well	as				
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CO2	2													
CO3	CO3 3													
<b>CO</b> 4	CO4 2													
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# UNIT I

**Water technology-I:** WHO standards - Water treatment for drinking purpose - sedimentation, coagulation, filtration, disinfection by chlorination, breakpoint chlorination and its significance - Desalination of brackish water - principle and process of electrodialysis and reverse osmosis, advantages and disadvantages.

**Water technology-II:** Boiler troubles - scales-formation, disadvantages and internal conditioning methods - phosphate conditioning, calgon conditioning and sodium aluminate, caustic embrittlement- reasons, mechanism and its control, and boiler corrosion – causes and control.

# UNIT II

**Phase rule and applications:** Definition and explanation of the terms – phase, component and degree of freedom, phase rule equation, phase equilibria of single component system – water system, two component system – silver-lead system, applications of phase rule.

**Electrochemistry:** Construction and working of Calomel electrode, silver-silver chloride electrode, and principle, construction and working of glass electrode, determination of pH using glass electrode. Chemistry of modern batteries -  $Li/SOCl_2$  battery and  $Li_xC/LiCoO_2$  battery – construction, working and advantages.

Fuel cells: General working principle of a fuel cell, examples, chemistry of  $H_2$ - $O_2$  fuel cell.

## UNIT III

**Corrosion principles:** Introduction, definition, reason for corrosion, examples – types of electrochemical corrosion – hydrogen evolution and oxygen absorption – corrosion due to dissimilar metals, galvanic series – differential aeration corrosion – pitting corrosion and concept of passivity.

**Corrosion control methods:** Cathodic protection- principle and types - impressed current method and sacrificial anode method, anodic protection-principle and method, corrosion inhibitors – types and mechanism of inhibition – principle, process and advantages of electroplating and electroless plating.

### UNIT IV

**Conducting polymers:** Definition, examples, classification-intrinsically conducting polymers and extrinsically conducting polymers- mechanism of conduction of undoped polyacetylene, doping of conducting polymers-mechanism of conduction of p-doped and n-doped polyacetylenes – applications of conducting polymers.

**Fuel technology:** Fuel-definition, calorific value- lower and higher calorific values and numericals on calculation of HCV and LCV relation, analysis of coal – proximate analysis and ultimate analysis, flue gas analysis by Orsat's apparatus, numericals based on calculation of air required for combustion.

## **TEXT BOOKS**

[1] Shikha Agarwal, "Engineering Chemistry – Fundamentals and Applications", Cambridge University Press, New Delhi, 1st edition (2015).

## **REFERENCE BOOKS**

- [1] Sunita Rattan, "A Textbook of Engineering Chemistry", S.K. Kataria & Sons, New Delhi, First edition 2012.
- [2] P.C. Jain , "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Limited, New Delhi, 15th edition.
- [3] B.S. Bahl, G. D. Tuli and Arun Bahl, "Essentials of Physical Chemistry", S. Chand and Company Limited, New Delhi.
- [4] O. G. Palanna, "Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd., New Delhi.

## **E-RESOURCES AND OTHER DIGITAL MATERIAL**

- [1] http://www.cip.ukcentre.com/steam.htm
- [2] http://corrosion-doctors.org/Modi;es/mod-basics.htm
- [3] http://nopr.niscair.res.in/bitstream/123456789/5475/1/JSIR%2063%289%29 %20715-728.pdf
- [4] https://chem.libretexts.org/Core/Analytical_Chemistry/Electrochemistry/Bas ics_of_Electrochemistry
- [5] http://www.filtronics.com/blog/tertiary-treatment/stages-in-typicalmunicipal-water-treatment/

[6] NPTEL online course, "Corrosion Part-I" offered by MHRD and instructed by Prof. Kallol Mondal of IIT Kanpur

#### 20ES2103C

PROGRAMMING ESSENTIALS IN PYTHON														
Cours	e Cat	tegor	y:	Engi Scie	ineeri nce	ing					Cred	its:	3	
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COUF	COURSE OUTCOMES     BTL     POI													
Upon successful completion of the course, the student will be able to:														
CO1	Und cont	erstar rol flo	nd the	e pytl ateme	hon s ents	yntax	and	sema	antics	of				
CO2Apply functions, modules and string handling in Python to solve problems														
CO3	Ana prog	lyze rams	the n with	netho Pytho	ds to on dat	crea ta stru	ite an	id ma es	inipul	late				
CO4	Anal to sc	lyse t olve p	he co roble	ncept ms	ts of o	object	t oriei	nted a	approa	ach				
Contr Outco	ibutio mes (	on of (1 – L	Cour Low, 2	•se O 2 - M	utcor ediur	nes to n, 3 –	owar - Hig	ds ac h)	hieve	ment	t of P	rogra	am	
	<b>PO</b> 1	PO 2	<b>PO</b> 3	<b>PO</b> 4	<b>PO</b> 5	<b>PO</b> 6	<b>PO</b> 7	<b>PO</b> 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
<b>CO1</b>	CO1         2         2         1         2										1		3	
CO2	CO2 1 2												1	
CO3		1	1		1						1		2	
							55							

<b>CO4</b>	3	2	2				2	3	
	-				-	-	-		-

### UNIT I

**Basics of Python Programming**: Features, History, future of python, , writing and executing first python program, Literal constants, variables and identifiers, data types, input operation, comments, reserved words, indentation, operators and expressions, expressions, Type conversion

**Decision control statements:** Introduction, Selection/conditional branching statements, Basic loop structures/iterative statements, Nested loops, break, continue and pass statements

**Strings:** Concatenating, appending and multiplying strings, immutability, String formatting operator, built-in string methods and function, slice operation.

### UNIT II

**Lists:** access and update values in lists, nested and cloning lists, basic list operations, List methods, Using lists as Stack and Queues, list comprehensions, looping in lists, functional programming:filter(), map(), reduce() functions.

**Tuple:** Creating tuple, utility of tuples, accessing values in a tuple, updating tuple, deleting elements in tuple, basic tuple operations

**Sets and Dictionaries:** Creating a Set and set operations, Creating a dictionary, accessing values, add, modify, delete, sort items in a dictionary, looping over a dictionary.

**Functions and Modules:** Introduction, function declaration and definition, function definition, function call, variable scope and lifetime, the return statement, recursive functions, modules, packages in python.

## UNIT III

File Handling: Introduction, Types of files, Opening and Closing of files,

Reading and Writing files, file position, renaming and deleting files, Directory Methods

**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.

**Regular Expression**: match(), search(), sub(), findall(), finditer() Functions, Flag Option, Meta-Characters in Regular Expression

**Classes and Objects:** Introduction, classes and objects, class method and self argument, init() method, class and object variables, del() method, other special 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

## UNIT IV

**Polymorphism:** Introduction, implementing operator overloading, reverse adding, overriding __getitem__() and __setitem__() methods, overriding the in operator, overriding miscellaneous functions, overriding the _call__() method.

**Inheritance:** Introduction, inheriting classes in python, types of inheritance, composition/containership/complex objects, abstract classes and interfaces, Meta class.

**Python Packages for Data Exploration:** Introduction to numpy for handling arrays, matplotlib: Controlling the line properties of a chart, creating multiple plots, styling your plots, Box plots, Heatmaps, Scatter plots with histograms, Area plots, Bubble charts

## Self-Study:

String functions: ord(), chr() functions, in and not in operators Standard Library modules, Globals(), Locals(), Reload(), date, time, sys Comparing, iterating string, the String module, Re-raising exception, Assertions in python

## **TEXT BOOKS**

[1] ReemaThareja, "Python ProgrammingUsing Problem Solving Approach", Oxford University Press, 2019.

[2] Mastering Python for Data Science by Samir Madhavan Released August 2015 Publisher(s):Packt Publishing ISBN: 9781784390150

#### **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", The MIT Press, 2013

[4] W.Chun, "Core Python Programming", 2nd Edition, Prentice Hall, 2006.

## **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Charles Severance: University of Michigan,Python for Everybody [COURSERA]. (05-01-2021), Available: <u>https://www.coursera.org/</u>

[2] Prof. SudarshanIyengar, IIT Ropar, Prof. Yayati Gupta, IIIT Dharwad, The Joy Of Computing Using Python [NPTEL], (05-01-2021),

Available:<u>https://nptel.ac.in/courses/106/106/106106182/#</u>

[3] Prof KannanMoudgalya, Professor, IIT Bombay, Python 3.4.3, [SWAYAM], (05-01-2021),

Available: <u>https://onlinecourses.swayam2.ac.in/aic20_sp33/preview</u>

[4] Corey Schafer, Python OOP Tutorials - Working with Classes, (05-01-2021), Available: <u>Python OOP Tutorials - Working with Classes - YouTube</u>

## 20ES2104A BASIC ELECTRONICS ENGINEERING

C		haci		<b>F</b> er :								•	2	
Cours	e Cat	tegor	<b>y:</b>	Eng Scie	ineeri	ing					Cred	its:	3	
Cours	е Туј	pe:		The	ory			-	Lectu	re -[]	Futor Practi	ial- ice:	3 - 0 -	0
Prerec	quisit	es:					(	Conti	nuou	s Eva	aluati	on:	30	
	•									Semo	ester o	end	70	
									100					
									,	Tota	l Mar	ks:		
				1										
COUR	RSE (	OUT	COM	ES							BTL		POI	[
Upon	succe	essful	com	pletio	on of	the c	ourse	e, the	stude	ent w	ill be	able	to:	
CO1	Con con	npreh npone	end t nts, c	he fu levice	ndam es, tra	ental nsduo	s of e cers	lectro	onic					
CO2       Understand and apply the principles of digital electronics														
CO3 Learn the principles of various communication systems.														
Contra Outco	ibutio mes	on of (1 – 1	Cour Low,	rse O 2 - M	utcor lediu	nes to m, 3	owar – Hig	ds ac (h)	hieve	men	t of P	rogra	am	
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
<b>CO1</b>	3	3			2									
CO2	3	3												
CO3	2				2									
		I		I	I			I	I	<u> </u>		<u> </u>		1
COUI	RSE	CON	TEN	Т										
UNIT	UNIT I													
Electr	<b>Electronic Components</b> : Passive components - resistors, capacitors & inductors (properties, common types, I.V. relationship, and uses). Semiconductor Devices:													
high	<i>AUCS</i> ,		111011	types	, 1- v		1011511	ip all	u use	5). 50		nuuc		vices.
							50							

Semiconductor Devices - Overview of Semiconductors - basic principle, operation and characteristics of PN diode, Zener diode, BJT, JFET, optoelectronic devices (LDR, photodiode, phototransistor, solar cell, photo couplers).

# UNIT II

**Transducers**: Transducers - Instrumentation - general aspects, classification of transducers, basic requirements of transducers, passive transducers - strain gauge, thermistor, Hall-Effect transducer, LVDT, and active transducers - piezoelectric and thermocouple -DHT, ULTRASONIC, PIR..sensors

# UNIT III

**Digital Electronics**: Number systems - binary codes - logic gates Boolean algebra, laws & theorems - simplification of Boolean expression - Implementation of Boolean expressions using logic gates – standard forms of Boolean expression.

# UNIT IV

**Digital Communication**: Block diagram of a basic communication system frequency spectrum - need for modulation, Types of communication-Analog and Digital communication-Advantages and Disadvantages of Digital Communication, Time and frequency domain representation of signals, Sampling theorem, Nyquist rate and Nyquist interval, Pulse code modulation, Line coding-Various formats, Generation of digital modulation techniques-ASK,FSK,PSK

# TEXT BOOKS

- [1] Thyagarajan.T, SendurChelvi.K.P, Rangaswamy, "Engineering Basics: Electrical, Electronics and computer Engineering", T.R, New Age International, Third Edition, 2007. (UNIT- I&II)
- [2] Thomas L. Floyd, "Electronic Devices", Pearson Education, 9thEdition, 2011. (UNIT- III)
- [3] Dr. Sanjay Sharma, "Communication Systems(Analog & Digital)", S.K.Kataria& Sons (KATSON Books), 6th edition, 2014 (UNIT- IV)

#### **REFERENCE BOOKS**

- [1] M. Morris Mano, Michael D. Ciletti, —Digital Designl, 4th edition, Prentice Hall, 2007.
- [2] S. Salivahanan, N.Suresh Kumar & A. Vallavaraj, "Electronic Devices & Circuits", 2nd Edition, Tata McGraw Hill,2008.
- [3] Simon Haykin. —Communication Systems, 4th edition, 2000, John Wiley and Sons

#### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

- [1] <u>https://nptel.ac.in/courses/117/103/117103063/</u>
- [2] <u>https://nptel.ac.in/courses/108/105/108105132/</u>
- [3] <u>https://nptel.ac.in/courses/108/102/108102096/</u>

#### 20ES2105

#### **ENGINEERING GRAPHICS**

<b>Course Category:</b>	Engineering Science	Credits:	3
	61		

Course Ty	pe:		Theor	y & P	ractice	;	Lect	ure -T P	utoria Practio	al- 1	- 0 - 4	ļ	
Prerequis	ites:		Nil					Cor Eva Seme Eva Total	itinuo luatio ster ei luatio Marl	us         30           on:         70           ond         10           on:         60	0 0 00		
COURSE	OURSE OUTCOMES												
Upon succ	essful	sful completion of the course, the student will be able to:											
<b>CO1</b>	Uno	Understand the Scales and conics.											
CO2	Dra	Draw Orthographic projections of points, Lines and Planes.											
CO3	Dra Aut	w Ort	hograp D.	ohic pr	ojectio	ons of	Solid	sand to	o unde	erstand	d basi	cs of	
CO4	Uno viev	derstar ws usii	nd the ng Aut	section to CAI	ns, De D.	velop	nentso	of soli	ds and	l draw	' isom	etric	
Contributi Outcomes (L – Low,	ion of M - M	Cours lediun	se Out n, H –	comes High	s towa	rds a	chieve	ment	of Pro	ogran	1		
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	
	1	1 2 3 4 5 6 7 8 9 10 11 12										12	
<b>CO1</b>	3		3				3						
CO2	2		3				3						
CO3	2		3				3						
<b>CO4</b>	1	3 3											

UNIT – I

**Introduction to Engineering Drawing:** Principles of Engineering Graphics and their Significance

Scales: Construction of plain and diagonal Scales

**Conic Sections**: Construction of ellipse, parabola and hyperbola (Treatment is limited to Eccentricity or General method only)

# UNIT – II

**Orthographic Projections:** Principles of Orthographic Projections –Projections of Points, Lines (Treatment is limited to First Angle Projection) and Projections of Plane regular geometric figures (Up to Plane Inclined to both of the Reference planes)

# UNIT – III

**Projections of Solids**: Projections of simple solids such as Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions (Limited to Solid Inclined to one of the Reference planes)

**INTRODUCTION TO AUTO CAD:**Basic introduction and operational instructions of various commands in AutoCAD.(Internal Evaluation only)

# UNIT – IV

# Sections and Development of Surfaces of Right Angular Solids:

Sections and sectional views of right angular solids of Prism, Pyramid and Cone, Development of surfaces of Right Regular Solids of Prism, Pyramid and Cone.

**Isometric Projections**: Conversion of isometric views into Orthographic Projections of simple castingsusing Auto CAD. (Treatment is limited to simple objects only, Internal Evaluation only).

# TEXT BOOKS

[1] BasanthAgrawal& C M Agrawal," Engineering Drawing", McGraw Hill Education Private Limited, New Delhi.

[2] N.D. Bhatt "Engineering Drawing", Charotar Publishing House, Anand. 53rd Edition – 2019.

# **REFERENCE BOOKS**

[1] K. L. Narayana& P. Kannaiah, "Text Book on Engineering Drawing", Scitech publications (India) Pvt. Ltd., Chennai, 2nd Edition - fifth reprint 2006

[2] K. Venugopal, "Engineering Drawing and Graphics + Auto CAD", New Age International, New Delhi

[3] D M Kulkarni, AP Rastogi, AK Sarkar, "Engineering Graphics with Auto CAD", PHI Learning Private Limited, Delhi Edition – 2013

# E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] http://www.youtube.com/watch?v=XCWJ XrkWco.

- [2] http://www.me.umn.edu/courses/me2011/handouts/drawing/blancotutorial.html# isodrawing.
- [3] <u>https://onlinecourses.nptel.ac.in/noc20_me79/preview</u>
  [4] http://nptel.ac.in/courses/112/103/112103019/

# 20BS2151B **ENGINEERING CHEMISTRY LABORATORY**

<b>Course Category:</b>	Basic Science	<b>Credits:</b>	1.5
Course Type:	Laboratory	Lecture -Tutorial- Practice:	0 - 0 - 3
	64		

<b>Prerequisites:</b>	Knowledge of	Continuous	30
	chemistry practicals at	<b>Evaluation:</b>	70
	Intermediate level	Semester end	100
		<b>Evaluation:</b>	
		<b>Total Marks:</b>	

#### **COURSE OUTCOMES**

#### Upon successful completion of the course, the student will be able to:

<b>CO1</b>	Analyze ores, commercial samples, quality parameters of water samples
	from different sources

- **CO2** Perform quantitative analysis using instrumental methods.
- **CO3** Apply the knowledge of preparation of polymers, separation of ions, mechanism of corrosion and photochemical reactions.

### **Contribution of Course Outcomes towards achievement of Program Outcomes**

(L-Low, M - Medium, H - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	<b>PO</b> 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>		3										
CO2				2								
CO3	2											

# **COURSE CONTENT**

## List of Experiments:

- 1. Determination of  $MnO_2$  in Pyrolusite / Iron in Haematite ore
- 2. Determination of total alkalinity of a water sample
- 3. Determination of purity of a boric acid sample
- 4. Conductometric analysis of a strong base using a strong acid
- 5. Determination of total hardness of a water sample
- 6. Determination of copper in a given sample
- 7. Chemistry of blueprinting
- 8. Determination of Mohr's salt Permanganometry

- 9. Determination of Mohr's salt Dichrometry
- 10. Comparison of corrosion rates of different metals
- 11. Determination of available chlorine in a bleaching powder sample
- 12. Determination of chlorides in a water sample
- 13. pH metric analysis of a strong base using a strong acid
- 14. Preparation of urea-formaldehyde resin
- 15. Separation of ions by paper chromatography

# **REFERENCE BOOKS**

- [1] *S.K. Bhasin and Sudha Rani*, "Laboratory Manual on Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 2nd edition.
- [2] *Sunitha Rattan*, "Experiments in Applied Chemistry", S.K. Kataria & Sons, New Delhi, 2nd edition.

# 20ES2152C

# PROGRAMMING ESSENTIALS IN PYTHON LABORATORY

<b>Course Category:</b>	Engineering Science	Credits:	1.5
<b>Course Type:</b>	Lab	Lecture -Tutorial- Practice:	0 - 0 - 3
	66		

Preree	20E Prog Prob Labo	S1152 gramn olem S orator	2Continuousming forEvaluation:SolvingSemester endryEvaluation:Total Marks:					ous on: end on: ks:	30 70 100					
COURSE OUTCOMES														
Upon	succ	essfu	l com	pleti	on of	the o	cours	e, the	e stud	lent v	vill bo	e able	e to:	
<b>CO1</b>	De pro	mons blem	trate s	the u	isage	of P	ythor	i synt	tax ai	nd se	manti	ics in	solvir	ig the
CO2	De	velop	pyth	on pr	ograr	ns us	ing fu	inctio	ns an	d bui	lt in r	nodul	es	
CO3	Im	pleme	ent Py	vthon	data	struct	tures	to sol	ve the	e com	plex	probl	ems	
CO4	Ap	ply o	bject	orien	ted co	oncep	ots to	desig	n solı	ition	to rea	l wor	ld scen	arios
Contr Outco	ibuti mes	ion of (L –	f Cou Low,	rse C M -	)utco Medi	mes t um, 1	towai H – F	rds ao Iigh)	chiev	emen	t of F	Progr	am	
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
COL	1	2	3	4	5	6	7	8	9	10	11	12	1	2
	2	2	1		2								3	2
CO2		1	1		2								1	2
$CO_{4}$		1	1		1								2	<u> </u>
		-	-		4								5	
COURSE CONTENT														
Implement the following programmes using IDE's (pycharm, jupyter notebook, spyder etc.,)Week 1: Declaration of Variables, identifiers and type conversions Write a program i) to define variables and assigning values of different basic67														

data types

ii) to know data type of a variable using Type statement

2. Write programs to do multiple assignments at a time

3. Write programs for writing multiple statements in a single line

4. Use Input statement, type conversion

5. Use different operators in programs

# Week 2: Python programs on Decision Control Statements, Looping Control Structures

a. Write programs using selection statements

b. Implement programs on and conditional branching statements

C. Design and develop programs using Iterative statements- while, for , nested loops

d. Use Break, continue, pass statements in programs

e. Understand the usage of else statement in loops with a case study

## Week 3 : Solve the problems using Strings

a. Apply string formatting operator

b. Use built in string methods and functions

# Week 4:Programs on the implementation of methods and operations on List and Tuple data structures

- a. Define a list and write programs to access and modify elements of a list
- b. Practice basic list operations, methods
- c. Write programs to use list as a stack and queue

# Week 5: Implement programs to solve the problems using Python other data structures: Set and Dictionaries

- a. Write programs to define a dictionary and write programs to modify values, adding new keys
- b. Apply looping over a dictionary
- c. Use built in dictionary methods, functions
- d. Create a tuple and assign values
- e. Use basic tuple operations and comparisons

# Week 6: Identify the need and importance in the creation of Python Functions and Modules

a. Write programs for defining and calling functions

- b. Understand Scope of a variable and Use global statement
- c. Differentiate fruitful and void functions through a case study
- d. Apply recursive and Lambda functions
- e. Understand different kinds of arguments through a case study
- f. Installing and usage of standard library modules
- g. Use python packages

# Week 7: File and Exception Handling

- a. Write a simple exception handling program with try- except
- b. Write a program for catching multiple exceptions
- c. Demonstrate raising and re raising exceptions

d.

# Week 8: Regular Expressions

# Week 09: Implement the Python Classes and Objects to address the real world scenarios

- a. Define classes and objects using python for the real world scenario
- b. Defining constructors and using Self
- c. Understand public and private members
- d. Practice calling class methods from another class
- e. Write built in functions to check, get, set and delete attributes

# Week 10: Develop the programs to implement Inheritance and Polymorphism

- a. Demonstrate different inheritance types
- b. Apply polymorphism and method overriding
- c. Create abstract classes
- d. Demonstrate the usage of polymorphism in overloading of operators

# Week 11: Programs on Data Representation and Visualisation

# **TEXT BOOKS**

[1] ReemaThareja, "Python ProgrammingUsing Problem Solving Approach", Oxford University Press, 2019.

[2] Mastering Python for Data Science by Samir Madhavan Released August 2015 Publisher(s):Packt Publishing ISBN: 9781784390150

#### **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", The MIT Press, 2013

[4] W.Chun, "Core Python Programming", 2nd Edition, Prentice Hall, 2006.

### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Charles Severance: University of Michigan,Python for Everybody [COURSERA]. (05-01-2021), Available: https://www.coursera.org/

[2] Prof. SudarshanIyengar, IIT Ropar, Prof. Yayati Gupta, IIIT Dharwad, The Joy Of Computing Using Python [NPTEL], (05-01-2021),

Available:<u>https://nptel.ac.in/courses/106/106/106106182/#</u>

[3] Prof KannanMoudgalya, Professor, IIT Bombay, Python 3.4.3, [SWAYAM], (05-01-2021),

Available: <u>https://onlinecourses.swayam2.ac.in/aic20_sp33/preview</u>

[4] Corey Schafer, Python OOP Tutorials - Working with Classes, (05-01-2021), Available: <u>Python OOP Tutorials - Working with Classes - YouTube</u>

#### 20ES2153 ENGINEERING WORKSHOP

<b>Course Category:</b>	Engineering Sciences	Crea	dits:	1.5
	7	0		

Cours	е Ту	pe:		Labo	orator	y		<b>Lecture -Tutorial-</b> 0 - 0 <b>Practice:</b>						- 3	
Preree	quisi	tes:		-	- Continuous Evaluation: Semester end Evaluation: Total Marks:				30 70 100						
		<b>^</b>	~~												
Upon successful completion of the course, the student will be able to:															
CO1Understand the basic joints using wood and familiarize with various fundamental aspects of house wiring															
CO2	Pre	epare etals u	basic basic	motion mo	dels u reldin	using g tecł	sheet	t met e.	al an	d pra	ictice	joini	ng of		
CO3	Fai	milian ectior	rize 1 mou	with 1lding	vari g and	ous 3D pi	manu rintin;	ıfactu g	iring	proc	esses	suc	ch as		
<b>CO4</b>	Un	derst	and tl	ne pre	eparat	tion o	f PCF	3							
<b>CO5</b>	Un	derst	and s	imple	· IOT	Appl	icatio	ons us	sing A	vrduir	10				
Contr Outco	ibuti mes	on of (L –	Cou Low,	rse O M - 1	)utco Medi	mes t um, ]	:owar H – H	·ds ac ligh)	chiev	emen	t of P	rogr	am		
	<b>PO</b> 1	<b>PO</b> 2	<b>PO</b> 3	<b>PO</b> 4	<b>PO</b> 5	PO 6	<b>PO</b> 7	<b>PO</b> 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	
<b>CO1</b>			2					1			3	2		1	
CO2			2					1			3	2	2	2	
CO3			2					1			3	2		2	
<b>CO</b> 4						1							1	1	
CO5 2 1										1					
<u> </u>															
71															

# PART-A

# **Carpentry:**

a. Demonstration of Cross half lap and T joints.

(1 class)

b. Demonstration of power tools.

# **Electrical Wiring:**

a. Fundamentals of Electric wiring and practice of Series wiring. (1 class)

b. Practice of stair case wiring and connecting a fluorescent Tube.

# Sheet metal & soldering:

a. Preparation of complete funnel using sheet metal and practice of soldering. (2 classes)

b. Preparation of a square box using sheet metal and practice of soldering.

# Welding:

a. Preparation of Corner Joint using arc welding process. (1 class)

b. Preparation of "T" joint using arc welding process.

# Manufacturing processes:

a. Preparation of a small plastic part using injection moulding process. (1 class)

b. Demonstration of manufacturing a simple model using 3D printing process.

# **Electronic Circuits:**

# 1. To prepare PCB for the given electronic circuit

- a. To prepare the layout and printing it on copper clad board
- b. To etch and drill the holes on PCB
- (2 classes)
- 2. To solder the components on the PCB prepared and test the circuit a. To identify and solder the components on the PCB prepared b. To test the operation of the circuit
  - b. To test the operation of the circuit.
#### **Basic IOT:**

#### 1. Demonstration of Arduino board

a. Demonstrate different components & pin configuration of Arduinob. To set up Arduino IDE for programming.

#### 2.To measure Temperature & Humidity

a. Interfacing of temperature & humidity sensor with Arduino.

(2 classes)

b. Execute the program on Arduino IDE & display the measured values.

#### 3. To measure Distance

a. Interfacing of Ultrasonic Sensor with Arduino

b. Execute the program on Arduino IDE & display the measured value.

#### PART-B

#### **GROUP** ACTIVITY

(4 classes)

Students must prepare a Working model / Assembly using the knowledge gained from the above trades.

#### **TEXT BOOKS**

[1] Kannaiah P. & Narayana K. C., "Manual on Workshop Practice", Scitech Publications, Chennai, 1999.

[2] Venkatachalapathy, V. S., "First year Engineering Workshop Practice", Ramalinga Publications, Madurai, 1999.

#### **REFERENCE BOOKS**

[1] Gopal, T.V., Kumar, T., and Murali, G., "A first course on workshop practice – Theory, Practice and Work Book", Suma Publications, Chennai, 2005

### **E-RESOURCES AND OTHER DIGITAL MATERIALL**

[1] https://dsceme.files.wordpress.com/2016/08/workshop-practice-

manual-2016-17- 1.pdf

[2] https://www.protosystech.com/rapid-prototyping.htm

[3] https://www.arduino.cc/en/Tutorial/Foundations

[4] <u>https://www.tutorialspoint.com/arduino/</u>

	20M	C2106	
PR	OFESSIONAL E	THICS & PRACTICE	
<b>Course Category:</b>	Mandatory Course	Credits	S:
		74	

Cours	e Type:		Theo	ry			Le	cture	-Tut Pra	orial- ctice:	1	- 0 - 0		
Prerec	quisites:							C E	Contir Valua	uous tion:		100		
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CO2	Understa	nd En	ginee	ring a	ıs Exp	perim	entati	on						
CO3	Understand about safety, risk and professional rights.													
CO4	<ul> <li>Understand about safety, risk and professional rights.</li> <li>Know the ethics regarding Global issues related to Environment, Computers and weapon's development. Understand general principles of contracting.</li> </ul>													
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CO3					3									
<b>CO4</b>											2			
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COUF	RSE CON	TEN	Γ											

### UNIT I

Engineering Ethics: Senses of 'Engineering Ethics' - variety of moral issues-

types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy - Models of Professional Roles - theories about right action - Self-interest - customs and religion- uses of ethical theories.

### UNIT II

**Engineering as Social Experimentation**: Engineering as experimentation – engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

### UNIT III

**Safety, Responsibilities and Rights:** Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk – the three mile island and chernobyl case studies. Collegiality and loyalty – respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

### UNIT IV

**Global Issues**: Multinational corporations- Environmental ethics- computer ethics - weapons development - engineers as managers-consulting engineersengineers as expert witnesses and advisors -moral leadership-sample code of Ethics (Specific to a particular Engineering Discipline).

**General principles of contracts management :** Indian contract act,1972 and amendments covering general principles of contracting.

# TEXT BOOKS

[1] Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw Hill, New York (1996).

[2] Govindarajan M, Natarajan S, Senthil Kumar V. S., "Engineering Ethics", Prentice Hall of India, New Delhi(2004).

#### **REFERENCE BOOKS**

[1] Baum, R.J. and Flores, A., "Ethical Problems in Engineering, Center for the

studyof the Human Dimensions of Science and Technology", Rensellae Polytechnic Institute, Troy, New York, 335 pp. eds. (1978)

[2] Beabout, G.R., Wennemann, D.J., "Applied Professional Ethics: A Developmental Approach for Use with Case Studies", University Press of America Lanham, MD, 175 pp (1994).

[3] Dutt (1994) Indian Contract Act, Eastern Law House.





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Cours	e Tvi	oe:		The	eory			L	ectur	e -T	utoria	<b>I-</b> 3	- 0 - 0	
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COUF	RSE (	OUT	COM	ES							BTL		POI	
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CO1Analyze of propositional calculus and first order logicKCO2Apply the basic and advanced countingk													.1,1.7.1, .1,4.6.3 4.2	
CO2	<b>CO2</b> Apply the basic and advanced count techniques												.1,2.5.1, .3,12.4.2	
CO3	<b>CO3</b> Analyze of relations and digraphs and their K4 1.2.1,2.8.1, 4.4.1,12.4.2													
CO4	Ana	lyze	of gra	phs a	and th	eir ap	oplica	tions			K4	1.2 4.4	.1,2.5.3, .1,12.4.2	
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							79							

#### **UNIT I: Propositional Calculus**

**Fundamentals of Logic:** Propositions, Connectives, Propositional functions, Truth tables, Tautology, Contradiction, Logical equivalences, Normal forms, Logical inferences, Methods of proof of an implication.

**First Order Predicate Logic:** Predicate, Quantifiers, and Rules of inference for Quantified propositions.

#### **UNIT II: Counting Techniques**

**Basics of Counting:** Sum and product rules, Indirect counting, One to one correspondence, Combinations and permutations, Enumerating combinations and permutations with and without repetitions.

Advanced Counting Techniques: Generating function of sequences, Recurrence relations, Solving recurrence relations – substitution- Generating functions-The method of characteristic roots, Solution of inhomogeneous recurrences relations.

### **UNIT III: Relations and Digraphs**

Relations and basic graphs, Special properties of binary relations, Equivalence relation, Partially ordered sets, Hasse diagrams, Lattices, Operations on relations, Paths and closures, Directed graphs and Adjacency matrices, Transitive closure, Warshall's algorithm.

### UNIT IV: Graph Theory

Introduction(graphs, sub graphs, circuits, trees) Sum of degrees theorem, Isomorphism and sub graphs, planar graphs, Euler's formula, Multi graphs and Euler's circuits, Hamiltonian graphs, Grin-berg's theorem, Graph coloring, Chromatic numbers.

### TEXT BOOKS

 J. L. Mott, A. Kandel, and T. P. Baker: Discrete Mathematics for Computer Scientists & Mathematicians, PHI, 2nd Edition.

#### **REFERENCE BOOKS**

[1] J. P. Trembly and R. Manohar: Discrete Mathematical structures with applications to computer science, TMH.

[2] K. H. Rosen: Discrete Mathematics and its Applications, Mc Graw Hill Companies, 7th Edition.

[3] D. S. Malik and M. K. Sen: Discrete Mathematical Structures: Theory and applications

#### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

- [1] Prof. Arindama Singh Department of Maths IIT Madras, Last accessed on 15-02-2022, https://nptel.ac.in/courses/111/106/111106052/
- [2] Prof Soumen Maity, Department of Maths, IISER Pune, Last accessed on 15-02-2022, <u>https://nptel.ac.in/courses/111/106/111106102/</u>
- [3] Dr.L.Sunil Chandran, Department of Computer Science and Automation, IISC Bangalore, Last accessed on 15-02-2022, https://nptel.ac.in/courses/106/108/106108051/

#### 20ES3102 DIGITAL LOGIC AND COMPUTER DESIGN

Cours	e Cat	tegor	<b>y:</b>	Er Sc	nginee	ering					Cre	dits:	3								
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CO2	O2Apply concepts of combinational logic to designK31.7.1,2.7.1, 2.7.2,3.7.1,3.8.1O2Apply sequential logic techniques to designK31.7.1,2.7.1,2.7.2,																				
CO3	CO3Apply sequential logic techniques to design Counters and Registers.K31.7.1,2.7.1,2.7.2, 3.7.1,3.8.1													Apply sequential logic techniques to designK31.7.1,2.7.1,2.7.2, 3.7.1,3.8.1Counters and Registers.K3							
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COURSE CONTENT																					
	82																				

### UNIT I

**Boolean Functions:** Introduction to Boolean Functions, Boolean Functions Simplification- The Map Method, Two and three variable Maps, Four-variable Map, Five variable Map, Product of Sums Simplification, Don't care conditions, The Tabulation Method, Determination of Prime Implicants, Selection of Prime-Implicants.

**Combinational Logic:** Introduction, Design Procedure, Adders, Subtractors, Code Conversions, Exclusive-or Gates, Parity Generators and Checkers.

### UNIT II

**Combinational Logic with MSI and LSI:** Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Demultiplexers, Encoders, Multiplexers.

**Programmable Logic**: Read only memory (ROM), Programmable read only memory (PROM), Programmable Logic Array (PLA), Programmable Array Logic (PAL), Introduction to FPGA.

### UNIT III

**Sequential Logic:** Sequential circuits, Classification, Latches, Flip Flops, Triggering of Flip-Flops, Master slave flip-flop, Flip-Flop Excitation tables, flip-flop direct inputs. Analysis of Clocked Sequential Circuits, State table, State diagram, state equations, State Reduction and Assignment, Design Procedure, design with unused states.

**Registers, Counters**: Registers, Shift Registers, Asynchronous Counters, Synchronous Counters, Ring Counter, Johnson Counter, Timing Sequences.

### UNIT IV

**Register Transfer and Micro-Operations:** Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

**Basic Computer Organization and Design:** Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input-Output and Interrupt, Design of Basic Computer, Design of Accumulator Logic.

### TEXT BOOKS

[1] M.Morris Mano, Digital Logic & Computer Design 1 e/d reprint, Pearson education, 2016.

[2] Morris M. Mano, Computer System Architecture, 3/e, Pearson/PHI ,2007

#### **REFERENCE BOOKS**

[1] A. Anand Kumar, Switching Theory and Logic Design, 2nd Edition, PHI,2013
[2] M.Morris Mano, Michael D Ciletti Digital Design with an Introduction toVerilog HDL 5th e/d, Pearson education, 2013

[3] Charles H.Roth , Fundamentals of Logic Design, 6/e, Cengage learning,2010

[4] Computer Architecture and Organization Designing for Performance, William Stallings, Ninth edition, Pearson Education series, 2014.

### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Prof. Neeraj Goel IIT Ropar, 18th May 2022, **Digital Systems**, NPTEL VIDEO, Available: https://nptel.ac.in/courses/108/106/108106177/

[2] Prof. N.J. Rao, IISc Bangalore, 18th May 2022, Digital systems, NPTELWEB Notes, Available at: https://nptel.ac.in/courses/106/108/106108099/

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COI	characteristics in Artificial Intelligence.       2.5.2         Analysis       161171251														characteristics in Artificial Intelligence.								
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CO2	prob	lems	and u	inders	stand	the is	ssues	of kn	owle	dge		5.01	•										
	repre	esenta	ation.																				
GOA	App	ly kn	nowle	dge 1	repres	sentat	ion a	and r	eason	ing	K3	1.6.	1.6.1,1.7.1, 2.5.1,										
CO3	for r	eal w	orld p	oroble	ems.					U		3.5.											
~~ (	App	ly fill	ler str	uctur	es foi	· diffe	erent	sente	nces a	and	K3	1.6.	1,1.7.1, 2.5	5.1,									
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#### **COURSE CONTENT**

#### UNIT I

**Introduction to Artificial Intelligence:** The AI Problems, AI Technique, Tic-Tac- Toe, Criteria for Success.

**Problems, Problem Spaces And Search:** Defining the Problem as a State space Search, Production Systems, Problem Characteristics, Production system characteristics.

#### UNIT II

Heuristic Search Techniques: Generate-and-test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

**Knowledge Representation Issues:** Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation.

### UNIT III

**Using Predicate Logic:** Representing Simple Facts in logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution.

**Representing Knowledge Using Rules** - Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching. **Natural Language Processing:** Introduction, syntactic processing.

UNIT IV

Weak Slot-and-Fillers Structures: Semantic Nets, Frames

Strong Slot-and- Fillers Structures: Conceptual Dependency, Scripts.

**Connectionist Models**: Introduction: Hopfield Networks, Learning in Neural Networks, Applications of Neural Networks.

### TEXT BOOKS

[1] Elaine Rich, Kevin Knight, & Shivashankar B Nair, "Artificial Intelligence", McGraw Hill, 3rd ed., 2017

### **REFERENCE BOOKS**

[1] S. Russel and P. Norvig, "Artificial Intelligence: A modern Approach", Prentice Hall, Third edition, 2015

[2] Nils J. Nilsson, "Artificial Intelligence: A New Synthesis", 1st Edition, Morgan-Kaufmann, 1998.

[3] R. O. Duda, E. Hart, and D.G. Stork, "Pattern Classification", Second Edition, John Wiley & Sons, Singapore, 2012.

#### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] An Introduction to Artificial Intelligence By Prof. Mausam/IIT Delhi https://onlinecourses.nptel.ac.in/noc22_cs56/preview Last accessed on 05-05-2023

#### 20AI&ML3304 JAVA PROGRAMMING

Cours	e Ca	tegor	y:	Pro	gram	Core	)				Cree	lits:	3	
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<b>CO2</b> Apply multiple inheritance through interfaces a given application.										for	K3	1.7. 2.7.	1,2.5.1,2.5 1,3.5.1,3.8	5.2,2.6.3, 3.2
<b>CO3</b> Apply exceptions, thread capabilities a handling files on a given application.											K3	1.7. 2.5. 3.5.	1,2.5.1, 2,2.6.3,2.6 1,3.8.2	5.4
CO4 Apply functional programming and Collection framework for a given application.										ons	K3	2.5. 2.5. 3.5. 5.4.	1, 2,2.6.3,2.6 1,3.6.2,3.8 2	5.4, 3.2,
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CO1	2	3												
CO2	2	2	3										2	2
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CO4		2	3		2								2	2
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COUI	RSE (	CON	TEN	Г										
							88							

### UNIT I

**Introduction, The History and Evolution of Java:** Java history and evolution, Java features, Java's Magic: Byte Code, How Java differs from C and C++.

An Overview of Java: Object Oriented Programming: Two paradigms, Principles of OOP, A First simple Program and Control statements.

**Data Types, Variables and Arrays**: Java keywords, Primitive types, Integers, Floating-Point Types, Characters, Booleans, Variables, Operators, Type Conversion, Casting and Arrays.

**Introducing Classes and Objects**: Class fundamentals, declaring objects, assigning object reference variables, introducing methods, constructors, this keyword, Garbage collection, overloading methods, using objects as parameters, returning objects, static and final keywords, nested and inner classes.

### UNIT II

**String Handling:** The String Constructors, String Buffer Class, String Tokenizer class.

**Inheritance**: Inheritance basics, using super, multilevel hierarchy, method overriding, dynamic method dispatch, using abstract classes, final with inheritance.

**Packages & Interfaces:** Defining a package, finding package and CLASSPATH. Access protection, importing packages, Defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces.

# UNIT III

**Exception handling**: Exception handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, throw, throws, finally, creating your own exception subclasses.

**I/O streams**: Byte Streams- InputStream, OutputStream, FileInputStream, FileOutputStream, Character Streams- Reader, Writer, FileReader, FileWriter.

**Multithread Programming:** The Java Thread Model, Creating a thread: Implementing Runnable, Extending Thread, creating multiple threads, Thread Priorities, Synchronization: Using Synchronized methods, The synchronized Statement.

#### UNIT IV

**Pragmatic Functional Programming using Lambdas:** Introduction to Functional programming, Functional Programming concepts and terminology, Functional Interfaces, Working with Lambda Expressions and Method References.

**Collections Framework:** Collections overview, Collection interfaces: Collection, List, and Set. Collection Classes: ArrayList, LinkedList, HashSet.Map Classes:HashMap, TreeMapJ

**The Stream API:** Stream basics, Reduction operations, Using parallel streams, Mapping, Collecting, Iterators and Streams.

#### **TEXT BOOKS**

[1] Herbert Schildt, "Java The Complete Reference", Eleventh Edition, Oracle Press, . 2019.

#### **REFERENCE BOOKS**

[1] Herbert Schildt, Dale Skrien, "Java Fundamentals A Comprehension Introduction", Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2017.

[2] E Balaguruswamy, "Programming with Java", 4th Edition, Mc Graw Hill, 2020.

[3] Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program", Eleventh Edition, Deitel & Associates, Inc.1, 2018.

[4] Timothy Budd, "Understanding Object Oriented Programming with Java ", Updated edition, Pearson Education, 2013.

[5] Kathy Sierra & Bert Bates, "Head First Java", 2nd Edition, Oreilly.

### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

 [1] Prof. Debasis Samanta. (14th,July, 2021), Department of Computer Science &Engineering, I.I.T.,Kharagpur, Swayam, NPTEL.
 <u>https://onlinecourses.nptel.ac.in/noc21_cs03/preview</u>.

[2] Evan Jones, Adam Marcus, Eugene Wu "Introduction to Programming in Java", MIT OpenCourseWare, Massachusetts Institute of Technology, May 28,

2021.https://ocw.mit.edu > courses

[3] Prof. Owen Astrachan, "Object Oriented Programming in Java", Duke University, 21st May 2021. coursera.org

https://www.coursera.org/specializations/object-oriented-programming

[4] Dheeru Mundluru, "Java In-Depth: Become a Complete Java Engineer", Udemy, 14th May 2021.

https://www.udemy.com/course/java-in-depth-become-a-complete-java-engineer/ [5] Prof. Olufisayo Omojokun,"Introduction to Object-Oriented Programming with Java I: Foundations and Syntax Basics", Georgia Institute of Technology, edX, May 2021.

https://www.edx.org/course/introduction-to-java-programming-i-foundationsand-syntax- basics

#### 20AI&ML3305 DATA STRUCTURES

<b>Course Category:</b>	Program Core	Credits:	3
<b>Course Type:</b>	Theory	Lecture -Tutorial-	3-0-0
		Practice:	
		91	

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CO1	CO1Apply different approaches to evaluate performance of algorithms, and stack data structure to solve problems.K31.2.1, 1.7.1, 2.5.1, 2.5.2, 2.5.3, 2.6.3, 2.6.4, 2.8.4CO1Understand the operations on Oueues and linkedK31.7.1, 2.5.1, 2.5.2, 2.5.3, 2.6.3, 2.6.4, 2.8.4													
CO2	CO2Understand the operations on Queues and linked lists data structures.K21.7.1, 2.5.1, 2.5.2Arealy, trac, and hear, elegrithms, to achus1.71, 2.51, 2.5.2													
CO3	3 Apply tree and heap algorithms to solve $K3$ $\begin{bmatrix} 1.7.1, 2.5.1, 2.5.2, \\ 2.5.3, 2.6.3, 2.8.4 \end{bmatrix}$													
<b>CO</b> 4	Apply graph algorithms and hashing techniquesK31.7.1, 2.5.1, 2.5.2, 2.5.3, 2.6.3, 2.8.4							2.5.2, 2.8.4						
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CO4	1	2											1	
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### UNIT I

**Introduction:** Algorithm specification, data abstraction, performance analysistime complexity, space complexity, asymptotic notations, linear and binary searches complexity analysis. Insertion, Merge sort, Quick sort and their complexity analysis.

**Stacks:** Definition, representing stacks and its operations: algorithms and their complexity analysis, Applications of stacks: expression conversion and evaluation – corresponding algorithms.

## UNIT II

**Queues:** Queue and its sequential representation, queue as an abstract data type, types of queues: simple queue, circular queue, operations on each type of queues: algorithms.

**Linked lists:** Representation in memory, singly linked lists: operations and algorithms; linked list representation of stack and queue, doubly linked list: operations and algorithms; circular linked lists: operations and algorithms.

### UNIT III

**Trees:** Tree terminology, representation of trees, binary Tree, complete binary tree, expression trees construction and evaluation; binary tree traversals: inorder, preorder and postorder, binary search trees, operations on binary search trees.

Heap: Min heap and max heap, operations on min Heap and max Heap, Heap sort.

### UNIT IV

**Graphs:** Introduction, graph terminology, representation of graphs, graph traversal algorithms: breadth-first search, depth first search.

**Hashing and Collision:** Introduction, hash tables, hash functions, different hash functions, collisions: collision resolution by open addressing, collision resolution by chaining, pros and cons of hashing.

### **TEXT BOOKS**

 Horowitz Sahni and Anderson-Freed "Fundamentals of Data Structures in C". 2nd Edition, Universities Press, 2008.

[2]Reema Thareja, "Data Structures using C", Second Edition, Oxford University Press, 2011.

### **REFERENCE BOOKS**

- [1]Richard F. Gilberg & B. A. Forouzan "Data Structures A Pseudocode Approcah with C", Second Edition, CENGAGE Learning.
- [2]Mark Allen Weiss,"Data structure and Algorithm Analysis in C". Addison Wesley Publication. 2006.
- [3]Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill, 1984.

[4]Thomas Cormen, C.Leiserson, R. L.Rivest & C.Stein, "Introduction to Algorithms". 3rd Edition, The MIT Press, 2009.

#### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Dr. P. P. Chakraborty, IIT Kharagpur, May 19, 2010, Data Structures, NPTEL, Available: www.youtube.com/watch? v=S47aSEqm 0I

[2] Dr. Naveen Garg, IIT Delhi, Sep 24, 2008, Data Strucutres, NPTEL,

Available:<u>http://-nptel.iitm.ac.in</u>, <u>http://freevideolectures.com/Course/2279/Data-</u> Structures-And-Algorithms

[3] Shai Simonson, Jun 16, 2014, Data Structures, NPTEL, Available: <u>http://npte-l.ac.in/video.php?-subjectId=106102064</u>

	20AI&ML3351 ARTIFICIAL INTELLIGENCE Course Category: Program Core Credits: 1.5													
Cours	e Cat	tegor	y:	Pro	gram	Core	;				Credi	ts:	1.5	
Cours	e Typ	pe:		Lab	orato	ory		Ι	lectu	re -T F	Tutoria Practic	al- ce:	0 - 0 - 3	3
Preree	quisit	es:		20ES Prog esser Labo	S2152C grammin ntials in pratory	C: ng n Pytho	n C	ontin	uous S T	Eva eme Eva Total	luatio ster e luatio Marl	nt nd n: xs:	30 70 100	
COUR	SE (		⁷ OM	ES							RTL		POI	
													101	
Upon	succe	essful	comj	pletio	on of	the co	ourse	e, the	stude	ent v	vill be	able	e to:	
CO1Apply artificial intelligence techniques to solveK31.2.1,1.7.1, 2.5.2Apply artificial intelligence techniques to solveK31.2.1,1.7.1, 2.5.2														
CO2	2 Apply knowledge representation approaches to K3 ^{1.6.1,1.7.1, 2.5.1,} solve problems													
CO3	CO3 Apply natural language processing on real world K3 ^{1.6.1,1.7.1, 2.5.1,} scenarios.							5.1,						
CO4	App com	ly the plex p	e con proble	cepts ems.	of c	onnec	ctioni	st Mo	odels	for	K3	1.6 2.7	5.1,1.7.1, 2. 7.1,3.5.1	5.1,
Contr Outco	ibutio mes (	on of (1 – L	Cour low, 2	se O 2 - M	utcor ediur	nes to n, 3 –	owar - Hig	ds ac h)	hieve	men	t of P	rogr	am	
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
<b>CO1</b>	2	2											1	1
CO2	CO2 2 2 2 2												1	1
CO3	2	2	2										1	1
<b>CO4</b>	2	2	2										1	1
						<u> </u>								

COURSE CONTENT/TASKS

- TASK 1: Program to Implement Breadth first search Traversal.
- TASK 2: Program to Implement Depth first search Traversal.
- TASK 3: Program to Implement Tic-Tac-Toe game.
- TASK 4: Program to implement Water jug Problem.
- TASK 5: Program to implement Monkeys and Bananas problem.
- TASK 6: Program to implement Hill climbing algorithm.
- TASK 7: Program to implement Travelling Salesperson problem.
- TASK 8: Program to represent simple facts in Prolog.
- TASK 9: a) Program to remove stop words for a given passage from a text file using NLTK.
  - b) Program to implement stemming for a given sentence using NLTK.
  - c) Program to perform POS (Parts of speech ) tagging for a given sentence using NLTK.
- TASK 10: Program to implement a perceptron connectionist model.
- Project : Program to implement a simple chatbot.

# **TEXT BOOKS**

[1] Elaine Rich, Kevin Knight, & Shivashankar B Nair, "Artificial Intelligence", McGraw Hill, 3rd ed.,2017

# **REFERENCE BOOKS**

 S. Russel and P. Norvig, "Artificial Intelligence: A modern Approach", Prentice Hall, Third edition, 2015
 Nils J. Nilsson, "Artificial Intelligence: A New Synthesis", 1st Edition, Morgan-Kaufmann, 1998.
 R. O. Duda, F. Hart, and D.G. Stark, "Pattern Classification", Second Edition

[3] R. O. Duda, E. Hart, and D.G. Stork, "Pattern Classification", Second Edition, John Wiley & Sons, Singapore, 2012.

### E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] An Introduction to Artificial Intelligence By Prof. Mausam/IIT Delhi https://onlinecourses.nptel.ac.in/noc22_cs56/preview_Last accessed on 05-05-2023

#### 20AI&ML3352 JAVA PROGRAMMING LABORATORY

<b>Course Category:</b>	Program Core	Credits:	1.5

Cours	е Тур	pe:		Lab	orato	ry		L	ectur	e -T P	utoria ractic	l- ( e:	)-0-3	
Prerec	nnisit	es:								Con	tinuo		30	
	14151									Eval	lustin	$\mathbf{n} \cdot \mathbf{n}$	70	
									S	omo	tor or	$\mathbf{n} \cdot \mathbf{n}$		
									0	Emes			100	
									_	Eva	luatio	n:		
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	Δnn	1.	the	cor	cento		fohie	ect	orien	ted	K3	1.7	.1, 2.5.1, 2	.5.2,
<b>CO1</b>	App	1 y	unc inat			5 U			Union	licu	KJ	2.7	.1, 5.4.1, 5	.4.2,
	prog	rainn	ing t	o sor	ve pro	oblem	IS.					11.	.4.1	
	App	lv mu	ltiple	inhe	aces		K3	2.5	.1, 2.5.2, 2	.6.3,				
CO2	11	5	1				0					2.7	1, 3.5.1, 3	.8.2,
												5.4	.1, 3.4.2	
CO3	App	ly e	excep	tions,	th	read	capa	abiliti	es a	and	K3	3.5	1, 3.8.2, 5	.4.1,
<b>CO3</b> handling files.														
Analyze the use of functional meansuring and VA 382541542														
<b>CO4</b>	Alla.	iyze i				lionai	prog	granni	inng a	anu	Λ4	9.6	0.1, 11.4.1	,
	Coll	ection	is ira	mewo	Drk									
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	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
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CO1	2	2	1		1						1		1	
COI	2	2	1		1						1			
$CO^{2}$		2	1		2								2	1
02		-	L		4									1
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CO3											1		2	
<b>CO4</b>			3		3				2		2		3	3
COUR														
COUR	SE (	JUN	LENI		SK									

### Task 1

Apply fundamentals of Java Data types, Variables, Operators, and Control Statements.

### Task 2

Apply the concepts of Classes and Objects.

# Task 3

Apply the concepts of Arrays.

# Task 4

Apply the concepts of String and String Tokenizer classes.

# Task 5

Apply the concepts of Inheritance and types of Inheritance.

## Task 6

Apply the concepts of Method Overloading and Method Overriding.

## Task 7

Apply the concepts of Packages.

# Task 8

Apply the concepts of Interfaces.

## Task 9

Apply the concepts of Exception Handling.

# Task 10

Develop a Java application to copy content from one file to another file using I/O Streams.

# Task 11

Apply the concepts of Threads and Multithread.

# Task 12

Apply the concepts of Lambda Expressions, Collections Framework and Stream API.

# Projects

1. A group project with unique topics.

# TEXT BOOKS

[1] Herbert Schildt, "Java The Complete Reference", Eleventh Edition, Oracle Press, . 2019.

#### **REFERENCE BOOKS**

[1] Herbert Schildt, Dale Skrien, "Java Fundamentals A Comprehension Introduction", Special Indian Edition, McGraw-Hill Education India Pvt. Ltd, 2017.

[2] E Balaguruswamy, "Programming with Java", 4th Edition, Mc Graw Hill, 2020.

[3] Paul J. Dietel and Dr.Harvey M. Deitel, "Java How to Program", Eleventh Edition, Deitel& Associates, Inc.1, 2018.

[4] Timothy Budd, "Understanding Object Oriented Programming with Java ", Updated edition, Pearson Education, 2013.

[5] Kathy Sierra & Bert Bates, "Head First Java", 2nd Edition, Oreilly.

## **E- RESOURCES AND OTHER DIGITAL MATERIAL**

 [1] Prof. DebasisSamanta. (14th,July, 2021), Department of Computer Science & Engineering, I.I.T.,Kharagpur, Swayam, NPTEL. https://onlinecourses.nptel.ac.in/noc21 cs03/preview.

[2] Evan Jones, AdamMarcus, Eugene Wu "Introduction to Programming in Java", MIT OpenCourseWare, Massachusetts Institute of Technology, May 28, 2021. https://ocw.mit.edu > courses

- [3] Prof. Owen Astrachan, "Object Oriented Programming in Java", Duke University, 21st May 2021. coursera.org https://www.coursera.org/specializations/object-oriented-programming
- [4] DheeruMundluru, "Java In-Depth: Become a Complete Java Engineer", Udemy, 14th May 2021. https://www.udemy.com/course/java-in-depth-become-a-complete-java-

engineer/

[5] Prof. OlufisayoOmojokun,"Introduction to Object-Oriented Programming with Java I: Foundations and Syntax Basics", Georgia Institute of Technology, edX, May 2021.

https://www.edx.org/course/introduction-to-java-programming-i-foundationsand-syntax- basics

						20AI	&MI	L <b>335</b> :	3													
			DA	ATA S	STRI	UCTI	URES	S LA	BOR	ATO	RY											
Cours	e Cat	tegor	y:	Pro	gram	Core	;				Cred	lits:	1.5									
Cours	e Typ	pe:		Lat	oratc	ory			Lect	ure -	<b>Futor</b>	rial-	0-0-3									
	• -					•				]	Pract	tice:										
Prerec	quisit	ces:		-			(	Conti	inuou	is Ev:	aluati	ion:	30									
	1									Sem	ester	end	70									
										Eva	aluati	ion:	100									
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COUR	RSE (	)UT(	COM	ES						]	BTL		POI	-								
Upon s	succe	ssful	comj	pletio	n of	the co	ourse	, the	stude	ent w	ill be	able	to:									
CO1	IApply arrays and stacks to different applications.K31.7.1, 2.5.1, 2.5.2, 2.5.3, 2.6.3, 2.8.4Understand the operations on queues and linkedK21.7.1, 2.5.1, 2.5.2, 2.5.3, 2.6.3, 2.8.4														Apply arrays and stacks to different applications.K31.72.5							
CO2	Understand the operations on queues and linked K2 1.7.1, 2.5.1, 2.5.2, 2.8.4													Understand the operations on queues and linked K2 lists.								
CO3	Understand the operations on binary search tree K2 and heap.								1.7. 2.8.	1, 2.5.1, 2 4	2.5.2,											
CO4	App hash	ly dit	fferen echnic	it gra	iph ti to sol	ravers	sal al oblem	goritl 1s.	hms a	and	K3	1.7. 2.5.	1, 2.5.1, 2 3, 2.6.3, 2	2.5.2, 2.8.4								
Contri Outco	ibutio mes	on of (1 – 1	Cour Low,	•se O 2 - M	utcor [ediu	nes to m, 3	owaro – Hig	ds ac gh)	hieve	ment	of P	rogra	ım									
	PO 1	PO 2	<b>PO</b> 3	<b>PO</b> 4	PO 5	PO 6	<b>PO</b> 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2								
CO1	1	2						1	1													
CO2	1	2											1	1								
CO3	1	2											1	1								
<b>CO4</b>	1	2											1	1								
	1												L	L								

# **COURSE CONTENT/TASK**

Task 1: Searching and sorting techniques: Linear and binary searches,

Task 2: Sorting techniques: Insertion, Merge and Quick sorts.

Task 3: Operations on a stack data structure.

Task 4 and 5: Stack applications (expression conversion and evaluation)

Task 6: Operations on queues and circular queues.

Task 7: Operations on singly linked list and doubly linked list.

Task 8: Operation on circular linked list.

Task 9: Binary search tree operations and tree traversal techniques.

Task 10: Operations on heap and heap sort.

Task 11: Graph Traversal algorithms: Depth First Search and Breadth First Search.

Task 12: Hashing: Open and close hashing techniques.

### TEXTBOOKS

- Horowitz Sahni and Anderson-Freed "Fundamentals of Data Structures in C". 2nd Edition, Universities Press, 2008.
- [2] Reema Thareja, "Data Structures using C", Second Edition, Oxford University Press, 2011.

#### **REFERENCE BOOKS**

- [1] Richard F. Gilberg & B. A. Forouzan "Data Structures A Pseudocode Approcah with C", Second Edition, CENGAGE Learning.
- [2] Mark Allen Weiss,"Data structure and Algorithm Analysis in C". Addison Wesley Publication. 2006.
- [3] Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill, 1984.
- [4] Thomas Cormen, C.Leiserson, R. L.Rivest & C.Stein, "Introduction to Algorithms". 3rd Edition, The MIT Press, 2009.

### **E- RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Dr. P. P. Chakraborty, IIT Kharagpur, May 19, 2010, Data Structures, NPTEL, Available: www.youtube.com/watch? v=S47aSEqm_0I. Last accessed on 19 May 2022.

- [2] Dr. Naveen Garg, IIT Delhi, Sep 24, 2008, Data Strucutres, NPTEL, Available: <u>https://nptel.ac.in/courses/106102064</u>. Last accessed on 19 May 2022.
- [3] Shai Simonson, Jun 16, 2014, Data Structures, NPTEL, Available: <u>http://nptel.ac.in/video.php?-subjectId=106102064</u>. Last accessed <u>on 19 May 2022</u>.

20TP3106 LOGIC AND REASONING														
Course	Cate	egory	•	Sof	t Ski	$\frac{1}{1}$					Cree	dits:	1	
Course	Тур	e:	•	Lea	Learning by Lecture -T							rial-	0-0-2	
	VI	-		Do	ing					tice:				
Prerequisites:										Co	ntinu	ious	100	
										ion:	0			
										end	100			
							Ev	aluat	ion:					
										Tota	ıl Ma	rks:		
COU	COURSE OUTCOMES													
Upon successful completion of the course, the student will be able to:														
<b>CO1</b>	Think reason logically in any critical situation													
CO2	Analyze given information to find correct solution													
CO3	To reduce the mistakes in day to day activities in practical life													
CO4	Develop time-management skills by approaching different shortcut methods													
CO5	Use mathematical based reasoning to make decisions													
CO6	Apply logical thinking to solve problems and puzzles in qualifying exams in any competitive exam.													
Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)														
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3												
CO2	3	3												
CO3	3	3			1									
<b>CO</b> 4	3	3		2										
	104													

CO5	3	2						
<b>CO6</b>	3	3						

#### **COURSE CONTENT**

#### UNIT I :

- 1. Series Completion,
- 2. Coding-Decoding,
- 3. Blood Relations,
- 4. Puzzles test

#### **UNIT II:**

- 1. Direction sense test,
- 2. Logical Venn diagrams,
- 3. Number test, ranking test,
- 4. Mathematical operations

#### **UNIT III:**

- 1. Arithmetical Reasoning,
- 2. Inserting missing character,
- 3. Syllogism.

#### **UNIT IV: Non – Verbal:**

- 1. Water images,
- 2. Mirror images,
- 3. Paper folding,
- 4. Paper cutting,
- 5. Embedded Figures,
- 6. Dot situation,
- 7. Cubes & Dice

#### **TEXT BOOKS**

[1] R. S. Aggarwal, "Verbal and non-verbal reasoning", Revised Edition, S Chand publication, 2017 ISBN:81-219-0551-6

20MC3107A ENVIRONMENTAL STUDIES															
<b>Course Category:</b>					Mandatory Credits					its: -					
				Co	urse	J									
<b>Course Type:</b>				Th	eory			<b>Lecture - Tutorial-</b> 2 - 0 -							
								Practice:							
Prerequisites:							C	<b>Continuous Evaluation:</b> 100							
										Semes Evol					
						Т	L va Fotal	Mar	ks:	100					
COURSE OUTCOMES															
Upon	Upon successful completion of the course, the student will be able to:														
<b>CO1</b>	Identify various factors causing degradation of natural resource and control measures														
CO2	Identify various ecosystem and need for biodiversity														
CO3	Realize and explore the problems related to environmental pollution and its management														
<b>CO</b> 4	Apply the information and technology to analyze social issues, use acts associated with environment												e acts		
Contr Outco	Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)														
	PO	PO	PO	PO	PO	PO	PO 7	PO	PO	<b>PO</b>	<b>PO</b>	PO 12	PSO 1	PSO	
001		2	3	4	3	U	/	0	7	10	11	14		۷	
COI								I					1		
CO2		1	1							1			1		
CO3				1	1								1		
<b>CO</b> 4						1	1	1					1		
	106														

### **COURSE CONTENT**

## UNIT I

The Multidisciplinary Nature of Environmental Studies, Definition, scope and importance Need for public awareness.

#### Natural Resources:

**Renewable and Non-renewable Resources:** Natural resources and associated problems.

(a)Forest resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people.

(b)Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c)Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

(d)Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

(e)Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

(f)Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

# 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, manwildlife 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 local to document environmental а area assetsriver/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.

# Self Study:

Water resources, Threats to biodiversity, Solid waste management, Role of Information Technology in environment and human health.

# TEXT BOOKS

[1] Erach Bharucha. 2004, Environmental Studies for undergraduate courses, University Grants Commission, New Delhi, Bharati Vidyapeeth Institute of 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 Gopala Rao, 2006, Prentice-Hall of India Pvt. Ltd., New Delhi.

[5] Ecological and Environmental Studies – Santosh Kumar Garg, Rajeswari Garg

(or) Rajani Garg, 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

[8] Bharucha Erach- Biodiversity of India, Mapin Publishing Pvt.Ltd.

### E RESOURCES AND OTHER DIGITAL MATERIAL

[1] Erach Bharucha. 2004, Environmental Studies for undergraduate courses, University Grants Commission, New Delhi, BharatiVidyapeeth Institute of Environment Education and

Research.https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf

[2] NPTEL Courses - Environmental Studies By Dr.Tushar Banerjee | Devi AhilyaViswavidyalaya, Indore.

# **SEMESTER - IV**

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Course	e Cate	egory	•	Bas	sic Sc	ience	;			(	Credi	ts:	3		
Course	Тур	e:		The	eory			Ι	lectu	re -T	utori	al-	3 - 0 - 0		
										P	ractio	e:			
Prereq	uisite	s:		-			C	ontin	uous	Eval	uatio	n:	30		
									S	emes	ster e	nd	70		
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									1	Utai		72.			
COUI	RSE (	OUT	COM	ES						]	BTL		POI	-	
Upon	pon successful completion of the course, the student will be able to:														
CO1	Solv syste valu argu	e algem of em of es n ment	gebrai f linea lear s.	ic ar ar equ end	nd tra uation point	ansce is and ts fo	ndent d esti or eq	tal e mate ually	quatic funct spa	ons, tion ced	K3				
CO2	arguments.Estimate function values near middle points and derivative using polynomial interpolation.K3														
CO3	<b>Eva</b> valu	<b>luate</b> e pro	integ blems	grals	nume	ericall	ly and	d solv	ve ini	tial	K4				
CO4	App com equa	o <b>ly</b> putat ations	Pyth ion,	on to s	moc solve	lules IVP	fo and	r s d sys	symbo stem	olic of	K3				
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<b>CO1</b>	3	2			1								1	1	
CO2	3	2			1								1	1	
CO3	3	2			1								1	1	
<b>CO4</b>	3	2			2								1	1	
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#### UNIT-I

## [Text Book-1]

Numerical Methods: Solution of Algebraic and Transcendental equations,Bisection method, Newton-Raphson method, Useful deductions from Newton-Raphson formula.

Solution of Linear Simultaneous Equations:Iterative methods of solution, Jacobi's Iterative method, Gauss-Seidel method.

Interpolation: Finite differences, Differences of polynomial, Other difference operators, Relations between the operators, Newton's Interpolation formulae.

### UNIT-II

## [Text Book-1]

Interpolation:Central difference Interpolation formulae, Gauss Forward Interpolation formula, Gauss Backward Interpolation formula, Stirling's formula,Interpolation with unequal intervals, Lagrange's formula for unequal Intervals, Divided differences, Newton's divided difference formula.

Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's forward difference formula.

### UNIT-III

# [Text Book-1]

Numerical Integration: Newton-Cote's quadrature formula, Trapezoidal rule, Simpson's one-thirdrule, Simpson's three-eighth rule.

Numerical Solutions of Differential Equations:Introduction, Euler's method, Modified Euler's method, Runge-Kutta method of 4th order.

Simultaneous First Order Differential Equations: Runge-Kutta method of 4th order.

### UNIT-IV

### [Text Book-2]

Numerical methods usingPython: Symbolic computation, SymPy, Symbols,

Numeric types, Differentiation and Integration, Ordinary differential equations, Linear equations and matrix inversion, Nonlinear equations, Visualizing data, Matplotlib, Pylab, Pyplot, SciPy, Numerical integration, Solving ordinary differential equations, Systems of coupled ODEs, Root finding using bisect method, Root finding using fsolve function, Interpolation.

# TEXT BOOKS

[1]B.S.Grewal, "Higher Engineering Mathematics", Khanna Publishers, 43rd edition, 2014. [UNIT I,II,III]

[2] Hans Fangohr, "Introduction to Python for Computational Science and Engineering", online edition link, https://fangohr.github.io/introduction-to-python-for-computational-science-and-engineering/book.pdf , Jan21, 2022. [UNIT IV]

### **REFERENCE BOOKS**

1] Krezig, "Advanced Engineering Mathematics", John Wiley & sons, 8th edition, 2007.

[2] R.K.Jain &S.R.K.Iyengar, "Advanced Engineering Mathematics", 3rd edition, Narosa Publishers.

S.S.Sastry, "Introductory Methods of Numerical Analysis", Prentice Hall of India, 2005.

## **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Prof.Ameeya Kumar Nayak,Sanjeev Kumar, IIT Roorkee, Numerical methods,

Available:https://onlinecourses.nptel.ac.in/noc21_ma45/preview

[2] Henrik Schmidt, Massachusetts Institute of Technology: MIT Open Courseware, Introduction to Numerical Analysis for Engineering.

Available:https://ocw.mit.edu

[3] Prof. Adrijit Goswami,IIT Kharagpur,Transform Calculus and its applications in Differential Equations.

Available:https://nptel.ac.in/courses/111/105/111105123/

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Upon	Upon successful completion of the course, the student will be able to:														
CO1	CO1Understand different types of algorithms, asymptotic notations, and performance analysis techniques.K2 $1.2.1, 1.7.1, 2.5.1,$ $2.5.2, 2.5.3$ $4urbit the algorithm design techniques.K21.2.1, 1.7.1, 2.5.1,2.5.2, 2.5.3$														
CO2	techniques.K3CO2Apply the algorithm design technique – string matching, divide and conquer, and greedy methods for solving different problems.K3														
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CO3	2	2						2	
<b>CO</b> 4	2	1						1	

## UNIT – I

Introduction: Algorithms, algorithms as a technology, recursive and randomized algorithms, growth of functions (Asymptotic notations), recurrences, Solution of Recurrences by substitution, recursion tree method, Master Theorem. Time complexity analysis of Merge and Quick sort.

String Matching: Naive string-matching algorithm, Rabin-Karp algorithm

# UNIT – II

Divide and conquer: General method, Finding the maximum and minimum, Strassen's matrix multiplication.

Greedy method: General method, Job sequencing with deadlines, knapsack problem, Huffman codes, Minimum cost spanning tree: Prims and Kruskal's algorithm, shortest path algorithms: Dijkstra

# UNIT - III

Dynamic Programming: General method, Matrix chain multiplication, longest common subsequence, optimal binary search trees, 0/1 knapsack problem,Traveling salesperson problem.

Backtracking: General method, n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles, 0/1 knapsack problem.

## UNIT - IV

Branch and Bound: General method, applications - Traveling salesperson problem, 0/1 knapsack problem: LC branch and bound solution, FIFO branch and bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, P, NP, NP Hard and NP Complete problems with examples, Cook's theorem

# TEXT BOOKS

[1] Ellis Horowitz, SatrajSahni and Rajasekharan, "Fundamentals of Computer Algorithms", Galgotia Publications Pvt. Ltd, 2008.

[1] T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, "Introduction to Algorithms", 2/e, PHI Pvt. Ltd., Pearson Education, 2009.

### **REFERENCE BOOKS**

[1] Allen Weiss, "Data structures and Algorithm Analysis in C++", Third Edition, Pearson Education, 2007.

[2] M.T.Goodrich and R.Tomassia, "Algorithm Design: Foundations, Analysis and Internet examples", John Wiley and sons, 2006.

# **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] N. Garg, IIT Delhi, Dec 31, 2009, Data Structures and Algorithms, NPTEL, Available:

http://nptel.ac.in/courses/106102064/25.

[2] A. G. Ranade, S. Viswanathan, and A. A. Diwan, IIT Bombay, Dec 31, 2009, Design and Analysis of Algorithms, NPTEL, Available:

https://nptel.ac.in/courses/106/101/106101060/(last accessed on 12-12-2022)

[3] E. Demaine, S. Devadas, and N. Lynch, MIT, Design and Analysis of Algorithms, MIT OpenCourseWare, Available: (last accessed on 12-12-2022) <a href="https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/(last accessed on 12-12-2022">https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/(last accessed on 12-12-2022)</a>
[4] Timroughgarden.org.Tim Roughgarden's Online Courses. Available :

http://timroughgarden.-org/videos.html.(last accessed on 12-12-2022)

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Upon	Upon successful completion of the course, the student will be able to:														
CO1	CO1Understand the basics of HTML and XMLK21.7.1, 2.7.13.8.2, 3.8.3														
CO2Apply the concepts of Java Servletsfor developing Dynamic Web PagesK31.7.1, 3.5.6, 3.8.2, 5.4.2															
CO3	CO2developing Dynamic Web PagesICO3Apply the concepts of Java Server Pages to build a Web ApplicationK3K31.7.1, 3.5.6, 3.8.2, 5.4.2														
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CO2	1		2		3								2	1	
CO3	1		2		3								2	1	
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#### UNIT I: HTML and XML

HTML – Basic concepts of HTML, The Skeleton of a Web Page, Creating a Form, Tables.

XML – Use of XML, The XML Flow, XML Parsers, Browsers and XML, The Design of an XML Document, Nesting Elements, Processing Instructions, Attributes, Create a DTD, Create an XML Schema, Referencing an XML Schema, Create an XSLT.

### **UNIT II: JAVA SERVLETS**

Java Servlets, Web Applications, Servlets and HTTP Servlets, Filters, Security, Internationalization, Servlet Life Cycle, Servlets for the World Wide Web -Requests, Responses, and Headers, GET and POST, HTTP Response Codes, Coding a HttpServlet – Deploying a Servlet, Web Application Deployment Configuration Descriptor Structure. Servlet Limitations of Configuration:web.xml Additions, Client/Server Servlet Programming, HttpServletRequest and HttpServletResponse, HttpServletRequest, Servlet Context – Initial Web Application Parameters, Servlet Event Listners.

### UNIT III: JAVA SERVER PAGES

JSP 2.0 Specification– JSP, Java Beans, Custom Tags and JSP Fragments, Expression Language. JSP Lifecycle, Difference between Servlets and JSP, JSP Syntax and Semantics– Elements and Template Data, Two types of Syntax, Scripting Elements, Directives, JSP Configuration, Standard JSP Actions, White Space Preservation, Attributes, Comments, Quoting and Escape Characters, Implicit Objects – pageContext, out, config, page, JSP in XML Syntax – XML Rules, JSP Documents. JavaBeans and JSP Expression Language, JSTL Expression Language, Core Tags– General Purpose Tags, Iteration, Conditionals,

### URL Manipulation.

## **UNIT IV: HIBERNATE AND SPRING**

Hibernate: An overview of Object-Relational Mapping (ORM) – Relationships and Cardinality, Object Identity, Cascade, Mapping, In-Memory versus Persisted Objects, Design of Database – Denormalization, Naming Convention, Database Design Disclaimers, DDL Script, HSQLDB, Working with Hibernate.

Spring Framework:Overview of Spring – Spring Packing for Development and Deployment, Overview of the Spring Modules, Benefits of using Spring, Fundamental Spring Concepts. Spring Web MVC Framework – Benefits, Spring Web MVC Concepts, Spring Setup, Developing User Interfaces with Spring.

## TEXT BOOKS

[1] Jim Keogh, "J2EE: The Complete Reference", McGraw Hill, 2002. (Unit I)

[2] Jayson, Falkner, and Jones Kevin. "Servlets and Java Server Pages:

The J2EE Technology Web Tier.", Addison-Wesley, 2004. (Unit II, III)

[3] Hemrajani, Anil. Agile Java Development with Spring, Hibernate and Eclipse. Sams publishing, 2006. (Unit IV)

## **REFERENCE BOOKS**

- [1] Hans Bergsten, "JavaServer Pages", 3rd Edition, O'Reilly Media, Inc., 2003.
- [2] Christian Bauer, Gavin King, "Hibernate in Action", Manning Publications, 2005.

# **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Java EE: Servlets and JavaServer Pages (JSP)
 <u>https://www.linkedin.com/learning/java-ee-servlets-and-javaserver-pages-jsp</u>
 Last accessed on 01-12-2022
 [2] Building Cloud Services with the Java Spring Framework

https://in.coursera.org/learn/cloud-services-java-spring-framework Last accessed on 01-12-2022

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CO1	Understand the fundamental concepts of computer networks and reference models     K2     1.7.1, 2.6.4														
CO2	Computer networks and reference modelsAnalyze error and flow control mechanisms in data link layerK4														
CO3	data link layerdata link layerAnalyse subnetting and various routing protocolsK4of network layer1.7.1, 2.5.2, 2.6.4														
CO4	Anal prote	yze pcols :	transp for sp	ort lecific	ayer 2 appl	and icatio	applions.	icatio	n lay	ver	K4	1.	7.1	, 2.6.3	
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CO4	3	2												2	
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### UNIT I

**Introduction:** Uses of Computer Networks, Network Topology, Network Hardware: LANs, MANs, WANs, Connection oriented vs Connection less.

**Reference Models:** The OSI Reference Model, TCP/IP Reference Model, the comparison of the OSI and TCP/IP reference models.

**Physical Layer:** Guided transmission media: Magnetic Media, Twisted Pair, Coaxial Cable, and Fiber Optics, Wireless Transmission: Radio transmission, Infrared and Light Transmission

## UNIT II

**Data Link Layer:** Design issues - Framing, Error Detection and Correction-Hamming Code , CRC, Checksum, Sliding Window Protocols – One bit sliding window, GoBack – N, Selective Repeat.

**Medium Access Control Sub layer:** Multiple access protocols- Aloha - Slotted Aloha -CSMA, CSMA/CD, Collision Free Protocols, Ethernet: Architecture, Frame Formats – DIX, IEEE 802.3, Wireless LAN: Architecture and Protocol stack, IEEE 802.11 format

## UNIT III

**Network Layer:** Design Issues: Store and forward, Services to transport layer, Implementation of connection less and connection oriented, VC and Datagram Networks, **Routing Algorithms**: Shortest Path, Flooding, DVR, and Link State routing algorithm, Congestion Control Algorithms. IPv4 Protocol, IP address-Classful Addressing – Classless Addressing – Network Address Translation, IPv6- Header, Extension Header

# UNIT IV

**Transport Layer:** UDP Header, TCP Header, Connection establishment, Connection Release, Connection Management, Congestion Control. **Application Layer:** The Domain Name System (DNS), and E-Mail- Architecture, Message Format – RFC 5322, MIME, SMTP.

### **TEXT BOOKS**

[1] Andrew S Tanenbaum, David J Wetherall "Computer Networks", 5th edition, Pearson Education.

### **REFERENCE BOOKS**

[1] Behrouz A.Fourozan, "Data Communications and Networking". 4 ed, TATA McGraw Hill.

[2] Computer Networking: A Top-Down Approach Featuring the Internet, J.F. Kurose and K.W.Ross, 6th Ed., Pearson Education, 2012

### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Prof Sowmya Kanti Ghosh, IIT Kharagpur, NPTEL Lectures, 18th April 2018, Video Lectures,

Available: https://nptel.ac.in/courses/106/105/106105183/

- [2] MIT Open Courseware, MIT, , 14th May 2015, Video Lectures, Available:http://ocw.mit.edu/courses/electricalengineering-and-computer-science/6-033-computer-systemengineering-spring-2009/video-lectures/
- [3] Dheeraj, IIT Kharagpur, 14th May 2015, Lecture Notes, Available: <u>http://www.cse.iitk.ac.in/users/dheeraj/cs425</u>

	20HS4105 UNIVERSAL HUMAN VALUES – II : UNDERSTANDING HARMONY														
Cours	Course Category:Humanities and Social SciencesCredits:3Course Type:MandatoryLecture -Tutorial-3 - 0 - 0														
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COU	COURSE OUTCOMES														
Upon	Upon successful completion of the course, the student will be able to:														
CO1	O1 Understand and aware of themselves and their surroundings (family, society and nature).														
CO2	2 Handle problems with sustainable solutions, while keeping human relationships and human nature in mind.														
CO3	<b>CO3</b> Exhibit critical ability and become sensitive to their commitment towards their understanding of human values, human relationship and human society.														
CO4	<b>CO4</b> Apply what they have learnt to their own self in different day-to-day settings in real life.														
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<b>CO1</b>				1		2			
CO2		3							
CO3				2					
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# UNIT – I: Course introduction, need, basic guidelines, content and process for value education:

**Part-1**: Purpose and motivation for the course, recapitulation from UHV-I, Self-exploration: what is it?, its content and process, 'Natural acceptance' and experiential validation- as the process for self-exploration. Continuous Happiness and Prosperity – A look at basic Human Aspirations.

**Part-2**: Right understanding, Relationship and Physical Facility – the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly – A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

(Practice sessions are to be included to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking).

# 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, Interconnectedness 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 BOOKS**

[1] Human values and professional ethics, R. R. Gaur, R. Sangal and G. P. Bagaria, Excel Books Private Limited, New Delhi (2010).

### **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).

### E RESOURCES AND OTHER DIGGITAL MATERIAL

[1] AICTE – SIP Youtube Channel:

https://www.youtube.com/channel/UCo8MpJB_aaVwB4LWLAx6AhQ

[2] AICTE – UHV Teaching Learning Material:

https://fdp-si.aicte-india.org/download.php#1

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<b>OPERATING SYSTEMS</b>

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CO1	CO1Understand the basic components of an Operating SystemK21.7.1CO2Apply CPU Scheduling and disk schedulingK31.7.1, 2.6.3, 2.6.4, 2.8.3, 2.8.4														
CO2Apply CPU Scheduling and disk scheduling algorithms to achieve specific criteriaK31.7.1, 2.6.3, 2.6.4, 2.8.3, 2.8.4CO2Analyze the mechanisms used for processK41.7.1, 2.5.2, 2.6.3,															
CO3Analyze the mechanisms used for process synchronization and handling deadlocksK41.7.1, 2.5.2, 2.6.3, 2.6.4, 2.8.4, 3.7.1															
<b>CO</b> 4	Synchronization and handling deadlocks2.0.4, 2.8.4, 3.7.1CO4Analyze virtual memory techniques & Secondary storage management techniquesK41.7.1, 2.5.2, 2.6.3, 2.6.4, 2.8.4, 3.7.1														
Contri Outco	Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)														
	PO 1	PO 2	PO 3	<b>PO</b> 4	PO 5	<b>PO</b> 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	
CO1	3												2		
CO2	3	3	1										2		
<b>CO3</b>	3	2	1										2		
<b>CO4</b>	3	3	1										2		
COUR	SE C	CONT	TENT												

## UNIT I

**Operating-System Structures:** Operating-System Services, User and Operating-System Interface, System Calls: Example, Application Programming Interface, Types of System Calls, System Services

**Processes:** Process Concept: The Process, Process State, Process Control Block, Threads, Process Scheduling: Scheduling Queues, CPU Scheduling, Context Switch, Operations on Processes: Process Creation, Process Termination, Interprocess Communication, IPC in Shared-Memory Systems, IPC in Message-Passing Systems: Naming, Synchronization, Buffering.

## UNIT II

**CPU Scheduling:** Basic Concepts: CPU-I/O Burst Cycle, CPU Scheduler, Preemptive & Nonpreemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, RR, Priority, Multilevel Queue, Multilevel Feedback Queue Scheduling, Multiple-Processor Scheduling: Approaches, Multicore Processors, Load Balancing, Processor Affinity, Heterogeneous Multiprocessing, Real-Time CPU Scheduling: Minimizing Latency, Priority-Based, Rate-Monotonic, Earliest-Deadline-First, Proportional Share Scheduling.

**Process Synchronization:** Background, The Critical-Section Problem, Peterson's Solution, Hardware Support for Synchronization, Mutex Locks, Semaphores: Semaphore usage, Semaphore Implementation, Monitors: Usage, Implementing using Semaphores, Resuming a Process, Liveness: Deadlock, Priority Inversion, Classic Problems of Synchronization: The Bounded-Buffer Problem, The Readers-Writers Problem, The Dining-Philosophers Problem

## UNIT III

**Deadlocks:** System Model, Deadlock in Multithreaded Applications: Livelock, Deadlock Characterization: Necessary conditions, Resource-Allocation Graph, Methods for Handling Deadlocks, Deadlock Prevention: Mutual Exclusion, Hold and Wait, No Preemption, Circular Wait, Deadlock Avoidance: Safe State, Resource-Allocation-Graph Algorithm, Bankers Algorithm, Deadlock Detection: Single Instance of Each Resource type, Several Instances, Detection Algorithm Usage, Recovery from Deadlock: Process and Thread Termination, Resource Preemption.

**Main Memory:** Background: Basic Hardware, Address Binding, Logical Vs Physical Address Space, Dynamic Loading, Dynamic Linking & Shared Libraries, Contiguous Memory Allocation: Memory Protection, Memory Allocation, Fragmentation, Paging: Basic Method, Hardware Support, Protection, Shared Pages, Structure of the Page Table: Hierarchical, Hashed Page Tables, Inverted Page Tables, Swapping: Standard Swapping, Swapping with Paging, Swapping on Mobile Systems.

## UNIT IV

**Virtual Memory:** Background, Demand Paging: Basic Concepts, Free-Frame List, Performance, Copy-on-Write, Page Replacement: Basic Page Replacement, FIFO, Optimal, LRU, LRU Approximation, Counting Based, Page Buffering, Allocation of Frames: Minimum Number of Frames, Allocation Algorithms, Global vs Local Allocation, Non Uniform Memory Access, Thrashing: Cause of Thrashing, Working-Set Model, Page-Faulty Frequency, Memory Compression

Mass-Storage Structure: HDD Scheduling: FCFS, SCAN, C-SCAN Scheduling,

**File -System Implementation:** Directory Implementation: Linear List, Hash Table, Allocation Methods: Contiguous, Linked, Indexed Allocation, Free-Space Management: Bit Vector, Linked List, Grouping, Counting, Space Maps, Efficiency and Performance

# TEXT BOOKS

[1] Abraham Silberschatz, Peter B. Galvin and Greg Gagne, "Operating System Concepts", 10th Edition, John Wiley & Sons Pvt. Ltd, 2018.

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[1] William Stallings, "Operating System: Internals and Design Principles", 9th Edition, PHI 2018.

[2] Andrew S.Tanenbaum, "Modern Operating Systems", 4th Edition, PHI, 2016.

[3] Dhananjay M Dhamdhere, "Operating Systems – A Concept Based Approach", 3rd Edition, McGraw Hill Publication, 2012

[4] Harvery M Deitel, Paul J Deitel & David R Choffnes, "Operating System", 3rd

Edition, Pearson Education, 2007

### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

- [1] Prof Santanu Chattopadhyay NPTEL Course on Operating Sytems @ https://nptel.ac.in/courses/106/105/106105214/ Available on 25-7-19
- [2] Stanford University Lecture Notes on Operating Systems @ https://www.scs.stanford.edu/21wi-cs140/notes/ Available on 21-05-21

[3] IIT Bombay – Lecture Notes on Operating Systems @

https://www.cse.iitb.ac.in/~mythili/os/ Available on 21-05-21

	DESI	IGN A	AND	ANA	LYS	20AI IS O	E&MI F AL	L4351 GOR	l RITH	MS I	LABC	)RA'	ΓORY		
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COUF	RSE (	OUT	СОМ	ES						]	BTL		PO	[	
Upon	successful completion of the course, the student will be able to:Implement efficient binary trees, M-way searchK31.2.1, 1.7.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1, 2.5.1,														
CO1	Implement efficient binary trees, M-way search trees, graph traversal and shortest path algorithms.K31.2.1, 1.7.1, 2.5.1, 2.5.2, 2.5.3, 2.6.3Use divide and conquer, and greedy methods forK31.2.1, 1.7.1, 2.5.1, 2.5.2, 2.5.3, 2.6.3														
CO2	algorithms.K3Use divide and conquer, and greedy methods for implementing solutions for problems.K3														
CO3	Imp prog	lemer gramn	nt solu ning a	utions and ba	s for j acktra	probleacking	ems u g.	ising	dynai	nic	K3	1.2. 2.5.	1, 1.7.1, 2.5 2, 2.5.3, 2.6	5.1, 5.3	
CO4	App prog	ly Bagrams	ranch for d	and iffere	Bou ent pro	nd te oblem	echnio ns.	ques	to w	rite	K3	1.2. 2.5.	1, 1.7.1, 2.5 2, 2.5.3, 2.6	5.1, 5.3	
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	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	
CO1	1	2	3	4	5	0	1	8	9	10	11	12		2	
COI	2	2											3		
CO2	2	3							3						
CO3	2	3											3		
CO4	2	3											2		

Task 1:String Matching algorithm: Naïve string matching, Rabin-Karp algorithm

Task 2:Divide and conquer: find maximum and minimum

Task 3:Divide and conquer: Strassen's matrix multiplication

Task 4:Shortest path algorithms: Dijkstra algorithms.

Task 5:Minimum spanning tree: Kruskal algorithms.

Task 6:Solve Knapsack problems using greedy method

Task 7: Matrix chain multiplication using dynamic programming.

Task 8:Dynamic programming: Optimal binary search tree algorithms

Task 9: N-queen and subset sum problems using backtracking technique.

Task 10:Graph coloring for a connected graph using backtracking technique.

Task 11: Traveling salesperson using branch and bound technique.

Task 12:0/1 knapsack problems using branch and bound technique.

## **TEXT BOOKS**

- [1] T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, "Introduction to Algorithms", 2/e, PHI Pvt. Ltd., Pearson Education, 2009.
- [2] Ellis Horowitz, SatrajSahni and Rajasekharan, "Fundamentals of Computer Algorithms", Galgotia Publications Pvt. Ltd, 2008.

## **REFERENCE BOOKS**

- [1] M.T.Goodrich and R.Tomassia, "Algorithm Design: Foundations, Analysis and Internet examples", John Wiley and sons, 2006.
- [2] Allen Weiss, "Data structures and Algorithm Analysis in C++", Third Edition, Pearson Education, 2007.

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[1] N. Garg, IIT Delhi, Dec 31, 2009, Data Structures and Algorithms, NPTEL, Available:

http://nptel.ac.in/courses/106102064/25.

[2] A. G. Ranade, S. Viswanathan, and A. A. Diwan, IIT Bombay, Dec 31, 2009, Design and Analysis of Algorithms, NPTEL, Available:

https://nptel.ac.in/courses/106/101/106101060/

[3] E. Demaine, S. Devadas, and N. Lynch, MIT, Design and Analysis of Algorithms, MIT OpenCourseWare, Available:

https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/

[4] Timroughgarden.org.TimRoughgarden's Online Courses. Available : http://timroughgarden.-org/videos.html.

			NCE	E <b>D J</b> A	AVA	20AI PRO	&M GRA	L4352	2 ING		ORA	ТО	RY		
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COURSE OUTCOMES     BTL     POI															[
Upon	Upon successful completion of the course, the student will be able to:														
CO1	CO1Understand the basics of HTML and XMLK21.7.1, 2.7.13.8.2, 3.8.3														
CO2	<b>D1</b> Image: Service of the concepts of														3.8.2,
CO3	App a W	ly the eb Ap	e cono oplica	cepts tion	of Ja	va Se	rver	Pages	to bi	uild	K3	1. 5.	7.1, 3. <del>:</del> 4.2	5.6, 1	3.8.2,
CO4	App basi	ly Oł c Spr	oject-1 ing C	relatio	onal N ots	Mapp	ing T	Sechno.	ology	and	K3	1. 5.	7.1, 3. <del>:</del> 4.2	5.6, 1	3.8.2,
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<b>CO</b> 4	1		2		3								2	2
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COURSE CONTENT														
Task 1:Design a static web page with HTML5 basic elements														
Task	2: De	sign a	ı stati	c web	o page	e witł	n HTN	ML fo	orms					
Task	Task 3: Create a DTD and XML Schema													
Task	Task 4:Deploy a basic servlet													
Task	Task 5:Deploy a servlet for link statistics of browser													
Task	Task 6: Deploy a servlet for uploading the file													
Task 7:Design a JSP page to keep a page counter of how many times it has been														
visited														
Task	Task 8: Design a JSP page with the usage of JavaBeans, getProperty and													
setPro	operty	actic	ons											
Task	9:Des	ign a	JSP ]	page i	using	a Tag	g Han	dler a	and T	LD				
Task 10: Write some simple code to accomplish two things: test the Hibernate											ernate			
setup	setup and also look at a basic example of how to use Hibernate.													
Task	11:De	evelop	oing [	Fimes	heet	Manag	ger us	sing H	Iiberr	nate				
Task 12:Develop a user interface using spring.														
TEX	Г ВО	OKS												
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(Onit [2] J2EE	1) Jayso Techi	n, Fa nolog	lkner y We	, and b Tie	Jone r.", A	es Ke Addiso	vin. ' on-W	'Servi esley,	lets a , 2004	nd Ja 4. (Ur	ıva So nit II,	erver III)	Pages	: The
[3] Eclips	Hemr se. Sa	ajani, ms pi	, Ani ıblish	l. Ag ing, 2	gile J 2006.	ava (Uni	Deve t IV)	lopme	ent w	vith S	Spring	g, Hi	bernat	e and

### **REFERENCE BOOKS**

[1] Hans Bergsten, "JavaServer Pages", 3rd Edition, O'Reilly Media, Inc., 2003.

[2] Christian Bauer, Gavin King, "Hibernate in Action", Manning Publications, 2005.

### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Java EE: Servlets and JavaServer Pages (JSP)
https://www.linkedin.com/learning/java-ee-servlets-and-javaserver-pages-jsp
[2] Building Cloud Services with the Java Spring Framework
https://in.coursera.org/learn/cloud-services-java-spring-framework

20AI&ML4353 COMPUTER NETWORKS LABORATORY																
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COU	RSE	OUT	CON	1ES												
Upon	succ	essfu	l com	pleti	on of	the c	ours	e, the	stud	ent w	vill be	e able	e to:			
CO1	Understand fundamental concepts of computer networks and reference models															
CO2	Analyze data link layer mechanisms for error control, flow control and multiple access															
CO3	Analyze functioning of routing algorithms, congestion control & QoS techniques used at network layer															
CO4	Analyze the different protocols used at transport layer and Application layer.															
Contr Outco	Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)															
	PO	PO	PO 2	PO	PO 5	PO	PO 7	PO	PO	PO	<b>PO</b>	PO	PSO 1	PSO		
<b>CO1</b>	1	1	3	4	3	U	1	0	9	10	11	12	1	2		
CO2					2								1			
CO3									3				1			
<b>CO4</b>									3				1			

## **COURSE CONTENT/TASKS**

# Task 1: Installation of Packet Tracer & environment Network Representation (PT 1.5.5) Task 2: Investigate OSI and TCP reference models in action Part 1: Examine HTTP Web Traffic (PT 3.5.5) Part 2: Display Elements of the TCP/IP Protocol Suite Task 3: Basic Switch and End Device Configuration Configure Initial Switch Settings (PT 2.5.5) Basic Switch and End Device Configuration (PT 2.9.1) Task 4: Physical Layer Connect a Wired and Wireless LAN (PT 4.6.5) Connect the Physical Layer (PT 4.7.2) Task 5: **Basic Router Configuration** Configure Initial Router Settings (PT 10.1.4) Connect a Router to a LAN (PT 10.3.4) Troubleshoot Default Gateway Issues (10.3.5) Basic Device Configuration (PT 10.4.3) Task 6: Data Link Layer Protocols Identify MAC and IP Addresses (PT 9.1.3) Examine the ARP Table (PT 9.2.9) Task 7: **IPv4** Addressing Subnet an IPv4 Network (PT 11.5.5) Subnetting Scenario (PT 11.7.5) Task 8: VLSM VLSM Design and Implementation Practice (PT 11.9.3)

Design and Implement a VLSM Addressing Scheme (PT 11.10.1)

# Task 9:

IPv6 Addressing

Configure IPv6 Addressing (PT 12.6.6)

Implement a Subnetted IPv6 Addressing Scheme (PT 12.9.1)

# **Task 10:**

ICMP for network testing

Verify IPv4 and IPv6 Addressing (PT 13.2.6)

Use Ping and Traceroute to Test Network Connectivity (PT 13.2.7)

Use ICMP to Test and Correct Network Connectivity (PT 13.3.1)

# Task 11:

Transport Layer

TCP and UDP Communications (PT 14.8.1)

# **Task 12:**

Device Security

Configure Secure Passwords and SSH (PT 16.4.6)

Secure Network Devices (PT 16.5.1)

Installing Wireshark & Using Wireshark to View Network Traffic

# Supplementary Coding Tasks:

- 1. Compute Cyclic Redundancy Check (CRC) for a given data frame using the three CRC polynomials CRC 12, CRC 16 & CRC CCITT.
- 2. Implement Dijkstra's algorithm to compute the Shortest path for a given graph
- 3. Obtain Routing table at each node using Distance Vector Routing (DVR) algorithm for given subnet

# TEXT BOOKS

[1] Andrew S Tanenbaum, David J Wetherall "Computer Networks", 5th Edition, Pearson Education

# **REFERENCE BOOKS**

[1] Kurose and Ross, "Computer Networks – A Top-down Approach Featuring the Internet", Pearson Education.

[2] Behrouz A.Fourozan, "Data Communications and Networking". 4th Ed, TATA McGraw Hill.

### [3] Nader F.Mir, Computer and Communication Networks. PHI Publications

### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

- [1] Prof Sowmya Kanti Ghosh, IIT Kharagpur, NPTEL Lectures, 18th April 2018, Video Lectures, Available: <u>https://nptel.ac.in/courses/106/105/106105183/</u>
- [2] MIT Open Courseware, MIT, 14th May 2015, Video Lectures, Available: <u>http://ocw.mit.edu/courses/electricalengineering-and-computer-science/6-033-computer-systemengineering-spring-2009/video-lectures/</u>
- [3] Dheeraj, IIT Kharagpur, 14th May 2015, Lecture Notes, Available: <u>http://www.cse.iitk.ac.in/users/dheeraj/cs425</u>

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COURSE OUTCOMES																	
Upon successful completion of the course, the student will be able to:																	
<b>CO1</b>	Present themselves effectively in the professional world																
CO2	Introduce themselves as well as others appropriately.																
CO3	Use vocabulary to form sentences and narrate stories by using creative thinking skills																
<b>CO4</b>	Involve in practical activity oriented sessions.																
CO5	Learn about various expressions to be used in different situations.																
<b>CO6</b>	<b>)6</b> Respond positively by developing their analytical thinking skills.																
Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)																	
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2			
<b>CO1</b>									3	3							
CO2										3							
CO3										3							
CO4									3	3							
CO5									3	3							
143																	

3

### **COURSE CONTENT**

### UNIT-I

- Beginners, Functional, Situational Conversations
- Practicing on Functional Conversations.

### UNIT-II

- Errors in usage of Parts of Speech with a thrust on Verbs, Adjectives and Conjunctions, Idioms/Phrases.
- Introducing Basic Grammar
- Practicing on Functional Conversations.

### UNIT-III

- Introducing Self & Others
- Structures and Forming Sentences
- Telephonic Etiquette, Social Etiquette and Table Manners
- Practicing on Functional Conversations.

### UNIT-IV

- Direct, Indirect/Reporting Speech
- Public Speaking Basics
- Versant Test Preparation
- Practicing on Situational Conversations.

### METHODOLOGY

Audio—Visuals / Hand Outs (Compiled/Created by Training Division, T&P Cell, VR Siddhartha Engineering College), Board & Chalk and Interactive Sessions.
20AI&ML4607 INDUSTRY STANDARD CODING PRACTICE – I																
Cours	e Cat	tegor	V:	Skill Oriented							Cree	dits:	s: 2			
••••	Course - 1									-						
Cours	Lab	orato	ry			Lect	ure -	Tuto Prac	rial- tice:	1-0-2						
Prerec	20A Data	A&M a Stru	L330 Icture	os Se	Cont emest	inuou zer en	is Ev d Ev Tota	valuation:30valuation:70al Marks:100								
COURSE OUTCOMES											BTL		POI			
Upon successful completion of the course, the student will be able to:																
CO1	Understand test and development aspects of programming by solving problems at Industry standards.											1.2. 4.6.	1.2.1, 1.7.1, 2.5.1, 4.6.3			
CO2	Apply domain skills and mathematical knowledge to solve any given problem.											1.2. 2.5.	1.2.1, 2.5.1, 2.5.3,4.4.1			
CO3	Apply methods to optimize solutions for any given problem.											1.2.	1.2.1, 2.5.3, 4.4.1			
<b>CO</b> 4	Apply elementary data structures to solve problems with test driven development											1.2.	1.2.1, 2.5.3, 4.4.1			
Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)																
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2		
CO1	3	3		2												
CO2	3	3		2									2	2		
CO3	3	3		2									2	2		
<b>CO</b> 4	3	3		2									2	2		
145																

### **COURSE CONTENT**

## UNIT I

Problem solving through Competitive Coding, Problem solving using control structures, Numeric series and patterns, Code Complexity analysis, Linear/ Logarithmic/ Super linear/ Polynomial/ Exponential/ Factorial Algorithms, Problem solving on rotations of data, Problem solving on Order statistic problems, Problem Solving Examples Problem solving on matrix data, Memory manipulation techniques using pointers. Memory Arithmetic, Problem solving implementing pointer to an array, Memory Layout, overcoming the segmentation faults, Runtime memory allocation, Coding comparisons of Linear list data structure and Pointers, examples and Practice problems.

## UNIT II

Problem solving on string data, Problem solving on String manipulations, coding problems using string handling functions, Problem solving on Multi-String Problems, Problem Solving for long strings, Examples, Practice problems. Problem solving using modular programming, Inter module communications, scopes of data in the code, Problem solving approaches using recursions, Evaluation of Recursive algorithms, Significance of mathematical Recurrence Relations, Evaluation of recurrence relations, Time Analysis, Examples, Practice problems.

## UNIT III

Problem solving on operational and traversal logics on linked lists, Problem solving to compare linked lists, detection of a cycle/merge point, Merging sorted linked lists, coding problems on circular linked lists/Double linked lists, Examples, Practice problems. Problem Solving Problem solving through Linked list coding, traversals, Problem solving to compare linked lists, detection of a cycle/merge point, Merging sorted linked lists, Circular linked list formation, Double linked list formation, Examples, Practice problems.

# UNIT IV

Problem solving through testing, implementing various testing approaches: Test strategy, Test development, Test execution, Bug fixing, Examples, Practice

problems, Problem solving Methods and techniques. Understanding the problem as math abstract, formation of the logic, Identifying the corner cases, Examples, Practice problems, Version control systems, Git repositories and working trees, adding new version of the files to a Git repository, Examples, practice problems

## **TEXT BOOKS**

- [1] Halim, Steven and Halim, Felix, Competitive Programming 3, 2013.
- [2] Ahmed Shamsul Arefin, Art of Programming Contest, ACMSolver, Second Edition, 2012

#### **REFERENCE BOOKS**

- [1] Programming Challenges: The Programming Contest Training Manual By Steven S Skiena, Miguel A. Revilla
- [2] Guide to Competitive Programming: Learning and Improving Algorithms Through Contests By Antti Laaksonen

#### **E-RESOURCES AND OTHER DIGITAL MATERIAL**

- [1] Topcoder tutorials https://www.topcoder.com/community/datascience/data-science-tutorials/
- [2] Nite Nimajneb's site http://comscigate.com/Books/contests/icpc.pdf
- [3] Slides from a Stanford Course http://web.stanford.edu/class/cs97si/
- [4] Halim, Steven and Halim, Felix, Competitive Programming 3, 2013. Ebook available at lulu.com. Site associate with with the book is http://cpbook.net

20MC4108B INDIAN CONSTITUTION															
Cours	Mandatory				Credits:					-					
Cours	Theory				Lecture -Tutorial-					2-0-0					
Prere	_				Continuous					100					
					Evaluation: Semester end					0 100					
					Evaluation:										
					Total Mai										
COURSE OUTCOMES															
Upon successful completion of the course, the student will be able to:															
<b>CO1</b>	Know the fundamental law of the land														
CO2	Understand how fundamental rights are protected														
<b>CO3</b>	Perceive the structure and formation of the Indian Government System														
CO4	Explain when and how an emergency can be imposed and what are the consequences.												he		
Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)															
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1						3	2								
CO2						2	3								
CO3						1									
CO4						2	1								
COURSE CONTENT															

## UNIT I

**Introduction to Constitution of India:** Meaning of the Constitution Law and Constitutionalism, Historical perspective of constitution of India, Salient features of Constitution of India.

### UNIT II

**Fundamental Rights:** Scheme of the fundamental rights, scheme of the fundamental right to equality, scheme of the fundamental right to certain freedoms under Article 19, scope of the right of life and personal liberty under Article 21, writs jurisdiction

### UNIT III

**Nature of the Indian Constitution:** Federal structure and distribution of legislative and financial powers between the Union and states

**Parliamentary form of Government in India:** The Constitution powers and status of the President of India, Amendment of the Constitutional powers and Procedure, Historical Perspectives of the constitutional amendments in India

Local Self Government: Constitutional Scheme in India

## UNIT – IV

**Emergency Provisions:** National Emergency, President rule, Financial Emergency

## **TEXT BOOKS**

[1] Dr. J.N. Pandey, Constitutional Law of India published by Central law Agency, Allahabad, Edition 2018

### **REFERENCE BOOKS**

- [1] V.N Shukla's, Constitution of India Eastern Book Company, Lucknow.
- [2] M.P. jain, Indian Constitution Law, Wadhwa and Company, Nagpur.
- [3] D.D. basu, Constitution of India, Wadhwa and Company, Nagpur