



VSB College of Engineering Technical Campus

Accredited by NAAC with A+ Grade

Approved by AICTE, New Delhi & Affiliated to Anna University

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REGULATIONS 2024

B.TECH. INFORMATION TECHNOLOGY

I. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates will be able to

PEO 1: Information Technology Graduates will have successful careers with high level of technical competency and problem-solving skills to produce innovative solutions for industrial needs.

PEO 2: Graduates will have good professionalism, team work, effective communication, leadership qualities and life-long learning for the welfare of mankind.

PEO 3: Graduates will be familiar with recent trends in industry for delivering and implementing innovative system in collaboration.

II. PROGRAM OUTCOMES (POs)

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, and basic engineering fundamentals to the solution of complex engineering problems in the major areas of Computer Science and Engineering.

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

PO3: Design/Development of solutions: Design solutions for the complex Computer Science and Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the cultural, societal and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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

PO6: The Engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Computer Science and Engineering practices.

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

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the professional Computer Science and Engineering practices.

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

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, and are able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environment.

PO12: Life-long learning: Recognize the need for and, have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes.

III. PROGRAM SPECIFIC OUTCOMES (PSOs)

To ensure graduates

PSO1: Apply programming skills to develop new software with assured quality.

PSO2: Ability to demonstrate specific coding skills to improve employability.

V.S.B COLLEGE OF ENGINEERING TECHNICAL CAMPUS -COIMBATORE

REGULATIONS 2024

B. TECH. INFORMATION TECHNOLOGY

CURRICULUM FOR SEMESTERS I TO VIII AND SYLLABUS FOR SEMESTERS I AND II

SEMESTER I

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24IP101	Induction Programme		-	-	-	-	-	0
THEORY									
2	24HST101	Professional English - I	HSMC	40/60	3	0	0	3	3
3	24MAT101	Matrices and Calculus	BSC	40/60	3	1	0	4	4
4	24PHT101	Engineering Physics	BSC	40/60	3	0	0	3	3
5	24CYT101	Engineering Chemistry	BSC	40/60	3	0	0	3	3
6	24GET101	Problem Solving and Python Programming	ESC	40/60	3	0	0	3	3
7	24GET102	□□□□□□□□□□ /Heritage of Tamils	HSMC	40/60	1	0	0	1	1
PRACTICALS									
8	24GEP101	Problem Solving and Python Programming Laboratory	ESC	75/25	0	0	4	4	2
9	24BSP101	Physics and Chemistry Laboratory	BSC	75/25	0	0	4	4	2
10	24GEP102	English Laboratory \$	EEC	75/25	0	0	2	2	1
TOTAL					16	1	10	27	22

\$ Skill Based Course

SEMESTER II

S.No	COURSE CODE	COURSE TITLE	CATE- GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	24HST201	Professional English - II	HSM C	40/60	2	0	0	2	2
2	24MAT201	Statistics and Numerical Methods	BSC	40/60	3	1	0	4	4
3	24PHT201	Physics for Information Science	BSC	40/60	3	0	0	3	3
4	24BET202	Basic Electrical and Electronics Engineering	ESC	40/60	3	0	0	3	3
5	24GET201	Engineering Graphics	ESC	40/60	2	0	4	6	4
6	24CST201	Programming in C	PCC	40/60	3	0	0	3	3
7	24GET202	□□□□□□□□ □□□□□□□□□□□□□□ /Tamils and Technology	HSM C	40/60	1	0	0	1	1
8		NCC Credit Course Level 1 #	-	40/60	2	0	0	2	2#
PRACTICALS									
9	24GEP201	Engineering Practices Laboratory	ESC	75/25	0	0	4	4	2
10	24CSP201	Programming in C Laboratory	PCC	75/25	0	0	4	4	2
11	24GEP202	Communication Laboratory / Foreign Language \$	EEC	75/25	0	0	4	4	2
TOTAL					17	1	16	34	26

[#] NCC Credit Course level 1 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

^{\$} Skill Based Course

SEMESTER III

S.No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	24MAT301	Discrete Mathematics	BSC	40/60	3	1	0	4	4
2	24CST301	Digital Principles and ComputerOrganization	ESC	40/60	3	0	2	5	4
3	24CST302	Foundations of Data Science	PCC	40/60	3	0	0	3	3
4	24ITT301	Data Structures and Algorithms	PCC	40/60	3	0	0	3	3
5	24CST304	Object Oriented Programming	PCC	40/60	3	0	0	3	3
PRACTICALS									
6	24ITP301	Data Structures and Algorithms Laboratory	PCC	75/25	0	0	4	4	2
7	24CSP302	Object Oriented Programming Laboratory	PCC	75/25	0	0	3	3	1.5
8	24CSP303	Data Science Laboratory	PCC	75/25	0	0	4	4	2
9	24GEP301	Professional Development\$	EEC	75/25	0	0	2	2	1
TOTAL					15	1	15	31	24.5

^{\$}Skill Based Course

SEMESTER IV

S.N o	OURSE CODE	COURSE TITLE	Int/Ext	CATE- GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	24CST401	Theory of Computation	40/60	PCC	3	0	0	3	3
2	24CST402	Artificial Intelligence and Machine Learning	40/60	PCC	3	0	2	5	4
3	24CST403	Database Management Systems	40/60	PCC	3	0	0	3	3
4	24ITT401	Web Essentials	40/60	PCC	3	0	2	5	4
5	24CST404	Introduction to Operating Systems	40/60	PCC	3	0	0	3	3
6	24GET401	Environmental Sciences and Sustainability	40/60	BSC	2	0	0	2	2
7		NCC Credit Course Level 2 [#]	40/60	-	3	0	0	3	3 [#]
PRACTICALS									
8	24CSP401	Operating Systems Laboratory	75/25	PCC	0	0	4	4	2
9	24CSP402	Database Management Systems Laboratory	75/25	PCC	0	0	3	3	1.5
			430/470	TOTA	20	0	10	30	
									22

[#] NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER V

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	24CST501	Computer Networks	PCC	40/60	3	0	2	5	4
2	24ITT501	Full Stack web Development	PCC	40/60	3	0	0	3	3
3	24CST502	Distributed Computing	PCC	40/60	3	0	0	3	3
4	24CST503	Embedded Systems and IoT	PCC	40/60	3	0	2	5	4
5		Professional Elective I	PEC	40/60	-	-	-	-	3
6		Professional Elective II	PEC	40/60	-	-	-	-	3
7		Mandatory Course- I ^{&}	MC		3	0	0	3	0
PRACTICALS									
8	24ITP501	Full Stack web Development Laboratory	PCC	75/25	0	0	4	4	2
TOTAL					-	-	-	-	22

& Mandatory Course-I is a Non-credit Course (Student shall select one course from the list given underMandatory Course-I)

SEMESTER VI

S.No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	24CST601	Object Oriented Software Engineering	PCC	40/60	3	0	2	5	4
2		Open Elective – I*	OEC	40/60	3	0	0	3	3
3		Professional Elective III	PEC	40/60	-	-	-	-	3
4		Professional Elective IV	PEC	40/60	-	-	-	-	3
5		Professional Elective V	PEC	40/60	-	-	-	-	3
6		Professional Elective VI	PEC	40/60	-	-	-	-	3
7		Mandatory Course-II &	MC		3	0	0	3	0
8		NCC Credit Course Level 3 [#]	-		3	0	0	3	3 #
PRACTICALS									
9	24ITP601	Mobile Application DevelopmentLaboratory	PCC	75/25	0	0	3	3	1.5
TOTAL					-	-	-	-	20.5

*Open Elective – I Shall be chosen from the list of open electives offered by other Programmes
 & Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-II)

[#] NCC Credit Course level 3 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA

SEMESTER VII / VIII*

S.N o	COURSE CODE	COURSE TITLE	CATE- GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	24GET701	Human Values and Ethics	HSMC	40/60	2	0	0	2	2
2		Elective - Management#	HSMC	40/60	3	0	0	3	3
3		Open Elective – II**	OEC	40/60	3	0	0	3	3
4		Open Elective – III**	OEC	40/60	3	0	0	3	3
5		Open Elective – IV**	OEC	40/60	3	0	0	3	3
PRACTICALS									
6	24ITP701	Summer Internship	EEC	75/25	0	0	0	0	2
TOTAL					14	0	0	14	16

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**

**** Open Elective II - IV (Shall be chosen from the list of open electives offered by other Programmes).**

Elective - Management shall be chosen from the Elective Management courses.

SEMESTER VIII /VII*

S.No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
PRACTICALS									
1	24ITP801	Project Work/Internship	EEC	75/25	0	0	20	20	10
TOTAL					0	0	20	20	10

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**

TOTAL CREDITS: 162

ELECTIVE – MANAGEMENT COURSES

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24GET01	Principles of Management	HSMC	40/60	3	0	0	3	3
2	24GET02	Total Quality Management	HSMC	40/60	3	0	0	3	3
3	24GET03	Engineering Economics and Financial Accounting	HSMC	40/60	3	0	0	3	3
4	24GET04	Human Resource Management	HSMC	40/60	3	0	0	3	3
5	24GET05	Knowledge Management	HSMC	40/60	3	0	0	3	3
6	24GET06	Industrial Management	HSMC	40/60	3	0	0	3	3

MANDATORY COURSES I

S.No	COURSECODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDIT S
					L	T	P		
1.	24MXT01	Introduction to Women andGender Studies	MC	40/60	3	0	0	3	0
2.	24MXT02	Elements of Literature	MC	40/60	3	0	0	3	0
3.	24MXT03	Film Appreciation	MC	40/60	3	0	0	3	0
4.	24MXT04	Disaster Management	MC	40/60	3	0	0	3	0

MANDATORY COURSES II

S.No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24MXT05	Well Being with traditional Practices (Yoga, Ayurveda and Siddha)	MC	40/60	3	0	0	3	0
2	24MXT06	History of Science and Technology in India	MC	40/60	3	0	0	3	0
3	24MXT07	Political and Economic Thought for a Human Society	MC	40/60	3	0	0	3	0
4	24MXT08	State, Nation Building and Politics in India	MC	40/60	3	0	0	3	0
5	24MXT09	Industrial Safety	MC	40/60	3	0	0	3	0

PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Data Science	Vertical II Full Stack Development for IT	Vertical III Cloud Computing and Data Centre Technologies	Vertical IV Cyber Security and Data Privacy	Vertical V Creative Media	Vertical VI Emerging Technologies	Vertical VII Artificial Intelligence and Machine Learning
Exploratory Data Analysis	Cloud Computing	Cloud Computing	Ethical Hacking	Augmented Reality/Virtual Reality	Augmented Reality/Virtual Reality	Knowledge Engineering
Recommender Systems	App Development	Virtualization	Digital and Mobile Forensics	Multimedia and Animation	Robotic Process Automation	Soft Computing
Neural Networks and Deep Learning	Cloud Services Management	Cloud Services Management	Social Network Security	Video Creation and Editing	Neural Networks and Deep Learning	Neural Networks and Deep Learning
Text and Speech Analysis	UI and UX Design	Data Warehousing	Modern Cryptography	UI and UX Design	Cyber security	Text and Speech Analysis
Business Analytics	Software Testing and Automation	Storage Technologies	Engineering Secure software systems	Digital marketing	Quantum Computing	Optimization Techniques
Image and video analytics	Web Application Security	Software Defined Networks	Cryptocurrency and Block chain Technologies	Visual Effects	Cryptocurrency and Block chain Technologies	Game Theory
Computer Vision	Dev-ops	Stream Processing	Network Security	Game Development	Game Development	Cognitive Science
Big Data Analytics	Principles of Programming Languages	Security and Privacy in Cloud	Security and Privacy in Cloud	Multimedia Data Compression and Storage	3D Printing and Design	Ethics And AI

Registration of Professional Elective Courses from Verticals:

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialization / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row- wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI. The registration of courses for B.E./B.Tech (Honors) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honors) or Minor degree also. For more details on B.E./B.Tech (Honors) or Minor degree refer to the Regulations 2021, Clause 4.10.

PROFESSIONAL ELECTIVE COURSES VERTICALS

VERTICAL 1: DATA SCIENCE

S. No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24CCT01	Exploratory Data Analysis	PEC	40/60	2	0	2	4	3
2	24CCT02	Recommender Systems	PEC	40/60	2	0	2	4	3
3	24CCT03	Neural Networks and DeepLearning	PEC	40/60	2	0	2	4	3
4	24CCT04	Text and Speech Analysis	PEC	40/60	2	0	2	4	3
5	24CCT05	Business Analytics	PEC	40/60	2	0	2	4	3
6	24CCT06	Image and video analytics	PEC	40/60	2	0	2	4	3
7	24CCT07	Computer Vision	PEC	40/60	2	0	2	4	3
8	24CCT08	Big Data Analytics	PEC	40/60	2	0	2	4	3

VERTICAL 2: FULL STACK DEVELOPMENT FOR IT

S. No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24CCT09	Cloud Computing	PEC	40/60	2	0	2	4	3
2	24CCT10	App Development	PEC	40/60	2	0	2	4	3
3	24CCT11	Cloud Services Management	PEC	40/60	2	0	2	4	3
4	24CCT12	UI and UX Design	PEC	40/60	2	0	2	4	3
5	24CCT13	Software Testing and Automation	PEC	40/60	2	0	2	4	3
6	24CCT14	Web Application Security	PEC	40/60	2	0	2	4	3
7	24CCT15	Dev-ops	PEC	40/60	2	0	2	4	3
8	24CCT16	Principles of Programming Languages	PEC	40/60	2	0	2	4	3

VERTICAL 3: CLOUD COMPUTING AND DATA CENTRE TECHNOLOGIES

S. No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24CCT17	Cloud Computing	PEC	40/60	2	0	2	4	3
2	24CCT18	Virtualization	PEC	40/60	2	0	2	4	3
3	24CCT19	Cloud Services Management	PEC	40/60	2	0	2	4	3
4	24CCT20	Data Warehousing	PEC	40/60	2	0	2	4	3
5	24CCT21	Storage Technologies	PEC	40/60	3	0	0	3	3
6	24CCT22	Software Defined Networks	PEC	40/60	2	0	2	4	3
7	24CCT24	Stream Processing	PEC	40/60	2	0	2	4	3
8	24CCT24	Security and Privacy in Cloud	PEC	40/60	2	0	2	4	3

VERTICAL 4: CYBER SECURITY AND DATA PRIVACY

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24CCT25	Ethical Hacking	PEC	40/60	2	0	2	4	3
2	24CCT26	Digital and Mobile Forensics	PEC	40/60	2	0	2	4	3
3	24CCT27	Social Network Security	PEC	40/60	2	0	2	4	3
4	24CCT28	Modern Cryptography	PEC	40/60	2	0	2	4	3
5	24CCT29	Engineering Secure Software Systems	PEC	40/60	2	0	2	4	3
6	24CCT30	Crypto currency and Block chain Technologies	PEC	40/60	2	0	2	4	3
7	24CCT31	Network Security	PEC	40/60	2	0	2	4	3
8	24CCT32	Security and Privacy in Cloud	PEC	40/60	2	0	2	4	3

VERTICAL 5: CREATIVE MEDIA

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24CCT33	Augmented Reality/Virtual Reality	PEC	40/60	2	0	2	4	3
2	24CCT34	Multimedia and Animation	PEC	40/60	2	0	2	4	3
3	24CCT35	Video Creation and Editing	PEC	40/60	2	0	2	4	3
4	24CCT36	UI and UX Design	PEC	40/60	2	0	2	4	3
5	24CCT37	Digital marketing	PEC	40/60	2	0	2	4	3
6	24CCT38	Visual Effects	PEC	40/60	2	0	2	4	3
7	24CCT39	Game Development	PEC	40/60	2	0	2	4	3
8	24CCT40	Multimedia Data Compression and Storage	PEC	40/60	2	0	2	4	3

VERTICAL 6: EMERGING TECHNOLOGIES

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24CCT41	Augmented Reality/Virtual Reality	PEC	40/60	2	0	2	4	3
2	24CCT42	Robotic Process Automation	PEC	40/60	2	0	2	4	3
3	24CCT43	Neural Networks and Deep Learning	PEC	40/60	2	0	2	4	3
4	24CCT44	Cyber security	PEC	40/60	2	0	2	4	3
5	24CCT45	Quantum Computing	PEC	40/60	2	0	2	4	3
6	24CCT46	Crypto currency and Block chain Technologies	PEC	40/60	2	0	2	4	3
7	24CCT47	Game Development	PEC	40/60	2	0	2	4	3
8	24CCT48	3D Printing and Design	PEC	40/60	2	0	2	4	3

VERTICAL 7: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24CCT49	Knowledge Engineering	PEC	40/60	2	0	2	4	3
2	24CCT50	Soft Computing	PEC	40/60	2	0	2	4	3
3	24CCT51	Neural Networks and Deep Learning	PEC	40/60	2	0	2	4	3
4	24CCT52	Text and Speech Analysis	PEC	40/60	2	0	2	4	3
5	24CCT53	Optimization Techniques	PEC	40/60	2	0	2	4	3
6	24CCT54	Game Theory	PEC	40/60	2	0	2	4	3
7	24CCT55	Cognitive Science	PEC	40/60	2	0	2	4	3
8	24CCT56	Ethics And AI	PEC	40/60	2	0	2	4	3

OPEN ELECTIVES

(Students shall choose the open elective courses, such that the course contents are not similar to any other course contents/title under other course categories).

OPEN ELECTIVES – I

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24OET01	Space Science	PEC	40/60	2	0	2	4	3
2	24OET02	Introduction to Industrial Engineering	PEC	40/60	2	0	2	4	3
3	24OET03	Climate Change and its Impact	PEC	40/60	2	0	2	4	3
4	24OET04	Environment and Social Impact Assessment	PEC	40/60	2	0	2	4	3
5	24OET05	Renewable Energy System	PEC	40/60	2	0	2	4	3
6	24OET06	Introduction to Industrial Instrumentation and Control	PEC	40/60	2	0	2	4	3
7	24OET07	Graph Theory	PEC	40/60	2	0	2	4	3
8	24OET08	Space Science	PEC	40/60	2	0	2	4	3

OPEN ELECTIVES – II

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24OET09	Resource Management Techniques	PEC	40/60	2	0	2	4	3
2	24OET10	Fintech Regulations	PEC	40/60	2	0	2	4	3
3	24OET11	Holistic Nutrition	PEC	40/60	2	0	2	4	3
4	24OET12	IT in Agriculture	PEC	40/60	2	0	2	4	3
5	24OET13	Introduction to Control Engineering	PEC	40/60	2	0	2	4	3
6	24OET14	Pharmaceutical Nanotechnology	PEC	40/60	2	0	2	4	3
7	24OET15	Aviation Management	PEC	40/60	2	0	2	4	3
8	24OET16	Resource Management Techniques	PEC	40/60	2	0	2	4	3

OPEN ELECTIVES – III

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24OET17	English for Competitive Examinations	OEC	40/60	3	0	0	3	3
2	24OET18	NGOs and Sustainable Development	OEC	40/60	3	0	0	3	3
3	24OET19	Democracy and Good Governance	OEC	40/60	3	0	0	3	3
4	24OET20	Renewable Energy Technologies	OEC	40/60	3	0	0	3	3
5	24OET21	Applied Design Thinking	OEC	40/60	2	0	2	4	3
6	24OET22	Reverse Engineering	OEC	40/60	3	0	0	3	3
7	24OET24	Sustainable Manufacturing	OEC	40/60	3	0	0	3	3
8	24OET24	Electric and Hybrid Vehicle	OEC	40/60	3	0	0	3	3
9	24OET25	Space Engineering	OEC	40/60	3	0	0	3	3
10	24OET26	Industrial Management	OEC	40/60	3	0	0	3	3
11	24OET27	Quality Engineering	OEC	40/60	3	0	0	3	3
12	24OET28	Fire Safety Engineering	OEC	40/60	3	0	0	3	3
13	24OET29	Introduction to non-destructive testing	OEC	40/60	3	0	0	3	3
14	24OET30	Mechatronics	OEC	40/60	3	0	0	3	3
15	24OET31	Foundation of Robotics	OEC	40/60	3	0	0	3	3
16	24OET32	Fundamentals of Aeronautical engineering	OEC	40/60	3	0	0	3	3
17	24OET33	Remote Sensing Concepts	OEC	40/60	3	0	0	3	3
18	24OET34	Urban Agriculture	OEC	40/60	3	0	0	3	3
19	24OET35	Drinking Water Supply and Treatment	OEC	40/60	3	0	0	3	3
20	24OET36	Electric Vehicle technology	OEC	40/60	3	0	0	3	3
21	24OET37	Introduction to PLC Programming	OEC	40/60	3	0	0	3	3
22	24OET38	Nano Technology	OEC	40/60	3	0	0	3	3
24	24OET39	Functional Materials	OEC	40/60	3	0	0	3	3
24	24OET40	Biomedical Instrumentation	OEC	40/60	3	0	0	3	3
25	24OET41	Traditional Indian Foods	OEC	40/60	3	0	0	3	3
26	24OET42	Introduction to food processing	OEC	40/60	3	0	0	3	3
27	24OET43	IPR for Pharma Industry	OEC	40/60	3	0	0	3	3
28	24OET44	Basics of Textile Finishing	OEC	40/60	3	0	0	3	3
29	24OET45	Industrial Engineering for Garment Industry	OEC	40/60	3	0	0	3	3
30	24OET46	Basics of Textile Manufacture	OEC	40/60	3	0	0	3	3
31	24OET47	Introduction to Petroleum Refining and Petrochemicals	OEC	40/60	3	0	0	3	3
32	24OET48	Energy Conservation and Management	OEC	40/60	3	0	0	3	3
33	24OET49	Basics of Plastics Processing	OEC	40/60	3	0	0	3	3

34	24OET50	Signals and Systems	OEC	40/60	3	0	0	3	3
35	24OET51	Fundamentals of Electronic Devices and Circuits	OEC	40/60	3	0	0	3	3
36	24OET52	Foundation Skills in integrated product Development	OEC	40/60	3	0	0	3	3
37	24OET53	Assistive Technology	OEC	40/60	3	0	0	3	3
38	24OET54	Operations Research	OEC	40/60	3	0	0	3	3
39	24OET55	Algebra and Number Theory	OEC	40/60	3	0	0	3	3
40	24OET56	Linear Algebra	OEC	40/60	3	0	0	3	3
41	24OET57	Lean Concepts, Tools And Practices	OEC	40/60	3	0	0	3	3

OPEN ELECTIVES – IV

S. No	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	24OET58	Project Report Writing	OEC	40/60	3	0	0	3	3
2	24OET59	Advanced Numerical Methods	OEC	40/60	3	0	0	3	3
3	24OET60	Random Processes	OEC	40/60	3	0	0	3	3
4	24OET61	Queuing and Reliability Modelling	OEC	40/60	3	0	0	3	3
5	24OET62	Production and Operations Management for Entrepreneurs	OEC	40/60	3	0	0	3	3
6	24OET63	Multivariate Data Analysis	OEC	40/60	3	0	0	3	3
7	24OET64	Additive Manufacturing	OEC	40/60	3	0	0	3	3
8	24OET65	New Product Development	OEC	40/60	3	0	0	3	3
9	24OET66	Industrial Design & Rapid Prototyping Techniques	OEC	40/60	2	0	2	4	3
10	24OET67	Micro and Precision Engineering	OEC	40/60	3	0	0	3	3
11	24OET68	Cost Management of Engineering Projects	OEC	40/60	3	0	0	3	3
12	24OET69	Batteries and Management system	OEC	40/60	3	0	0	3	3
13	24OET70	Sensors and Actuators	OEC	40/60	3	0	0	3	3
14	24OET71	Space Vehicles	OEC	40/60	3	0	0	3	3
15	24OET72	Management Science	OEC	40/60	3	0	0	3	3
16	24OET73	Production Planning and Control	OEC	40/60	3	0	0	3	3
17	24OET74	Operations Management	OEC	40/60	3	0	0	3	3
18	24OET75	Industrial Hygiene	OEC	40/60	3	0	0	3	3
19	24OET76	Chemical Process Safety	OEC	40/60	3	0	0	3	3
20	24OET77	Electrical, Electronic and Magnetic materials	OEC	40/60	3	0	0	3	3
21	24OET78	Nano materials and applications	OEC	40/60	3	0	0	3	3
22	24OET79	Hydraulics and Pneumatics	OEC	40/60	3	0	0	3	3
24	24OET80	Sensors	OEC	40/60	3	0	0	3	3
24	24OET81	Foundation of Automation	OEC	40/60	3	0	0	3	3
25	24OET82	Concepts in Mobile Robotics	OEC	40/60	3	0	0	3	3
26	24OET83	Marine Propulsion	OEC	40/60	3	0	0	3	3
27	24OET84	Marine Merchant Vehicles	OEC	40/60	3	0	0	3	3
28	24OET85	Elements of Marine Engineering	OEC	40/60	3	0	0	3	3
29	24OET86	Drone Technologies	OEC	40/60	3	0	0	3	3
30	24OET87	Geographical Information System	OEC	40/60	3	0	0	3	3
31	24OET88	Agriculture Entrepreneurship Development	OEC	40/60	3	0	0	3	3

32	24OET89	Biodiversity Conservation	OEC	40/60	3	0	0	3	3
33	24OET90	Introduction to control systems	OEC	40/60	3	0	0	3	3
34	24OET91	Introduction to Industrial Automation	OEC	40/60	3	0	0	3	3
		Systems							
35	24OET92	Energy Technology	OEC	40/60	3	0	0	3	3
36	24OET93	Surface Science	OEC	40/60	3	0	0	3	3
37	24OET94	Environment and Agriculture	OEC	40/60	3	0	0	3	3
38	24OET95	Fundamentals of Food Engineering	OEC	40/60	3	0	0	3	3
39	24OET96	Food safety and Quality Regulations	OEC	40/60	3	0	0	3	3
40	24OET97	Nutraceuticals	OEC	40/60	3	0	0	3	3
41	24OET98	Basics of Dyeing and Printing	OEC	40/60	3	0	0	3	3
42	24OET99	Fibre Science	OEC	40/60	3	0	0	3	3
43	24OET100	Garment Manufacturing Technology	OEC	40/60	3	0	0	3	3
44	24OET101	Industrial safety	OEC	40/60	3	0	0	3	3
45	24OET102	Unit Operations in Petro Chemical Industries	OEC	40/60	3	0	0	3	3
46	24OET103	Plastic Materials for Engineers	OEC	40/60	3	0	0	3	3
47	24OET104	Properties and Testing of Plastics	OEC	40/60	3	0	0	3	3
48	24OET105	VLSI Design	OEC	40/60	3	0	0	3	3
49	24OET106	Industrial IoT and Industry 4.0	OEC	40/60	2	0	2	4	3
50	24OET107	Wearable devices	OEC	40/60	3	0	0	3	3
51	24OET108	Medical Informatics	OEC	40/60	3	0	0	3	3
52	24OET109	Basics of Integrated Water Resources Management	OEC	40/60	3	0	0	3	3

SUMMARY

Name of the Programme: B.Tech. Information Technology

S.No	Subject Area	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII/VIII	VIII/VII	
1	HSMC	4	3					5		12
2	BSC	12	7	4	2					25
3	ESC	5	9	4						18
4	PCC		5	14.5	20	16	5.5			61
5	PEC					6	12			18
6	OEC						3	9		12
7	EEC	1	2	1				2	10	16
8	Non-Credit (Mandatory)					√	√			
Total		22	26	24.5	22	22	20.5	16	10	162

This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over.

The induction programme has been introduced by AICTE with the following objective:

“Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have a broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.”

“One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character.”

Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

(i) Physical Activity

This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.

(i) Creative Arts

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later.

(i) Universal Human Values

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, make decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base.

Methodology of teaching this content is extremely important. It must not be through do's and don'ts, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv) Literary Activity

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

(iv) Proficiency Modules

This would address some lacunas that students might have, for example, English, computer familiarity etc.

(iv) Lectures by Eminent People

Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

(iv) Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the underprivileged.

(iv) Familiarization to Dept./Branch & Innovations

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

(iv) Department Specific Activities

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering / Technology / Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

References:

Guide to Induction program from AICTE

OBJECTIVES :

- To improve the communicative competence of learners
- To learn to use basic grammatic structures in suitable contexts
- To acquire lexical competence and use them appropriately in a sentence and understand their meaning in a text
- To help learners use language effectively in professional contexts
- To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.

UNIT I INTRODUCTION TO EFFECTIVE COMMUNICATION**1**

What is effective communication? (Explain using activities) Why is communication critical for excellence during study, research and work? What are the seven C's of effective communication? What are key language skills? What is effective listening? What does it involve? What is effective speaking? What does it mean to be an excellent reader? What should you be able to do? What is effective writing? How does one develop language and communication skills? What does the course focus on? How are communication and language skills going to be enhanced during this course? What do you as a learner need to do to enhance your English language and communication skills to get the best out of this course?

UNIT 1 INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION**8**

Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself. Grammar - Present Tense (simple and progressive); Question types: Wh/ Yes or No/ and Tags. Vocabulary - Synonyms; One word substitution; Abbreviations & Acronyms (as used in technical contexts).

UNIT II NARRATION AND SUMMATION**9**

Reading - Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. Writing - Guided writing-- Paragraph writing Short Report on an event (field trip etc.) Grammar –Past tense (simple); Subject-Verb Agreement; and Prepositions. Vocabulary - Word forms (prefixes& suffixes); Synonyms and Antonyms. Phrasal verbs.

UNIT III DESCRIPTION OF A PROCESS / PRODUCT**9**

Reading – Reading advertisements, gadget reviews; user manuals. Writing - Writing definitions; instructions; and Product /Process description. Grammar - Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses. Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words).

UNIT IV CLASSIFICATION AND RECOMMENDATIONS**9**

Reading – Newspaper articles; Journal reports –and Non Verbal Communication (tables, pie charts etc,.). Writing – Note-making / Note-taking (*Study skills to be taught, not tested); Writing recommendations; Transferring information from non verbal (chart , graph etc, to

verbal mode)

Grammar – Articles; Pronouns - Possessive & Relative pronouns. Vocabulary - Collocations; Fixed /Semi fixed expressions.

UNIT V EXPRESSION

9

Reading – Reading editorials; and Opinion Blogs; Writing – Essay Writing (Descriptive or narrative). Grammar – Future Tenses, Punctuation; Negation (Statements & Questions); and Simple, Compound & Complex Sentences. Vocabulary - Cause & Effect Expressions – Content vs Function words.

TOTAL : 45 PERIODS

LEARNING OUTCOMES :

At the end of the course, learners will be able

- To use appropriate words in a professional context
- To gain understanding of basic grammatic structures and use them in right context.
- To read and infer the denotative and connotative meanings of technical texts
- To write definitions, descriptions, narrations and essays on various topics

TEXT BOOKS :

1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 edition)
2. English for Science & Technology Cambridge University Press, 2021.
3. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

REFERENCES:

1. Technical Communication – Principles And Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. A Course Book On Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.
3. English For Technical Communication (With CD) By [Aysha Viswamohan](#), Mcgraw Hill Education, ISBN : 0070264244.
4. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.

ASSESSMENT PATTERN

Two internal assessments and an end semester examination to test students' reading and writingskills along with their grammatical and lexical competence.

WEB REFERENCES:

1. https://onlinecourses.swayam2.ac.in/cec24_lg08/preview
2. <https://archive.nptel.ac.in/courses/109/106/109106129/>
3. https://onlinecourses.nptel.ac.in/noc20_hs56/preview
4. https://onlinecourses.nptel.ac.in/noc21_hs16/preview
5. <https://www.udemy.com/course/learn-business-english/>

ONLINE RESOURCES:

1. <https://www.ebooksfree4u.com/2018/11/technical-communication-by-meenakshi.html>
2. <https://www.msajce-edu.in/academics/sh/LectureNote/HS3151-LN.pdf>
3. <https://www.poriyaan.in/paper/professional-english-i-1/>
4. slhd.nsw.gov.au/learningtocommunicate/pdf/LtC_ParentHandbook.pdf
5. <https://www.manage.gov.in/studymaterial/EC.pdf>

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To understand various techniques of multiple integrals.

UNIT I MATRICES**9+3**

Eigen values and Eigenvectors of a real matrix – Characteristic equation - Properties of Eigen values and Eigenvectors – Cayley – Hamilton Theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II DIFFERENTIAL CALCULUS**9+3**

Derivatives – Differentiation rules (Sum, Product, Quotient, Chain rules) – Implicit differentiation – Logarithmic differentiation – Maxima and Minima of functions of one variables.

UNIT III FUNCTIONS OF SEVERAL VARIABLES**9+3**

Partial differentiation– Total derivative - Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables–Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

UNIT IV INTEGRATION**9+3**

The Definite and Indefinite integral – Integration techniques - Substitution methods-Integration by parts –Reduction formula- Trigonometric substitutions- Integration of rational and Irrational functions (Partial fraction method)-Improper Integrals.

UNIT V MULTIPLE INTEGRALS**9+3**

Double integrals– Double integrals in polar coordinates– Change of order of integration - Triple integrals– Volume of solids – Change of variable in double and triple integrals.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, learners will be able

- Use the matrix algebra methods for solving practical problems.
- Apply differential calculus tools in solving various application problems.
- Able to use differential calculus ideas on several variable functions.
- Apply different methods of integration in solving practical problems.
- Apply various techniques in multiple integrals.

TEXT BOOKS:

- 1.Kreyszig E, “Advanced Engineering Mathematics” John Wiley and 10th Edition, NewDelhi, 2016.
- 2.Grewal B. S, “Higher Engineering Mathematics, New Delhi, 44th Edition, 2018.
- 3.James Stewart, “Calculus: Early Transcendentals“, Cengage Learning 8th Edition, NewDelhi, 2015.

REFERENCES:

- 1.Jain R.K and Iyengar S.R.K “Advanced Engineering Mathematics”, Narasa Publications, New Delhi, 5th Edition, 2016.
- 2.Narayanan S, and Manicavachagampillai T. K, “Calculus:Volume I and II”, S. Viswnathan Publishers Pvt. Ltd., Chennai, 2009.
- 3.Ramana B. V, “Higher Engineering Mathematics”, McGral Hill Eduvation Pvt. Ltd.,New Delhi, 2016.

WEB REFERENCES:

1. <https://archive.nptel.ac.in/courses/111/106/111106144/>
2. <https://archive.nptel.ac.in/courses/111/106/111106146/3>.
3. <https://archive.nptel.ac.in/courses/111/108/111108157/>
4. <https://archive.nptel.ac.in/courses/111/104/111104092/>
5. <https://archive.nptel.ac.in/courses/111/105/111105160/>

ONLINE RESOURCES:

1. https://books.google.co.in/books/about/Engineering_Mathematics_I_Matrices_and_C.html?id=iPvAEAAAQBAJ&redir_esc=y
2. https://easyengineering.net/ma3151-matrices-and-calculus-notes/#google_vignette
3. <https://learnengineering.in/ma3151-matrices-and-calculus/>
4. https://menso88.weebly.com/uploads/1/7/5/8/17586891/textbook_og_engineering_matematics.pdf

24PHT101

ENGINEERING PHYSICS

(Common to all branches)

L T P C

3 0 0 3

COURSE OBJECTIVES:

- To make the students effectively achieve an understanding of mechanics.
- To enable the students to gain knowledge of electromagnetic waves and its applications.
- To introduce the basics of oscillations, optics and lasers.
- Equipping the students to successfully understand the importance of quantum physics.
- To motivate the students towards the applications of quantum mechanics.

UNIT I MECHANICS

9

Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – motion of the CM – kinetic energy of the system of particles. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M .I –moment of inertia of continuous bodies –of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope - torsional pendulum –double pendulum –Introduction to nonlinear oscillations.

UNIT II ELECTROMAGNETIC WAVES

9

The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, Conditions on the wave field - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - polarization - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, waves from localized sources, momentum and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium- vacuum interface for normal incidence.

UNIT III OSCILLATIONS, OPTICS AND LASERS

9

Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect. Reflection and refraction of light waves - total internal reflection - interference –Michelson interferometer –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, CO₂ laser, semiconductor laser –Basic applications of lasers in industry.

UNIT IV BASIC QUANTUM MECHANICS

9

Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes-

Normalization, probabilities and the correspondence principle.

UNIT V APPLIED QUANTUM MECHANICS

9

The harmonic oscillator(qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope - Resonant diode - Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Basics of Kronig-Penney model and origin of energy bands.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

- Understand the importance of mechanics.
- Express their knowledge in electromagnetic waves.
- Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
- Understand the importance of quantum physics.
- Comprehend and apply quantum mechanical principles towards the formation of energy bands.

TEXT BOOKS:

1. D.Kleppner and R.Kolenkow. An Introduction to Mechanics. McGraw Hill Education (Indian Edition), 2017.
2. E.M.Purcell and D.J.Morin, Electricity and Magnetism, Cambridge Univ.Press, 2013.
3. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw-Hill (Indian Edition), 2017.

REFERENCES:

1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition), 2009.
2. Paul A. Tipler, Physics – Volume 1 & 2, CBS, (Indian Edition), 2004.
3. K.Thyagarajan and A.Ghatak. Lasers: Fundamentals and Applications, Laxmi Publications, (Indian Edition), 2019.
4. D.Halliday, R.Resnick and J.Walker. Principles of Physics, Wiley (Indian Edition), 2015.
5. N.Garcia, A.Damask and S.Schwarz. Physics for Computer Science Students. Springer-Verlag, 2012.

WEB REFERENCES:

1. <https://archive.nptel.ac.in/courses/122/103/122103010/>
2. <https://archive.nptel.ac.in/courses/122/103/122103011/>
3. <https://archive.nptel.ac.in/courses/122/107/122107035/>
4. <https://archive.nptel.ac.in/courses/122/103/122103011/#>
5. <https://archive.nptel.ac.in/courses/115/106/115106133/>

ONLINE RESOURCES:

1. <https://www.mbit.edu.in/wp-content/uploads/2020/05/FULLBOOKPHYSICS.pdf>
2. <https://physicsrvce.files.wordpress.com/2022/03/unit-4-laser-and-of.pdf>
3. <http://www.gpcet.ac.in/wp-content/uploads/2018/09/UNIT-1-EP-PDF.pdf>

4. https://www.ks.uiuc.edu/Services/Class/PHYS480/qm_PDF/QM_Book.pdf
5. <https://books.google.co.in/books?id=61WJDAAAQBAJ&printsec=copyright#v=onepage&q&f=false>

24CYT101

ENGINEERING CHEMISTRY

L T P C

3 0 0 3

COURSE OBJECTIVES:

- To inculcate sound understanding of water quality parameters and water treatment techniques.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.
- To introduce the basic concepts and applications of phase rule and composites.
- To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
- To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.

UNIT I WATER AND ITS TREATMENT

9

Water: Sources and impurities, Water quality parameters: Definition and significance of-color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, fluoride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process.

UNIT II NANOCHEMISTRY

9

Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials: Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

UNIT III PHASE RULE AND COMPOSITES

9

Phase rule: Introduction, definition of terms with examples. One component system - water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Thermal analysis; Two component system: lead-silver system - Pattinson process. Composites: Introduction: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites - definition and examples.

UNIT IV FUELS AND COMBUSTION

9

Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil - cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. CO₂ emission and carbon footprint.

UNIT V ENERGY SOURCES AND STORAGE DEVICES

9

Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy; Batteries: Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion- battery; Electric vehicles - working principles; Fuel cells: H₂-O₂ fuel cell, microbial fuel cell; Supercapacitors: Storage principle, types and examples.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able:

- To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
- To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
- To apply the knowledge of phase rule and composites for material selection requirements.
- To recommend suitable fuels for engineering processes and applications.
- To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

TEXT BOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.

4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

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1. <https://archive.nptel.ac.in/courses/122/101/122101001/>
2. https://onlinecourses.nptel.ac.in/noc21_cy49/preview
3. <https://archive.nptel.ac.in/courses/122/106/122106028/>
4. <https://nptel.ac.in/courses/104101130>
5. <https://www.classcentral.com/course/youtube-core-science-engineering-chemistry-1-47682>

ONLINE RESOURCES:

1. [https://www.academia.edu/37796622/Engineering Chemistry by Jain and Jain](https://www.academia.edu/37796622/Engineering_Chemistry_by_Jain_and_Jain)
2. <https://vtu.ac.in/wp-content/uploads/2023/05/Sealed-E-version-Engg-Chemistry-Handbook-for-I-II-Semester-22-Sheme.pdf>
3. <https://soaneemrana.org/onewebmedia/CHEMISTRY%20THEORY.pdf>
4. <https://www.srividyaengg.ac.in/coursematerial/Iyear/111144.pdf>
5. <https://www.studocu.com/in/document/nirma-university-of-science-and-technology/engineering-chemistry/engineering-chemistry-notes-e-book-for-1st-year-engg-part-1/31170495>

COURSE OBJECTIVES:

- To understand the basics of algorithmic problem solving.
- To learn to solve problems using Python conditionals and loops.
- To define Python functions and use function calls to solve problems.
- To use Python data structures - lists, tuples, dictionaries to represent complex data.
- To do input/output with files in Python.

UNIT I COMPUTATIONAL THINKING AND PROBLEM SOLVING 9

Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA TYPES, EXPRESSIONS, STATEMENTS 9

Python interpreter and interactive mode,debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III CONTROL FLOW, FUNCTIONS, STRINGS 9

Conditionals:Boolean values and operators, conditional (if), alternative (if-else),chained conditional (if-elif-else);Iteration: state, while, for, break, continue, pass; Fruitful functions: return values,parameters, local and global scope, function composition, recursion; Strings: string slices,immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS, TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation.

UNIT V FILES, MODULES, PACKAGES 9

Files and exceptions: text files, reading and writing files, format operator; command line

arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).

TOTAL : 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, students will be able to

CO1: Develop algorithmic solutions to simple computational problems.

CO2: Develop and execute simple Python programs.

CO3: Write simple Python programs using conditionals and loops for solving problems.

CO4: Decompose a Python program into functions.

CO5: Represent compound data using Python lists, tuples, dictionaries etc.

CO6: Read and write data from/to files in Python programs.

TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021
4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
5. <https://www.python.org/>
6. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.

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1. https://onlinecourses.nptel.ac.in/noc24_cs57/preview
2. https://onlinecourses.swayam2.ac.in/cec24_cs03/preview
3. <https://www.youtube.com/watch?v=c235EsGFcZs>
4. <https://www.youtube.com/watch?v=i-gjacxrQqY>
5. https://www.youtube.com/channel/UCaMIU19xncd_rJPvsFNQLIQ/videos

ONLINE RESOURCES:

1. <https://topperworld.in/python-handwritten-notes-2/>
2. <https://www.bu.edu/lernet/artemis/years/2011/slides/python.pdf>

3. <https://www.stat.berkeley.edu/~spector/python.pdf>
4. https://cfm.ehu.es/ricardo/docs/python/Learning_Python.pdf
5. <https://static.realpython.com/python-basics-sample-chapters.pdf>

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HERITAGE OF TAMILS

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UNIT I LANGUAGE AND LITERATURE

3

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

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE

3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS

3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNITIV THINAI CONCEPT OF TAMILS

3

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

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

3

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

TOTAL : 15 PERIODS

REFERENCES:

1. தமிழகவரலாறு - மக்களும்பண்பாடும் - கே.கேபிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்)
2. கணினிதமிழ்-முனைவர்இல.சுந்தரம் (விகடன்பிரசுரம்).
3. கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
4. பொருறை -ஆற்றங்கரைநாகரிகம்(தொல்லியல்துறைவெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: 36 International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

அலகு 1 : மொழி மற்றும் இலக்கியம்

இந்தியமொழி குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி –தமிழ் செவ்விலக்கியங்கள் – சங்க இலக்கியத்தின் சமயசார்பற்றதன்மை – சங்க இலக்கியத்தின்பகிர்தல் அறம்-திருக்குறளில் மேலாண்மை கருத்துகள்-தமிழ் காப்பியங்கள்,தமிழகத்தில் சமணபௌத்த சமயங்களின் தாக்கம்-பக்தி இலக்கியம்,ஆழ்வார்கள் மற்றும் நாயன்மார்கள்- சிற்றிலக்கியங்கள்-தமிழில்நவீன இலக்கியத்தின் வளர்ச்சி-தமிழ் இலக்கியவளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு .

அலகு 2 : மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை-சிற்பக்கலை:

நடுக்கல் முதல் நவீன சிற்பங்கள் வரை- ஐம்பொன் சிலைகள்-பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினை பொருட்கள் மற்றும் பொம்மைகள்-தேர்செய்யும் கலை-சுடுமண் சிற்பங்கள்-நாட்டுப்புற தெய்வங்கள்-குமரிமுனையில் திருவள்ளுவர்சிலை-இசைக்கருவிகள்- மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம்-தமிழர்களின் சமூக பொருளாதார வாழ்வியல் கோவில்களின் பங்கு.

அலகு 3 : நாட்டுப்புறகலைகள்மற்றும்வீரவிளையாட்டுகள்

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஓயிலாட்டம், தோல்பாவைகூத்து, சிலம்பாட்டம்,வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு 4 : தமிழர்களின் திணைக் கோட்பாடுகள்

தமிழகத்தின் தாவரங்களும், விலங்குகளும்-தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள்-தமிழர்கள் போற்றிய அறக்கோட்பாடு சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும்,கல்வியும்-சங்ககால நகரங்களும்,துறை முகங்களும்-சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி-கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு 5: இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்கு தமிழர்களின் பங்களிப்பு

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்குஇந்தியாவின் பிறபகுதிகளில் தமிழ்பண்பாட்டின் தாக்கம்-சுயமரியாதையை இயக்கம்-இந்திய மருத்துவத்தில்,சித்தமருத்துவத்தின்பங்கு- கல்வெட்டுகள்,கையெழுத்து படிகள்-தமிழ் புத்தகங்களில் அச்சுவரலாறு.

REFERENCES:

- 1.தமிழகவரலாறு - மக்களும்பண்பாடும் - கே.கேபிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்)
- 2.கணினிதமிழ்-முனைவர்இல.சுந்தரம் (விகடன்பிரசுரம்).
- 3.கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)
- 4.பொருறை -ஆற்றங்கரைநாகரிகம்(தொல்லியல்துறைவெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: 36 International Institute of Tamil Studies.)
9. Keeladi - ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
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11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

COURSE OBJECTIVES:

- To understand the problem solving approaches.
- To learn the basic programming constructs in Python.
- To practice various computing strategies for Python-based solutions to real world problems.
- To use Python data structures -lists, tuples, dictionaries.
- To do input/output with files in Python.

LIST OF EXPERIMENTS:

Note: The examples suggested in each experiment are only indicative. The lab instructor is expected to design other problems on similar lines. The Examination shall not be restricted to the sample experiments listed here.

1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Component of a car/Materials required for construction of a building—operations of list & tuples)
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)
6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)
7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)
8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)
10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)
11. Exploring Pygame tool.
12. Developing a game activity using Pygame like bouncing ball, car race etc.

TOTAL: 60 PERIODS**COURSE OUTCOMES:**

On completion of the course, students will be able to:

- Develop algorithmic solutions to simple computational problems
- Develop and execute simple Python programs.
- Implement programs in Python using conditionals and loops for solving problems.

- Deploy functions to decompose a Python program.
- Process compound data using Python data structures.
- Utilize Python packages in developing software applications.

TEXTBOOKS:

1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCE BOOKS:

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021.

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1. https://onlinecourses.nptel.ac.in/noc24_cs57/preview
2. https://onlinecourses.swayam2.ac.in/cec24_cs03/preview
3. <https://www.youtube.com/watch?v=c235EsGFcZs>
4. <https://www.youtube.com/watch?v=i-gjacxrQqY>
5. https://www.youtube.com/channel/UCaMIU19xncd_rJPvsFNQLIQ/videos

ONLINE RESOURCES:

1. <https://topperworld.in/python-handwritten-notes-2/>
2. <https://www.bu.edu/lernet/artemis/years/2011/slides/python.pdf>
3. <https://www.stat.berkeley.edu/~spector/python.pdf>
4. https://cfm.ehu.es/ricardo/docs/python/Learning_Python.pdf
5. <https://static.realpython.com/python-basics-sample-chapters.pdf>

PHYSICS LABORATORY: (Any Seven Experiments)**COURSE OBJECTIVES:**

- To learn the proper use of various kinds of physics laboratory equipment.
- To learn how data can be collected, presented and interpreted in a clear and concise manner.
- To learn problem solving skills related to physics principles and interpretation of experimental data.
- To determine error in experimental measurements and techniques used to minimize such error.
- To make the student as an active participant in each part of all lab exercises.

LIST OF EXPERIMENTS:

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.
2. Simple harmonic oscillations of cantilever.
3. Non-uniform bending - Determination of Young's modulus.
4. Uniform bending – Determination of Young's modulus.
5. Laser- Determination of the wavelength of the laser using grating.
6. Air wedge - Determination of thickness of a thin sheet/wire.
 - a) Optical fibre -Determination of Numerical Aperture and acceptance angle.
 - b) Compact disc- Determination of width of the groove using laser.
7. Ultrasonic interferometer – determination of the velocity of sound and compressibility of
8. liquids.
9. Post office box -Determination of Band gap of a semiconductor.
10. Michelson Interferometer.
11. Melde's string experiment.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the students should be able to

- Understand the functioning of various physics laboratory equipment.
- Use graphical models to analyze laboratory data.
- Use mathematical models as a medium for quantitative reasoning and describing physical reality.
- Access, process and analyze scientific information.
- Solve problems individually and collaboratively.

CHEMISTRY LABORATORY**COURSE OBJECTIVES:**

- To impart practical skills in the estimation of water quality parameters by volumetry and gravimetry.
- To familiarize the students with the estimation of impurities in aqueous solutions through electro analytical techniques such as, pH metry, potentiometry and conductometry.
- To demonstrate the analysis of metals by UV-Visible spectroscopic and flame photometric methods.

LIST OF EXPERIMENTS:

1. Determination of total, temporary & permanent hardness of water by EDTA method
 2. Determination of chloride content of water sample by Argentometric method
 3. Determination of types and amount of alkalinity in water sample
 4. Determination of DO content of water sample by Winkler's method
 5. Determination of strength of acids in a mixture of acids using conductivity meter
 6. Conductometric titration of barium chloride against sodium (precipitation titration).
 7. Estimation of iron content of the given solution using potentiometer
- Open Ended Experiments
1. Determination of strength of given hydrochloric acid using pH meter.
 2. Conductometric titration of Strong acid against Strong base

TOTAL: 30 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able:

- To independently estimate the water quality parameters, such as, acidity, alkalinity, hardness, DO, TDS, chloride and copper contents by appropriate wet chemical analyses.
- To quantitatively analyse the impurities in aqueous solution by electro analytical techniques.
- To determine the amount of metal ions in aqueous samples by spectroscopic techniques.

TEXT BOOKS:

1. J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, “Vogel’s Textbook of Quantitative Chemical Analysis”, Pearson Education, 2009.
2. V.K. Ahluwalia, Sunitha Dhingra and Adarsh Gulati, “College Practical Chemistry”, Universities Press (India) Pvt. Ltd., 2018

WEB RESOURCES:

1. <https://archive.nptel.ac.in/courses/122/103/122103010/>
2. <https://archive.nptel.ac.in/courses/122/103/122103011/>
3. <https://archive.nptel.ac.in/courses/122/107/122107035/>
4. <https://nptel.ac.in/courses/104101130>
5. <https://www.classcentral.com/course/youtube-core-science-engineering-chemistry-1->

ONLINE RESOURCES:

1. https://www.academia.edu/9476156/Vogels_TEXTBOOK_OF_QUANTITATIVE_CHEMICAL_ANALYSIS_5th_ed_G_H_Jeffery
2. https://www.osmania.ac.in/Syllabus_2019/UG/Fac%20of%20Science%202years/CHEMIST
3. RY.pdf<https://magpi.raspberrypi.com/books/essentials-c-v1>

OBJECTIVES :

- To improve the communicative competence of learners
- To help learners use language effectively in academic /work contexts
- To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
- To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.
- To use language efficiently in expressing their opinions via various media.

UNIT I INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 6

Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form. Speaking - making telephone calls-Self Introduction; Introducing a friend; - politeness strategies- making polite requests, making polite offers, replying to polite requests and offers- understanding basic instructions(filling out a bank application for example).

UNIT II NARRATION AND SUMMATION 6

Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking - Narrating personal experiences / events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings-engaging in small talk- describing requirements and abilities.

UNIT III DESCRIPTION OF A PROCESS / PRODUCT 6

Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products. Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product- explaining uses and purposes- Presenting a product- describing shapes and sizes and weights- talking about quantities(large & small)-talking about precautions.

UNIT IV CLASSIFICATION AND RECOMMENDATIONS 6

Listening – Listening to TED Talks; Listening to lectures - and educational videos. Speaking – Small Talk; discussing and making plans-talking about tasks-talking about progress- talking about positions and directions of movement-talking about travel preparations- talking about transportation-

UNIT V EXPRESSION 6

Listening – Listening to debates/ discussions; different viewpoints on an issue; and panel discussions. Speaking –making predictions- talking about a given topic-giving opinions-understanding a website-describing processes

TOTAL : 30 PERIODS

LEARNING OUTCOMES:

At the end of the course, learners will be able

- To listen and comprehend complex academic texts
- To speak fluently and accurately in formal and informal communicative contexts
- To express their opinions effectively in both oral and written medium of communication

ASSESSMENT PATTERN

- One online / app based assessment to test listening /speaking
- End Semester **ONLY** listening and speaking will be conducted online.
- Proficiency certification is given on successful completion of listening and speaking internal test and end semester exam.

ONLINE RESOURCES;

1. <https://www.scribd.com/document/526389054/BOOK-Q-Skill-for-Success-4-Listening-and-Speaking>
2. <https://www.scribd.com/document/377019701/richards-jack-c-bohlke-david-speak-now-2-student-s-book>
3. <http://www.ir.juit.ac.in:8080/jspui/bitstream/123456789/5563/1/Communication%20Skills%20for%20Engineers-C.%20Muralikrishna%20-%20Pearson.pdf>
4. <https://www.scribd.com/document/529071930/Speak-Now-4-Student-s-Book>
5. https://ia804601.us.archive.org/17/items/ilhem_201504/%5BGillian_Porter_Ladousse%5D_Speaking_Personally_Qu_text.pdf

COURSE OBJECTIVES:

- To improve the learners skill to read and comprehend the technical texts.
- To strengthen the ability of the learners' official written communication skill on technical context.
- To help learners to enhance the public speaking skills to make technical presentations, participate in group discussions.
- To develop the analytical thinking skills, problem solving skills and interpersonal skills of the learners.
- To develop the ability to write job applications and interviews for internship and effective reports.

UNIT I STRENGTHENING PROFESSIONAL WRITING**9**

Listening–Evaluative Listening: Advertisements, Product Descriptions, -Audio/video; Active and passive Listening. Speaking – Asking and giving directions, Persuasive Speech Techniques. Writing – Professional emails writing- Compare and Contrast Essay; Itinerary Grammar – Tenses in Functional usage, Prepositional phrases. Language Development–Contextual meaning of words, Purpose and statement.

UNIT II BUSINESS WRITING IN TECHNICAL CONTEXT**9**

Listening - Listening to long technical talks and completing–gap filling exercises. Listening to the comprehension talks. – Listening to information from podcasts. Speaking – Describing and discussing the reasons of accidents or disasters based on news reports. Describing about process/product (Technical and General). Reading – Reading longer technical texts-news reports, journals and understanding the technical terms. Writing – Writing responses to complaints. Letter writing- Accepting, Declining the invitation and seeking clarification. Grammar – Active Passive Voice transformations, Infinitive and Gerunds. Language Development – Word Formation, Adverbs.

UNIT III ENGLISH IN WORK PLACE**9**

Listening – listening to/Watching movie scenes/documentaries depicting a technical problem and suggesting solutions. Speaking – Group Discussion (based on case studies), Discussion on a technical topic of common interest by group participants. Reading - Practice in lexical chunking and speed reading, Reading the Case Studies, excerpts from literary texts, news reports etc., Writing – Jumbled sentences, Problem solution essay / Argumentative Essay. Grammar – Direct and Indirect questions; If conditional sentences. Language Development – Embedded sentences, Sentence Completion.

UNIT IV REPORTING OF THE EVENTS AND ANALYSING THE CONTENT

9

Listening – Listening Comprehension based on IELTS Practice test. Speaking – Public Speaking (Debate, Extempore and just a minute), Presenting an oral report, Mini presentations on select topics. Reading – Newspaper articles; Technical reports and Advertisements. Writing – Minutes of the Meeting, Recommendations, Transcoding, Report writing- Feasibility and Survey report. Grammar–Verbal Analogies, Modals. Language Development–Conjunctions-use of prepositions.

UNIT V THE ABILITY TO NARRATE THE INFORMATION PERSUASIVELY

9

Listening – Listening and its process –Practices and strategies of better Listening. Listening to TED Talks, Presentations, Formal job interviews, (analysis of the interview performance); Speaking – Participating in a Role play, (interview/telephone interview), Types of role play, Mock interviews, Formal conversations. Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; Writing – Job application – Cover letter & Resume; Grammar–Numerical adjectives, Misspelt words. Language Development–Idioms, Error Spotting.

TOTAL: 45 PERIODS

WEB RESOURCES:

1. <https://www.mygreatlearning.com/academy/learn-for-free/courses/smart-english-basics-for-professionals>
2. <https://www.udemy.com/topic/english-grammar/free/>
3. https://learn.saylor.org/course/index.php?categoryid=29&utm_source=google&utm_medium=keyword&utm_campaign=google_keyword_ad_esl&gad_source=1&gclid=EAIaIQobChMIhuOVq6CRhQMvJatmAhlSlgRAEAMYASAAEgK9uPD_BwE

ONLINE RESOURCES:

1. <https://www.scribd.com/document/586171781/Professional-English-II>
2. <https://archive.org/details/englishforengine0000unse/page/n7/mode/2up>
3. <https://www.slideshare.net/SmitPatel888407/communication-skills-meenakshi-raman-sangeeta-sharma>
4. <https://www.scribd.com/document/463389417/VAAR-012>
5. <https://uwetat.files.wordpress.com/2014/08/improve-your-writing.pdf>

COURSE OBJECTIVES:

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems?
- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines?
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

UNIT I TESTING OF HYPOTHESIS**9 + 3**

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.

UNIT II DESIGN OF EXPERIMENTS**9 + 3**

One way and two way classifications - Completely randomized design – Randomized block design– Latin square design - factorial design.

UNIT III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS**9 + 3**

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices.

UNIT IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION**9 + 3**

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivatives using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**9 + 3**

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.

COURSE OUTCOMES:

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

CO1: Apply the concept of testing of hypothesis for small and large samples in real life problems.

CO2: Apply the basic concepts of classifications of design of experiments in the field of agriculture.

CO3: Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.

CO4: Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

CO5: Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

TEXT BOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.
5. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics", Tata McGraw Hill Edition, 4th Edition, 2012.
6. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010.

WEB REFERENCES:

1. https://onlinecourses.nptel.ac.in/noc23_ma30/preview
2. <https://archive.nptel.ac.in/courses/111/105/111105164/>
3. https://onlinecourses.nptel.ac.in/noc21_ae02/preview
4. https://onlinecourses.nptel.ac.in/noc20_ge05/preview
5. <https://www.shiksha.com/online-courses/matlab-programming-for-numerical-computation-course-nptel870>

ONLINE RESOURCES:

1. <http://www.mi.sanu.ac.rs/~gvm/Teze/Numerical%20methods%20In%20Computational%20Engineering.pdf>
2. <https://www.mdpi.com/books/reprint/7666-computational-methods-and-applications-for-numerical-analysis>
3. <https://web.pdx.edu/~crkl/readings/quandt83.pdf>
4. http://eprints.covenantuniversity.edu.ng/12569/1/Emetere2019_Chapter_IntroductionToComputationalTec.pdf
5. <https://www.scribd.com/document/513474165/Computational-Techniques-Lecture-notes->

COURSE OBJECTIVES:

- To make the students understand the importance in studying electrical properties of materials.
- To enable the students to gain knowledge in semiconductor physics
- To instill knowledge on magnetic properties of materials.
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement, ensuing nano device applications and quantum computing.

UNIT I ELECTRICAL PROPERTIES OF MATERIALS

9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Wiedemann-Franz law – Success and failures - electrons in metals – Particle in a three dimensional box – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole.

UNIT II SEMICONDUCTOR PHYSICS

9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – Carrier transport in Semiconductor: random motion, drift, mobility and diffusion – Hall effect and devices – Ohmic contacts – Schottky diode.

UNIT III MAGNETIC PROPERTIES OF MATERIALS

9

Magnetic dipole moment – atomic magnetic moments- magnetic permeability and susceptibility - Magnetic material classification: diamagnetism – paramagnetism – ferromagnetism – antiferromagnetism – ferrimagnetism – Ferromagnetism: origin and exchange interaction- saturation magnetization and Curie temperature – Domain Theory- M versus H behaviour – Hard and soft magnetic materials – examples and uses – Magnetic principle in computer data storage – Magnetic hard disc (GMR sensor).

UNIT IV OPTICAL PROPERTIES OF MATERIALS

9

Classification of optical materials – carrier generation and recombination processes - Absorption emission and scattering of light in metals, insulators and semiconductors (concepts only) - photo current in a P-N diode – solar cell - LED – Organic LED – Laser diodes – Optical data storage techniques.

UNIT V NANODEVICES AND QUANTUM COMPUTING

9

Introduction - quantum confinement – quantum structures: quantum wells, wires and dots — band gap of nanomaterials. Tunneling – Single electron phenomena: Coulomb blockade - resonant- tunneling diode – single electron transistor – quantum cellular automata - Quantum system for information processing - quantum states – classical bits – quantum bits or qubits – CNOT gate - multiple qubits – Bloch sphere – quantum gates – advantage of quantum computing over classical computing.

TOTAL :45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students should be able to

- gain knowledge on classical and quantum electron theories, and energy band structures
- acquire knowledge on basics of semiconductor physics and its applications in various devices
- get knowledge on magnetic properties of materials and their applications in data storage,
- have the necessary understanding on the functioning of optical materials for optoelectronics
- understand the basics of quantum structures and their applications and basics of quantum computing

TEXT BOOKS:

1. Jasprit Singh, “Semiconductor Devices: Basic Principles”, Wiley (Indian Edition), 2007.
2. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw-Hill Education (Indian Edition), 2020.
3. Parag K. Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian Edition), 2020.

REFERENCES:

1. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
2. Y.B.Band and Y.Avishai, Quantum Mechanics with Applications to Nanotechnology and Information Science, Academic Press, 2013.
3. V.V.Mitin, V.A. Kochelap and M.A.Stroscio, Introduction to Nanoelectronics, Cambridge Univ.Press, 2008.
4. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson Education (Indian Edition) 2009.
5. B.Rogers, J.Adams and S.Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2014.

WEB REFERENCES:

1. <https://archive.nptel.ac.in/courses/115/103/115103108/>
2. <https://www.youtube.com/watch?v=Ioap-8GEVdQ>
3. <https://www.youtube.com/playlist?list=PLx8lp704LAvhYOn-h2dHZCWbLTqXMeiH7>
4. <https://www.coursera.org/learn/quantum-physics>
5. <https://www.coursera.org/learn/semiconductor-process-1>

ONLINE RESOURCES:

1. <https://www.optima.ufam.edu.br/SemPhys/Downloads/Neamen.pdf>
2. <https://www.scribd.com/document/70908178/Semiconductor-Devices-Basic-Principles-Jasprit-Singh>
3. <http://www.icet.ac.in/Uploads/Downloads/Module%20III%20-%20Quantum%20Mechanicsand%20Nanotechnology.pdf>
4. https://ocw.mit.edu/courses/6-701-introduction-to-nanoelectronics-spring-2010/6a95133986a8698a55448d60c7834d15_MIT6_701S10_textbook.pdf
5. <https://www.scribd.com/doc/92486213/Hanson-fundamentals-of-Nanoelectronics-Copy>

COURSE OBJECTIVES:

- To introduce the basics of electric circuits and analysis
- To impart knowledge in the basics of working principles and application of electrical machines
- To introduce analog devices and their characteristics
- To educate on the fundamental concepts of digital electronics
- To introduce the functional elements and working of measuring instruments

UNIT I ELECTRICAL CIRCUITS**9**

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws –Independent and Dependent Sources – Simple problems- Nodal Analysis, Mesh analysis with Independent sources only (Steady state)

Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Steady state analysis of RLCcircuits (Simple problems only)

UNIT II ELECTRICAL MACHINES**9**

Construction and Working principle- DC Separately and Self excited Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, Working principle and Applications of Transformer, Three phase Alternator, Synchronous motor and Three Phase Induction Motor.

UNIT III ANALOG ELECTRONICS**9**

Resistor, Inductor and Capacitor in Electronic Circuits- Semiconductor Materials: Silicon & Germanium – PN Junction Diodes, Zener Diode –Characteristics Applications – Bipolar Junction Transistor-Biasing, JFET, SCR, MOSFET, IGBT – Types, I-V Characteristics and Applications, Rectifier and Inverters

UNIT IV DIGITAL ELECTRONICS**9**

Review of number systems, binary codes, error detection and correction codes, Combinational logic - representation of logic functions-SOP and POS forms, K-map representations - minimization using K maps (Simple Problems only).

UNIT V MEASUREMENTS AND INSTRUMENTATION**9**

Functional elements of an instrument, Standards and calibration, Operating Principle, types - Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT, DSO- Block diagram- Data acquisition.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completing this course, the students will be able to

CO1: Compute the electric circuit parameters for simple problems

CO2: Explain the working principle and applications of electrical

machines
CO3: Analyze the characteristics of analog electronic devices

CO4: Explain the basic concepts of digital electronics

CO5: Explain the operating principles of measuring instruments

TEXT BOOKS:

1. Kothari DP and I.J Nagrath, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill Education, 2020
2. S.K.Bhattacharya “Basic Electrical and Electronics Engineering”, Pearson Education, Second Edition, 2017.
3. Sedha R.S., “A textbook book of Applied Electronics”, S. Chand & Co., 2008
4. James A .Svoboda, Richard C. Dorf, “Dorf’s Introduction to Electric Circuits”, Wiley, 2018.
5. A.K. Sawhney, Puneet Sawhney ‘A Course in Electrical & Electronic Measurements & Instrumentation’, Dhanpat Rai and Co, 2015.

REFERENCES:

1. Kothari DP and I.J Nagrath, “Basic Electrical Engineering”, Fourth Edition, McGraw Hill
2. Education, 2019.
3. Thomas L. Floyd, ‘Digital Fundamentals’, 11th Edition, Pearson Education, 2017.
4. Albert Malvino, David Bates, ‘Electronic Principles, McGraw Hill Education; 7th edition, 2017.
5. Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, 2002.
6. H.S. Kalsi, ‘Electronic Instrumentation’, Tata McGraw-Hill, New Delhi, 2010

WEB REFERENCES:

1. <https://archive.nptel.ac.in/courses/108/105/108105112/>
2. <https://archive.nptel.ac.in/courses/108/101/108101091/>
3. <https://www.classcentral.com/course/youtube-electrical-basic-electrical-technology-47680>
4. https://www.youtube.com/results?search_query=digital+electronics+NPTEL
5. <https://www.youtube.com/playlist?list=PLbRMhDVUMnge4gDT0vBWjCb3Lz0HnYKkX>

ONLINE RESOURCES:

1. <https://www.griet.ac.in/nodes/BEEE.pdf>
2. http://www.pcefet.com/common/library/books/39/173_BasicElectricalEngineeringbyV.K.MehtaandRohitMehta.pdf
3. <https://www.academia.edu/34107910/BEEE>
4. <https://in.pinterest.com/pin/pdf-be3251-basic-electrical-and-electronics-engineering-beee-books-lecture--590393832423198787/>
5. <https://www.scribd.com/document/340956975/Beee>

COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students for:

- Drawing engineering curves.
- Drawing a freehand sketch of simple objects.
- Drawing orthographic projection of solids and section of solids.
- Drawing development of solids
- Drawing isometric and perspective projections of simple solids.

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications — Use of drafting instruments — BIS conventions and specifications — Size, layout and folding of drawing sheets — Lettering and dimensioning.

UNIT I PLANE CURVES**6+12**

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE**6+12**

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS AND FREEHAND SKETCHING**6+12**

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles — Representation of Three Dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects.

Practicing three dimensional modeling of simple objects by CAD Software (Not for examination)

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES**6 +12**

Sectioning of above solids in simple vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other — obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones.

Practicing three dimensional modeling of simple objects by CAD Software (Not for examination)

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS

6+12

Principles of isometric projection — isometric scale — isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids - Prisms, pyramids and cylinders by visualray method.

Practicing three dimensional modeling of isometric projection of simple objects by CAD Software (Not for examination)

TOTAL: (L=30+P=60) 90 PERIODS

OUTCOMES:

On successful completion of this course, the student will be able to

- Use BIS conventions and specifications for engineering drawing.
- Construct the conic curves, involutes and cycloid.
- Solve practical problems involving projection of lines.
- Draw the orthographic, isometric and perspective projections of simple solids.
- Draw the development of simple solids.

TEXT BOOK:

1. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 53rd Edition, 2019.
2. Natarajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015

REFERENCES:

1. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, McGraw Hill, 2nd Edition, 2019.
2. Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. Luzzader, Warren.J. and Duff, John M., “Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Parthasarathy N. S. and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
5. Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson Education India, 2nd Edition, 2009.
6. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P)Limited, 2008.

Publication of Bureau of Indian Standards:

1. IS 10711 — 2001: Technical products Documentation — Size and layout of drawing sheets.
2. IS 9609 (Parts 0 & 1) — 2001: Technical products Documentation — Lettering.
3. IS 10714 (Part 20) — 2001 & SP 46 — 2003: Lines for technical drawings.
4. IS 11669 — 1986 & SP 46 — 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) — 2001: Technical drawings — Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only.
4. The students will be permitted to use appropriate scale to fit a solution within A3 size.
5. The examination will be conducted in appropriate sessions on the same day

WEB REFERENCES:

1. <https://archive.nptel.ac.in/courses/112/102/112102304/>
2. <https://nptel.ac.in/courses/112103019>
3. <https://nptel.ac.in/courses/112/105/112105294/>
4. <https://www.classcentral.com/course/swayam-engineering-graphics-and-design-43589>
5. <https://nptel.ac.in/courses/112/103/112103019/>

ONLINE RESOURCES:

1. <https://www.slideshare.net/alurikumaraswamy/engineering-graphics-80165287>
2. <https://easyengineering.net/ge8152-engineering-graphics/>
3. https://www.academia.edu/7867472/ENGINEERING_GRAPHICS
4. <https://www.cousincrewclothing.com/forum/general-discussions/kv-natarajan-engineering-graphics-pdf-free-download>
5. <https://edurev.in/p/68354/Introduction-to-Engineering-Graphics>

COURSE OBJECTIVES:

- To understand the constructs of C Language.
- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop modular applications in C using functions
- To develop applications in C using pointers and structures
- To do input/output and file handling in C

UNIT I BASICS OF C PROGRAMMING**9**

Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives - Compilation process

UNIT II ARRAYS AND STRINGS**9**

Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.

UNIT III FUNCTIONS AND POINTERS**9**

Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

UNIT IV STRUCTURES AND UNION**9**

Structure - Nested structures – Pointer and Structures – Array of structures – Self referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.

UNIT V FILE PROCESSING**9**

Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to
 CO1: Demonstrate knowledge on C Programming constructs
 CO2: Develop simple applications in C using basic constructs

CO3: Design and implement applications using arrays and strings

CO4: Develop and implement modular applications in C using functions.CO5: Develop applications in C using structures and pointers.

CO6: Design applications using sequential and random access file processing.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. ReemaThareja, “Programming in C”, Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2015.

REFERENCES:

1. Paul Deitel and Harvey Deitel, “C How to Program with an Introduction to C++”, Eighth edition, Pearson Education, 2018.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3. Byron S. Gottfried, “Schaum’s Outline of Theory and Problems of Programming with C”, McGraw-Hill Education, 1996.
4. Pradip Dey, Manas Ghosh, “Computer Fundamentals and Programming in C”, Second Edition, Oxford University Press, 2013.
6. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, 1stEdition, Pearson Education, 2013.

WEB REFERENCES:

1. https://onlinecourses.nptel.ac.in/noc22_cs40/preview
2. https://onlinecourses.nptel.ac.in/noc23_cs53/preview
3. <https://archive.nptel.ac.in/courses/106/105/106105171/>
4. <https://www.shiksha.com/online-courses/introduction-to-programming-in-c-course-nptel790>
5. https://onlinecourses.nptel.ac.in/noc23_cs93/preview

ONLINE RESOURCES:

1. https://www.cimat.mx/ciencia_para_jovenes/bachillerato/libros/%5BKernighan-Ritchie%5DThe_C_Programming_Language.pdf
2. https://www.vssut.ac.in/lecture_notes/lecture1424354156.pdf
3. https://progforperf.github.io/Expert_C_Programming.pdf
4. <http://pdvpmtasgaon.edu.in/uploads/dptcomputer/Let%20us%20c%20-%20yashwantkanetkar.pdf>
5. https://www.researchgate.net/publication/320371751_A_Text_Book_of_C_Programming

UNIT I WEAVING AND CERAMIC TECHNOLOGY

3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY

3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during

UNIT III MANUFACTURING TECHNOLOGY

3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel - Copper and gold Coins as source of history - Minting of Coins – Beads making - industries Stone beads - Glass beads - Terracotta beads - Shell beads/ bone beads - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

3

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

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TEXT-CUM-REFERENCE BOOKS

1. தமிழகவரலாறு - மக்களும் பண்பாடும் - கே.கேபிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும் கல்வியியல்பணிகள்கழகம்)

2. கணினிதமிழ்-முனைவர் இல.சுந்தரம் (விகடன் பிரசுரம்).

3. கீழடி-வைகைநதிக்கரையில் சங்ககாலநகரநாகரிகம் (தொல்லியல்துறை வெளியீடு)

4. பொருநை - ஆற்றங்கரைநாகரிகம் (தொல்லியல்துறை வெளியீடு)

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)

7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: 36

International Institute of Tamil Studies.)

9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

24GET202

தமிழரும்தொழில்நுட்பமும்

L T P C
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அலகு 1 நெசவுமற்றும்பாணைத்தொழில்நுட்பம்

சங்ககாலத்தில்நெசவுத்தொழில்-பாணைத்தொழில்நுட்பம்-கருப்பு

சிவப்பு

பாண்டங்கள்- பாண்டாங்கின் கீறல் குறியீடுகள்.

அலகு 2 வடிவமைப்புமற்றும்கட்டிடத்தொழில்நுட்பம்

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டு மானங்கள் & சங்ககாலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு-சங்ககாலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும்-சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள்-மாமல்லபுரச் சிற்பங்களும்,கோவில்களும்-சோழர்காலத்து பெருங்கோவில்கள் மற்றும் பிற வழிபாட்டுத்தளங்கள்-நாயக்கர் காலக் கோவில்கள் – மாதரி கட்டமைப்புகள் பற்றிய அறிதல்,மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால்-செட்டிநாட்டு வீடுகள்-பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக்கலை.

அலகு 3 உற்பத்தித் தொழில்நுட்பம்

கப்பல் கட்டும்கலை-உலோகவியல்-இரும்புத்தொழிற்சாலை-இரும்பைஉருக்குதல்,எஃகு-வரலாற்று சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள்-நாணயங்கள் அச்சடித்தல் –மணி உருவாக்கும் தொழில் சாலைகள்-கல் மணிகள்,கண்ணாடி மணிகள்-சுடுமண் மணிகள்-சங்கு மணிகள்-எலும்புத் துண்டுகள்-தொல்லியல் சான்றுகள்-சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு 4 வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம்

அணை, ஏறி, குளங்கள், மதகு சோழர் கால குமிழித்தூம்பின் முக்கியத்துவம்- கால்நடை பராமரிப்பு- கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள்- வேளாண்மை மற்றும் வேளாண்மைச்சார்ந்த செயல்பாடுகள்-கடல்சார் அறிவு - மீன்வளம் -முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம் .

அலகு 5 அறிவியல் தமிழ் மற்றும் கணிணித் தமிழ்

அறிவியல் தமிழின் வளர்ச்சி - கணிணித் தமிழ் வளர்ச்சி-தமிழ்நூல் களையின் பதிப்பு செய்தல்-தமிழ் மென்பொருட்கள் உருவாக்கம்-தமிழ் இணையக் கல்விகழகம்-தமிழ் மின்நூலகம்-இணையத்தில் தமிழ் அகராதிகள்-சொற் குறைவுத்திட்டம்.

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் - கே.கே பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2. கணிணி தமிழ்-முனைவர் இல.சுந்தரம் (விகடன்பிரசுரம்).
3. கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல்துறைவெளியீடு)
4. பொருறை – ஆற்றங்கரை நாகரிகம் (தொல்லியல்துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: 36 International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

24CSTP101

PROGRAMMING IN C LABORATORY

L T P C

0 0 4 2

COURSE OBJECTIVES:

- To familiarise with C programming constructs.
- To develop programs in C using basic constructs.
- To develop programs in C using arrays.
- To develop applications in C using strings, pointers, functions.
- To develop applications in C using structures.
- To develop applications in C using file processing.

LIST OF EXPERIMENTS:

Note: The lab instructor is expected to design problems based on the topics listed. The Examination shall not be restricted to the sample experiments designed.

1. I/O statements, operators, expressions
2. decision-making constructs: if-else, goto, switch-case, break-continue
3. Loops: for, while, do-while
4. Arrays: 1D and 2D, Multi-dimensional arrays, traversal
5. Strings: operations
6. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
7. Recursion
8. Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers
9. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.
10. Files: reading and writing, File pointers, file operations, random access, processor directives.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

CO1: Demonstrate knowledge on C programming constructs.

CO2: Develop programs in C using basic constructs.

CO3: Develop programs in C using arrays.

CO4: Develop applications in C using strings, pointers, functions.

CO5: Develop applications in C using structures.

CO6: Develop applications in C using file processing.

TEXT BOOKS:

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.
4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1stEdition,

Pearson Education, 2013.

WEB RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc22_cs101/preview
2. https://onlinecourses.nptel.ac.in/noc22_cs40/preview
3. https://onlinecourses.swayam2.ac.in/cec21_cs05/preview
4. <https://www.mygreatlearning.com/academy/learn-for-free/courses/c-for-beginners1>
5. <https://www.guvi.in/courses/programming/c-programming-for-beginners/>

ONLINE RESOURCES:

1. <https://karadev.net/uroci/filespdf/files/a%20book%20on%20c.pdf>
2. [c-programming-step-by-step-beginners-to-experts-edition_compress.pdf](https://c-programming-step-by-step-beginners-to-experts-edition-compress.pdf)
3. https://people.engr.tamu.edu/slupoli/notes/C/supplements/UMBCTraining/IntermediateC_Course.pdf
4. <https://magpi.raspberrypi.com/books/essentials-c-v1>
5. <https://www.e-booksdirectory.com/details.php?ebook=10892>

24GEP201

ENGINEERING PRACTICES LABORATORY

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COURSE OBJECTIVES:

The main learning objective of this course is to provide hands on training to the students in:

1. Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planing; making joints in wood materials used in common household wood work.
2. Wiring various electrical joints in common household electrical wire work.
3. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work.
4. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

GROUP – A (CIVIL & ELECTRICAL)

PART I CIVIL ENGINEERING PRACTICES 15

PLUMBING WORK:

- a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
- b) Preparing plumbing line sketches.
- c) Laying pipe connection to the suction side of a pump
- d) Laying pipe connection to the delivery side of a pump.
- e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:

- a) Sawing,
 - b) Planing and
 - c) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.
- Wood Work Study:
- a) Studying joints in door panels and wooden furniture
 - b) Studying common industrial trusses using models.

PART II ELECTRICAL ENGINEERING PRACTICES 15

- a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
- b) Staircase wiring
- c) Fluorescent Lamp wiring with introduction to CFL and LED types.
- d) Energy meter wiring and related calculations/ calibration
- e) Study of Iron Box wiring and assembly

- f) Study of Fan Regulator (Resistor type and Electronic type using Diac/Triac/quadrac)
- g) Study of emergency lamp wiring/Water heater

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III	MECHANICAL ENGINEERING PRACTICES	15
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WELDING WORK:

- a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
- b) Practicing gas welding.

BASIC MACHINING WORK:

- a) (simple)Turning.
- b) (simple)Drilling.
- c) (simple)Tapping.

ASSEMBLY WORK:

- a) Assembling a centrifugal pump.
- b) Assembling a household mixer.
- c) Assembling an airconditioner.

SHEET METAL WORK:

- a) Making of a square tray

FOUNDRY WORK:

- a) Demonstrating basic foundry operations.

PART IV	ELECTRONIC ENGINEERING PRACTICES	15
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SOLDERING WORK:

- a) Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

- a) Assembling and testing electronic components on a small PCB.

ELECTRONIC EQUIPMENT STUDY:

- a) Study an elements of smart phone..
- b) Assembly and dismantle of LED TV.
- c) Assembly and dismantle of computer/ laptop

TOTAL : 60 PERIODS

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
- Wire various electrical joints in common household electrical wire work.
- Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
- Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

COURSE OBJECTIVES:

- To extend student's logical and mathematical maturity and ability to deal with abstraction.
- To introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
- To understand the basic concepts of combinatorics and graph theory.
- To familiarize the applications of algebraic structures.
- To understand the concepts and significance of lattices and boolean algebra which are widely used in computer science and engineering.

UNIT I LOGIC AND PROOFS**9+3**

Propositional logic – Propositional equivalences - Predicates and quantifiers – Nested quantifiers – Rules of inference - Introduction to proofs – Proof methods and strategy.

UNIT II COMBINATORICS**9+3**

Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions – Inclusion and exclusion principle and its applications.

UNIT III GRAPHS**9+3**

Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT IV ALGEBRAIC STRUCTURES**9+3**

Algebraic systems – Semi groups and monoids - Groups – Subgroups – Homomorphism's – Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

UNIT V LATTICES AND BOOLEAN ALGEBRA**9+3**

Partial ordering – Posets – Lattices as posets – Properties of lattices - Lattices as algebraic systems – Sub lattices – Direct product and homomorphism – Some special lattices – Boolean algebra – Sub Boolean Algebra – Boolean Homomorphism.

TOTAL: 60 PERIODS**COURSE OUTCOMES:**

At the end of the course, students would :

CO1:Have knowledge of the concepts needed to test the logic of a program.

CO2:Have an understanding in identifying structures on many levels.

CO3:Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.

CO4:Be aware of the counting principles.

CO5:Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

TEXT BOOKS:

1. Rosen. K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGrawHill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2017.
2. Tremblay. J.P. and Manohar. R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCES:

1. Grimaldi. R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 5th Edition, Pearson Education Asia, Delhi, 2013.
2. Koshy. T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.
3. Lipschutz. S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGrawHill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

WEB RESOURCES:

1. <https://www.coursera.org/courses?query=discrete%20mathematics>
2. https://onlinecourses.nptel.ac.in/noc22_cs33/preview
3. https://www.udemy.com/course/discrete-math/?srsltid=AfmBOoocf3mbmg1Y1pfxd0BTMjc4KuD34USTxkMm_Jai6v0EQkRxZAot
4. <https://www.edx.org/learn/discrete-mathematics>
5. <https://www.codecademy.com/learn/discrete-math>

Online Resources:

1. <https://discrete.openmathbooks.org/pdfs/dmoi3-tablet.pdf>
2. <https://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf>
3. https://edscl.in/pluginfile.php/2579/mod_resource/content/1/dm%20book%20pdf%20by%20email.pdf
4. <https://broman.dev/download/Discrete%20Mathematics%208th%20Edition.pdf>
5. <https://dpvipracollege.ac.in/wp-content/uploads/2023/01/Discrete-Mathematical-Structures-2nd-Ed.pdf>

COURSE OBJECTIVES:

- To analyze and design combinational circuits.
- To analyze and design sequential circuits
- To understand the basic structure and operation of a digital computer.
- To study the design of data path unit, control unit for processor and to familiarize with the hazards.
- To understand the concept of various memories and I/O interfacing.

UNIT I COMBINATIONAL LOGIC 9

Combinational Circuits – Karnaugh Map - Analysis and Design Procedures – Binary Adder – Subtractor – Decimal Adder - Magnitude Comparator – Decoder – Encoder – Multiplexers – Demultiplexers.

UNIT II SYNCHRONOUS SEQUENTIAL LOGIC 9

Introduction to Sequential Circuits – Flip-Flops – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design – Moore/Mealy models, state minimization, state assignment, circuit implementation - Registers – Counters.

UNIT III COMPUTER FUNDAMENTALS 9

Functional Units of a Digital Computer: Von Neumann Architecture – Operation and Operands of Computer Hardware Instruction – Instruction Set Architecture (ISA): Memory Location, Address and Operation – Instruction and Instruction Sequencing – Addressing Modes, Encoding of Machine Instruction – Interaction between Assembly and High Level Language.

UNIT IV PROCESSOR 9

Instruction Execution – Building a Data Path – Designing a Control Unit – Hardwired Control, Microprogrammed Control – Pipelining – Data Hazard – Control Hazards.

UNIT V MEMORY AND I/O 9

Memory Concepts and Hierarchy – Memory Management – Cache Memories: Mapping and Replacement Techniques – Virtual Memory – DMA – I/O – Accessing I/O: Parallel and Serial Interface – Interrupt I/O – Interconnection Standards: USB, SATA

45 PERIODS**PRACTICAL EXERCISES:****30 PERIODS**

1. Verification of Boolean theorems using logic gates.
2. Design and implementation of combinational circuits using gates for arbitrary functions.
3. Implementation of 4-bit binary adder/subtractor circuits.
4. Implementation of code converters.
5. Implementation of BCD adder, encoder and decoder circuits
6. Implementation of functions using Multiplexers.
7. Implementation of the synchronous counters

8. Implementation of a Universal Shift register.
9. Simulator based study of Computer Architecture

COURSE OUTCOMES:

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

- CO1 :** Design various combinational digital circuits using logic gates
- CO2 :** Design sequential circuits and analyze the design procedures
- CO3 :** State the fundamentals of computer systems and analyze the execution of an instruction
- CO4 :** Analyze different types of control design and identify hazards
- CO5 :** Identify the characteristics of various memory systems and I/O communication

TOTAL:75 PERIODS

TEXT BOOKS

1. M. Morris Mano, Michael D. Ciletti, “Digital Design : With an Introduction to the Verilog HDL, VHDL, and System Verilog”, Sixth Edition, Pearson Education, 2018.
2. David A. Patterson, John L. Hennessy, “Computer Organization and Design, The Hardware/Software Interface”, Sixth Edition, Morgan Kaufmann/Elsevier, 2020.

REFERENCES

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, “Computer Organization and Embedded Systems”, Sixth Edition, Tata McGraw-Hill, 2012.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Tenth Edition, Pearson Education, 2016.
3. M. Morris Mano, “Digital Logic and Computer Design”, Pearson Education, 2016.

WEB RESOURCES:

1. <https://www.youtube.com/playlist?list=PLRvJfry30-23Q0Zn3SCVYiDhbqYJq8ql>
2. https://onlinecourses.nptel.ac.in/noc20_cs64/preview
3. <https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/>
4. <https://libguides.brooklyn.cuny.edu/cisc3310-briskman>
5. <http://vlabs.iitkgp.ernet.in/coa/>

Online Resources:

1. <https://broman.dev/download/Digital%20Logic%20Design%20and%20Computer%20Organization.pdf>
2. <https://www.gacwrmd.in/learning/Computer/7BCEE2A>
Digital%20Principles%20and%20Computer%20Organization.pdf
3. https://www.bau.edu.jo/UserPortal/UserProfile/PostsAttach/43038_4306_1.pdf
4. <https://techknowledgebooks.com/?product=digital-logic-design-and-analysis>
5. <https://www.vidyalankar.org/infinite/assets/docs/study-material/cse-module-2.pdf>

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	2	-	-	-	1	1	2	1			
2	2	2	1	2	2	-	-	-	1	1	1	2			
3	2	1	-	1	1	-	-	-	2	1	1	2			
4	2	2	1	2	2	1	1	-	1	2	1	3			
5	3	2	2	1	2	-	-	-	1	1	2	2			
AVg.	2	2	1	1	2	1	1	-	1	1	1	2			

COURSE OBJECTIVES:

- To understand the data science fundamentals and process.
- To learn to describe the data for the data science process.
- To learn to describe the relationship between data.
- To utilize the Python libraries for Data Wrangling.
- To present and interpret data using visualization libraries in Python

UNIT I INTRODUCTION**9**

Data Science: Benefits and uses – facets of data - Data Science Process: Overview – Defining research goals – Retrieving data – Data preparation - Exploratory Data analysis – build the model– presenting findings and building applications - Data Mining - Data Warehousing – Basic Statistical descriptions of Data

UNIT II DESCRIBING DATA**9**

Types of Data - Types of Variables -Describing Data with Tables and Graphs –Describing Data with Averages - Describing Variability - Normal Distributions and Standard (z) Scores

UNIT III DESCRIBING RELATIONSHIPS**9**

Correlation –Scatter plots –correlation coefficient for quantitative data –computational formula for correlation coefficient – Regression –regression line –least squares regression line – Standard error of estimate – interpretation of r^2 –multiple regression equations –regression towards the mean

UNIT IV PYTHON LIBRARIES FOR DATA WRANGLING**9**

Basics of Numpy arrays –aggregations –computations on arrays –comparisons, masks, boolean logic – fancy indexing – structured arrays – Data manipulation with Pandas – data indexing and selection – operating on data – missing data – Hierarchical indexing – combining datasets – aggregation and grouping – pivot tables

UNIT V DATA VISUALIZATION**9**

Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three dimensional plotting - Geographic Data with Basemap - Visualization with Seaborn.

COURSE OUTCOMES:

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

CO1: Define the data science process

CO2: Understand different types of data description for data science process
CO3: Gain knowledge on relationships between data

CO4: Use the Python Libraries for Data Wrangling

CO5: Apply visualization Libraries in Python to interpret and explore data

TOTAL:45 PERIODS

TEXTBOOKS:

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016. (Unit I)
2. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017. (Units II and III)
3. Jake VanderPlas, "Python Data Science Handbook", O'Reilly, 2016. (Units IV and V)

REFERENCE:

1. Allen B. Downey, "Think Stats: Exploratory Data Analysis in Python", Green Tea Press, 2014.

WEB RESOURCES:

1. <https://www.coursera.org/learn/foundations-of-data-science>
2. https://onlinecourses.swayam2.ac.in/imb23_mg64/preview
3. <https://www.mygreatlearning.com/academy/learn-for-free/courses/data-science-foundations>
5. <https://www.coursera.org/collections/data-science-foundations>

Online Resources:

1. <https://www.cs.cornell.edu/jeh/book.pdf>
2. <https://prathyusha.edu.in/wp-content/uploads/2023/11/DataScience.pdf>
3. https://bmsce.ac.in/Content/ADS/Foundations_of_Data_Science-WEBSITE.pdf
4. https://www.stat.berkeley.edu/~mmahoney/talks/foundations_apr16.pdf
5. <https://www.cs.cornell.edu/jeh/book2016June9.pdf>

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
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4	3	2	2	1	2	-	-	-	1	1	2	2			
5	2	2	1	2	2	-	-	-	1	1	1	2			
AVg.	2	2	1	2	2	1	1	-	1	1	1	2			

COURSE OBJECTIVES:

- To understand the concepts of ADTs
- To design linear data structures – lists, stacks, and queues
- To understand sorting, searching, and hashing algorithms
- To apply Tree and Graph structures

UNIT I ABSTRACT DATA TYPES 9

Abstract Data Types (ADTs) – ADTs and classes – introduction to OOP – classes in Python – inheritance – namespaces – shallow and deep copying
Introduction to analysis of algorithms – asymptotic notations – divide & conquer – recursion – analyzing recursive algorithms

UNIT II LINEAR STRUCTURES 9

List ADT – array-based implementations – linked list implementations – singly linked lists – circularly linked lists – doubly linked lists – Stack ADT – Queue ADT – double ended queues – applications

UNIT III SORTING AND SEARCHING 9

Bubble sort – selection sort – insertion sort – merge sort – quick sort – analysis of sorting algorithms – linear search – binary search – hashing – hash functions – collision handling – load factors, rehashing, and efficiency

UNIT IV TREE STRUCTURES 9

Tree ADT – Binary Tree ADT – tree traversals – binary search trees – AVL trees – heaps – multi-way search trees

UNIT V GRAPH STRUCTURES 9

Graph ADT – representations of graph – graph traversals – DAG – topological ordering – greedy algorithms – dynamic programming – shortest paths – minimum spanning trees – introduction to complexity classes and intractability

TOTAL: 45 PERIODS**COURSE OUTCOMES:**

At the end of the course, the student should be able to:

CO1: Explain abstract data types

CO2: Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications

CO3: Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting

CO4: Model problems as graph problems and implement efficient graph algorithms to solve them

TEXT BOOK:

1. Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser, "Data Structures & Algorithms in Python", An Indian Adaptation, John Wiley & Sons Inc., 2021

REFERENCES:

1. Lee, Kent D., Hubbard, Steve, "Data Structures and Algorithms with Python" Springer Edition 2015
2. Rance D. Necaise, "Data Structures and Algorithms Using Python", John Wiley & Sons, 2011
3. Aho, Hopcroft, and Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, "Introduction to Algorithms", Second Edition, McGraw Hill, 2002.
5. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Fourth Edition, Pearson Education, 2014

WEB RESOURCES:

1. <https://www.coursera.org/courses?query=data%20structures%20and%20algorithms>
2. https://www.udemy.com/topic/data-structures/?srsltid=AfmBOooLvS_xc82uD8ogDqFlcIgCEjbJmFxP00jZf2fiSSFYpNBNfEp
3. <https://www.geeksforgeeks.org/courses/dsa-self-paced>
4. <https://www.edx.org/learn/data-structures>
5. <https://www.coursera.org/learn/algorithms-part1>

Online Resources:

1. <https://www.mta.ca/~rrosebru/oldcourse/263114/Dsa.pdf>
2. https://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/DataStructures.pdf
3. https://sar.ac.id/stmik_ebook/prog_file_file/AV9H5tskeH.pdf
4. <https://github.com/codemistic/Data-Structures-and-Algorithms/blob/main/DSA-revision-guide.pdf>
5. https://www.cet.edu.in/noticefiles/280_DS%20Complete.pdf

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	3	3	0	0	0	0	0	0	2	3	1	3
2	3	3	3	3	3	0	0	0	0	0	0	2	3	1	3
3	3	2	3	3	3	0	0	0	0	0	0	2	3	1	3
4	3	3	2	2	2	0	0	0	0	0	0	2	3	1	3
5	3	3	2	2	2	0	0	0	0	0	0	2	3	1	3
AVg.	3	3	3	3	3	0	0	0	0	0	0	2	2	1	3

COURSE OBJECTIVES:

- To understand Object Oriented Programming concepts and basics of Java programming language
- To know the principles of packages, inheritance and interfaces
- To develop a java application with threads and generics classes
- To define exceptions and use I/O streams
- To design and build Graphical User Interface Application using JAVA FX

UNIT I INTRODUCTION TO OOP AND JAVA**9**

Overview of OOP – Object oriented programming paradigms – Features of Object Oriented Programming – Java Buzzwords – Overview of Java – Data Types, Variables and Arrays – Operators – Control Statements – Programming Structures in Java – Defining classes in Java – Constructors-Methods -Access specifiers - Static members- JavaDoc comments

UNIT II INHERITANCE, PACKAGES AND INTERFACES**9**

Overloading Methods – Objects as Parameters – Returning Objects –Static, Nested and Inner Classes. Inheritance: Basics– Types of Inheritance -Super keyword -Method Overriding – Dynamic Method Dispatch –Abstract Classes – final with Inheritance. Packages and Interfaces: Packages – Packages and Member Access –Importing Packages – Interfaces.

UNIT III EXCEPTION HANDLING AND MULTITHREADING**9**

Exception Handling basics – Multiple catch Clauses – Nested try Statements – Java's Built-in Exceptions – User defined Exception. Multithreaded Programming: Java Thread Model–Creating a Thread and Multiple Threads – Priorities – Synchronization – Inter Thread Communication- Suspending –Resuming, and Stopping Threads –Multithreading. Wrappers – Auto boxing.

UNIT IV I/O, GENERICS, STRING HANDLING**9**

I/O Basics – Reading and Writing Console I/O – Reading and Writing Files. Generics: Generic Programming – Generic classes – Generic Methods – Bounded Types – Restrictions and Limitations. Strings: Basic String class, methods and String Buffer Class..

UNIT V JAVA FX EVENT HANDLING, CONTROLS AND COMPONENTS**9**

JAVA FX Events and Controls: Event Basics – Handling Key and Mouse Events. Controls: Checkbox, ToggleButton – RadioButtons – ListView – ComboBox – ChoiceBox – Text Controls – ScrollPane. Layouts – FlowPane – HBox and VBox – BorderPane – StackPane – GridPane. Menus – Basics – Menu – Menu bars – MenuItem.

COURSE OUTCOMES:

On completion of this course, the students will be able to

CO1:Apply the concepts of classes and objects to solve simple problems

CO2:Develop programs using inheritance, packages and interfaces

CO3:Make use of exception handling mechanisms and multithreaded model to solve real world problems

CO4:Build Java applications with I/O packages, string classes, Collections and generics concepts

CO5:Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications

TOTAL:45 PERIODS

TEXT BOOKS:

1. Herbert Schildt, “Java: The Complete Reference”, 11th Edition, McGraw Hill Education, New Delhi, 2019
2. Herbert Schildt, “Introducing JavaFX 8 Programming”, 1st Edition, McGraw Hill Education, New Delhi, 2015

REFERENCE:

1. Cay S. Horstmann, “Core Java Fundamentals”, Volume 1, 11th Edition, Prentice Hall, 2018.

WEB RESOURCES:

1. <https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/>
2. https://www.w3schools.com/java/java_oop.asp
3. <https://www.javatpoint.com/java-oops-concepts>
4. <https://www.coursera.org/specializations/object-oriented-programming>
5. <https://www.oracle.com/java/technologies/oop.html>

Online Resources:

1. https://baou.edu.in/assets/pdf/BSCIT_304_slm.pdf
2. <https://library.uc.edu.kh/userfiles/pdf/8.Fundamentals%20of%20OOP%20and%20Data%20Structures%20in%20Java.pdf>
3. <https://www.stannescet.ac.in/cms/staff/qbank/EEE/Notes/CS8392-OBJECT%20ORIENTED%20PROGRAMMING-1825148287%20CS8392%20OOPS%20%20notes.pdf>
4. https://kp.kiit.ac.in/pdf_files/06/STUDY_MATERIAL_3RD_CSE_OBJECT_ORIENTED_METHODODOLOGY.pdf
5. https://vemu.org/uploads/lecture_notes/04_01_2020_376566432.pdf

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	3	1	3	-	-	-	3	2	2	2			
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4	3	1	2	2	2	-	-	-	1	2	1	3			
5	1	1	2	3	2	-	-	-	3	2	1	2			
AVg.	2	1	2	2	2	-	-	-	2	2	1	2			

COURSE OBJECTIVES:

- To implement ADTs in Python
- To design and implement linear data structures – lists, stacks, and queues
- To implement sorting, searching and hashing algorithms
- To solve problems using tree and graph structures

LIST OF EXPERIMENTS:

1. Implement simple ADTs as Python classes
2. Implement recursive algorithms in Python
3. Implement List ADT using Python arrays
4. Linked list implementations of List
5. Implementation of Stack and Queue ADTs
6. Applications of List, Stack and Queue ADTs
7. Implementation of sorting and searching algorithms
8. Implementation of Hash tables
9. Tree representation and traversal algorithms
10. Implementation of Binary Search Trees
11. Implementation of Heaps
12. Graph representation and Traversal algorithms
13. Implementation of single source shortest path algorithm
14. Implementation of minimum spanning tree algorithms

COURSE OUTCOMES:

At the end of the course, the student should be able to:

CO1:Implement ADTs as Python classes

CO2:Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications

CO3:Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting

CO4:Model problems as graph problems and implement efficient graph algorithms to solve them

TOTAL:60 PERIODS

TEXT BOOK:

1. Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser, “Data Structures & Algorithms in Python”, John Wiley & Sons Inc., 2013

REFERENCES:

1. Rance D. Nicaise, “Data Structures and Algorithms Using Python”, John Wiley & Sons, 2011
2. Aho, Hopcroft, and Ullman, “Data Structures and Algorithms”, Pearson Education, 1983.
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, “Introduction to Algorithms”, Second Edition, McGraw Hill, 2002.
4. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Fourth Edition, Pearson Education, 2014

COURSE OBJECTIVES

- To build software development skills using java programming for real-world applications.
- To understand and apply the concepts of classes, packages, interfaces, inheritance, exception handling and file processing.
- To develop applications using generic programming and event handling

LIST OF EXPERIMENTS

1. Solve problems by using sequential search, binary search, and quadratic sorting algorithms (selection, insertion)
2. Develop stack and queue data structures using classes and objects.
3. Develop a java application with an Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club funds. Generate pay slips for the employees with their gross and net salary.
4. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea() that prints the area of the given shape.
5. Solve the above problem using an interface.
6. Implement exception handling and creation of user defined exceptions.
7. Write a java program that implements a multi-threaded application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
8. Write a program to perform file operations.
9. Develop applications to demonstrate the features of generics classes.
10. Develop applications using JavaFX controls, layouts and menus.
11. Develop a mini project for any application using Java concepts.

Lab Requirements: for a batch of 30 students

Operating Systems: Linux / Windows

Front End Tools: Eclipse IDE / Netbeans IDE

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of this course, the students will be able to

CO1 : Design and develop java programs using object oriented programming concepts

CO2 : Develop simple applications using object oriented concepts such as package, exceptions

CO3: Implement multithreading, and generics concepts

CO4 : Create GUIs and event driven programming applications for real world problems

CO5: Implement and deploy web applications using Java

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
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3	2	2	1	2	1	-	-	-	1	2	1	3			
4	2	2	1	3	-	-	-	-	3	1	1	1			
5	1	3	3	1	3	-	-	-	1	1	1	1			
AVg.	2	2	2	2	2	-	-	-	2	2	2	2			

COURSE OBJECTIVES:

- To understand the python libraries for data science
- To understand the basic Statistical and Probability measures for data science.
- To learn descriptive analytics on the benchmark data sets.
- To apply correlation and regression analytics on standard data sets.
- To present and interpret data using visualization packages in Python.

LIST OF EXPERIMENTS:

1. Download, install and explore the features of NumPy, SciPy, Jupyter, Statsmodels andPandas packages.
2. Working with Numpy arrays
3. Working with Pandas data frames
4. Reading data from text files, Excel and the web and exploring various commands for doing descriptive analytics on the Iris data set.
5. Use the diabetes data set from UCI and Pima Indians Diabetes data set for performing the following:
 - a. Univariate analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis.
 - b. Bivariate analysis: Linear and logistic regression modeling
 - c. Multiple Regression analysis
 - d. Also compare the results of the above analysis for the two data sets.
6. Apply and explore various plotting functions on UCI data sets.
 - a. Normal curves
 - b. Density and contour plots
 - c. Correlation and scatter plots
 - d. Histograms
 - e. Three dimensional plotting
7. Visualizing Geographic Data with Basemap

List of Equipments:(30 Students per Batch)

Tools: Python, Numpy, Scipy, Matplotlib, Pandas, statmodels, seaborn, plotly, bokeh

Note: Example data sets like: UCI, Iris, Pima Indians Diabetes etc.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- CO1:** Make use of the python libraries for data science
- CO2:** Make use of the basic Statistical and Probability measures for data science.
- CO3:** Perform descriptive analytics on the benchmark data sets.
- CO4:** Perform correlation and regression analytics on standard data sets
- CO5:** Present and interpret data using visualization packages in Python.

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
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4	2	3	1	3	-	-	-	-	2	3	2	3			
5	1	2	3	1	1	-	-	-	2	1	3	1			
AVg.	2	2	2	2	1	-	-	-	2	2	2	2			

OBJECTIVES:

To be proficient in important Microsoft Office tools: MS WORD, EXCEL, POWERPOINT.

- To be proficient in using MS WORD to create quality technical documents, by using standard templates, widely acceptable styles and formats, variety of features to enhance the presentability and overall utility value of content.
- To be proficient in using MS EXCEL for all data manipulation tasks including the common statistical, logical, mathematical etc., operations, conversion, analytics, search and explore, visualize, interlink, and utilizing many more critical features offered
- To be able to create and share quality presentations by using the features of MS PowerPoint, including: organization of content, presentability, aesthetics, using media elements and enhance the overall quality of presentations.

MS WORD:**10 Hours**

Create and format a

documentWorking with

tables

Working with Bullets and Lists

Working with styles, shapes, smart art, charts

Inserting objects, charts and importing objects from other office

toolsCreating and Using document templates

Inserting equations, symbols and special characters

Working with Table of contents and References,

citationsInsert and review comments

Create bookmarks, hyperlinks, endnotes

footnoteViewing document in different modes

Working with document protection and

securityInspect document for accessibility

MS EXCEL:**10 Hours**

Create worksheets, insert and format data

Work with different types of data: text, currency, date, numeric etc.Split, validate, consolidate, Convert data Sort and filter data

Perform calculations and use functions: (Statistical, Logical, Mathematical, date, Time etc.,)Work with Lookup and reference formulae

Create and Work with different types of charts Use pivot tables to summarize and analyse data
Perform data analysis using own formulae and functions

Combine data from multiple worksheets using own formulae and built-in functions to
generateresults

Export data and sheets to other file
formatsWorking with macros
Protecting data and Securing the workbook

MS POWERPOINT:

10 Hours

Select slide templates, layout and themes

Formatting slide content and using bullets and
numberingInsert and format images, smart art, tables,
charts

Using Slide master, notes and handout master

Working with animation and transitions

Organize and Group slides

Import or create and use media objects: audio, video, animation

Perform slideshow recording and Record narration and create presentable videos

TOTAL: 30 PERIODS

OUTCOMES:

On successful completion the students will be able to

- Use MS Word to create quality documents, by structuring and organizing content fortheir day to day technical and academic requirements
- Use MS EXCEL to perform data operations and analytics, record, retrieve data as perrequirements and visualize data for ease of understanding
- Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

COURSE OBJECTIVES:

- To understand foundations of computation including automata theory
- To construct models of regular expressions and languages.
- To design context free grammar and push down automata
- To understand Turing machines and their capability
- To understand Undecidability and NP class problems

UNIT I AUTOMATA AND REGULAR EXPRESSIONS 9

Need for automata theory - Introduction to formal proof – Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Equivalence between NFA and DFA –Finite Automata with Epsilon transitions – Equivalence of NFA and DFA- Equivalence of NFAs with and without ϵ -moves- Conversion of NFA into DFA – Minimization of DFAs.

UNIT II REGULAR EXPRESSIONS AND LANGUAGES 9

Regular expression – Regular Languages- Equivalence of Finite Automata and regular expressions – Proving languages to be not regular (Pumping Lemma) – Closure properties of regular languages.

UNIT III CONTEXT FREE GRAMMAR AND PUSH DOWN AUTOMATA 9

Types of Grammar - Chomsky's hierarchy of languages -Context-Free Grammar (CFG) and Languages – Derivations and Parse trees – Ambiguity in grammars and languages – Push Down Automata (PDA): Definition – Moves - Instantaneous descriptions -Languages of pushdown automata – Equivalence of pushdown automata and CFG-CFG to PDA-PDA to CFG – Deterministic Pushdown Automata.

UNIT IV NORMAL FORMS AND TURING MACHINES 9

Normal forms for CFG – Simplification of CFG- Chomsky Normal Form (CNF) and Greibach Normal Form (GNF) – Pumping lemma for CFL – Closure properties of Context Free Languages – Turing Machine : Basic model – definition and representation – Instantaneous Description – Language acceptance by TM – TM as Computer of Integer functions – Programming techniques for Turing machines (subroutines).

UNIT V UNDECIDABILITY 9

Unsolvable Problems and Computable Functions –PCP-MPCP- Recursive and recursively enumerable languages – Properties - Universal Turing machine -Tractable and Intractable problems - P and NP completeness – Kruskal's algorithm – Travelling Salesman Problem- 3-CNF SAT problems.

TOTAL:45 PERIODS

COURSE OUTCOMES:

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

CO1: Construct automata theory using Finite Automata

CO2: Write regular expressions for any pattern

CO3: Design context free grammar and Pushdown Automata

CO4: Design Turing machine for computational functions

CO5: Differentiate between decidable and undecidable problems

TEXT BOOKS:

1.Hopcroft J.E., Motwani R. & Ullman J.D., "Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, 2008.

2.John C Martin , "Introduction to Languages and the Theory of Computation", 4th Edition, TataMcGraw Hill, 2011.

REFERENCES

1.Harry R Lewis and Christos H Papadimitriou , "Elements of the Theory of Computation", 2ndEdition, Prentice Hall of India, 2015.

2.Peter Linz, "An Introduction to Formal Language and Automata", 6th Edition, Jones & Bartlett,2016.

3. K.L.P.Mishra and N.Chandrasekaran, "Theory of Computer Science: Automata Languages and Computation", 3rd Edition, Prentice Hall of India, 2006.

WEB RESOURCES:

1. <https://www.coursera.org/courses?query=theory%20of%20computation>
2. https://onlinecourses.nptel.ac.in/noc19_cs79/preview
3. <https://www.udemy.com/course/the-complete-theory-of-computation/?srsltid=AfmBOoqJPoz2axI2tvLXL-Hs6arbrixltctirBGh-ah8A8BVyURDWspR>
4. <https://online.stanford.edu/courses/cs154-introduction-theory-computation>
5. <https://www.goclasses.in/courses/Theory-of-Computation-60fdd9810cf2279d7d966677>

Online Resources:

1. <https://cglab.ca/~michiell/TheoryOfComputation/TheoryOfComputation.pdf>
2. <https://fuuu.be/polytech/INFOF408/Introduction-To-The-Theory-Of-Computation-Michael-Sipser.pdf>
3. https://ac.informatik.uni-freiburg.de/teaching/ss_23/tcs_bridging/book/Introduction_to_the_theory_of_computation_by_Michael_Sipser.pdf
4. <https://mu.ac.in/wp-content/uploads/2022/09/Theory-of-Computation-1.pdf>
5. <https://www.freebookcentre.net/CompuScience/Free-Computation-Theory-BooksDownload.html>

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
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1	1	3	2	3	-	-	-	-	1	1	2	3			
2	2	2	3	2	1	-	-	-	3	3	2	3			
3	2	2	3	2	1	-	-	-	1	3	1	2			
4	2	2	2	1	-	-	-	-	1	3	3	2			
5	2	2	2	1	1	-	-	-	1	1	3	2			
AVg.	2	2	2	2	1	-	-	-	1	2	2	2			

COURSE OBJECTIVES:

The main objectives of this course are to:

- Study about uninformed and Heuristic search techniques.
- Learn techniques for reasoning under uncertainty
- Introduce Machine Learning and supervised learning algorithms
- Study about ensembling and unsupervised learning algorithms
- Learn the basics of deep learning using neural networks

UNIT I PROBLEM SOLVING 9

Introduction to AI - AI Applications - Problem solving agents – search algorithms – uninformed search strategies – Heuristic search strategies – Local search and optimization problems – adversarial search – constraint satisfaction problems (CSP)

UNIT II PROBABILISTIC REASONING 9

Acting under uncertainty – Bayesian inference – naïve bayes models. Probabilistic reasoning – Bayesian networks – exact inference in BN – approximate inference in BN – causal networks.

UNIT III SUPERVISED LEARNING 9

Introduction to machine learning – Linear Regression Models: Least squares, single & multiple variables, Bayesian linear regression, gradient descent, Linear Classification Models: Discriminant function – Probabilistic discriminative model - Logistic regression, Probabilistic generative model – Naïve Bayes, Maximum margin classifier – Support vector machine, Decision Tree, Random forests

UNIT IV ENSEMBLE TECHNIQUES AND UNSUPERVISED LEARNING 9

Combining multiple learners: Model combination schemes, Voting, Ensemble Learning - bagging, boosting, stacking, Unsupervised learning: K-means, Instance Based Learning: KNN, Gaussian mixture models and Expectation maximization

UNIT V NEURAL NETWORKS 9

Perceptron - Multilayer perceptron, activation functions, network training – gradient descent optimization – stochastic gradient descent, error backpropagation, from shallow networks to deep networks – Unit saturation (aka the vanishing gradient problem) – ReLU, hyperparameter tuning, batch normalization, regularization, dropout.

45 PERIODS
30 PERIODS

PRACTICAL EXERCISES:

1. Implementation of Uninformed search algorithms (BFS, DFS)
2. Implementation of Informed search algorithms (A*, memory-bounded A*)
3. Implement naïve Bayes models
4. Implement Bayesian Networks
5. Build Regression models

6. Build decision trees and random forests
7. Build SVM models
8. Implement ensembling techniques
9. Implement clustering algorithms
10. Implement EM for Bayesian networks
11. Build simple NN models
12. Build deep learning NN models

COURSE OUTCOMES:

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

CO1: Use appropriate search algorithms for problem solving CO2: Apply reasoning under uncertainty

CO3: Build supervised learning models

CO4: Build ensembling and unsupervised models CO5: Build deep learning neural network models

TOTAL: 75 PERIODS

Text Books:

1. Stuart Russell and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2021.
2. Ethem Alpaydin, “Introduction to Machine Learning”, MIT Press, Fourth Edition, 2020.

REFERENCES:

1. Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”, Pearson Education, 2007
2. Kevin Night, Elaine Rich, and Nair B., “Artificial Intelligence”, McGraw Hill, 2008
3. Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006
4. Deepak Khemani, “Artificial Intelligence”, Tata McGraw Hill Education, 2013(<http://nptel.ac.in/>)
5. Christopher M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2006.
6. Tom Mitchell, “Machine Learning”, McGraw Hill, 3rd Edition, 1997.
7. Charu C. Aggarwal, “Data Classification Algorithms and Applications”, CRC Press, 2014
8. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, “Foundations of Machine Learning”, MIT Press, 2012.
9. Ian Good fellow, Yoshua Bengio, Aaron Courville, “Deep Learning”, MIT Press, 2016.

WEB RESOURCES:

1. <https://www.coursera.org/courses?query=artificial%20intelligence>
2. https://www.udemy.com/topic/artificial-intelligence/?srsltid=AfmBOoooVLZGq5ROWM5VVqcW4-l8dFfbrzc9xQTRIZJG6bUwbUhl_uyx
3. https://www.udemy.com/topic/artificial-intelligence/?srsltid=AfmBOoooVLZGq5ROWM5VVqcW4-l8dFfbrzc9xQTRIZJG6bUwbUhl_uyx
4. <https://aws.amazon.com/training/learn-about/machine-learning/>
5. <https://www.coursera.org/collections/best-machine-learning-ai>

Online Resources:

1. <https://mimo.mit.edu/wp-content/uploads/2023/03/mimoDLW23.pdf>
2. <https://prathamaupbank.com/img/index.php?u=/product/artificial-intelligence-and-machine-learning-an-intelligent-perspective-of-emerging-technologies/>
3. https://www.researchgate.net/publication/337714209_Artificial_Intelligence_and_Machine_Learning_Applications_in_Smart_Production_Progress_Trends_and_Directions
4. https://beta.gujaratuniversity.ac.in/Uploads/Department/News/News_20220608162255.pdf
5. <https://www.nerc.com/pa/rrm/bpsa/Documents/Whitepaper-AI%20and%20ML%20in%20Real-Time%20System%20Operations.pdf>

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
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1	3	2	3	3	-	-	-	-	1	3	3	3			
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3	2	1	2	1	1	-	-	-	2	1	1	3			
4	3	1	3	1	-	-	-	-	2	1	2	1			
5	3	1	1	2	2	-	-	-	3	1	2	3			
AVg.	2	1	2	2	1	-	-	-	2	2	2	3			

OBJECTIVES:

- To learn the fundamentals of data models, relational algebra and SQL
- To represent a database system using ER diagrams and to learn normalization techniques
- To understand the fundamental concepts of transaction, concurrency and recovery processing
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design
- To have an introductory knowledge about the Distributed databases, NOSQL and database security

UNIT I RELATIONAL DATABASES 10

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL – Dynamic SQL

UNIT II DATABASE DESIGN 8

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

UNIT III TRANSACTIONS 9

Transaction Concepts – ACID Properties – Schedules – Serializability – Transaction support in SQL – Need for Concurrency – Concurrency control – Two Phase Locking – Timestamp – Multiversion – Validation and Snapshot isolation – Multiple Granularity locking – Deadlock Handling – Recovery Concepts – Recovery based on deferred and immediate update – Shadow paging – ARIES Algorithm

UNIT IV IMPLEMENTATION TECHNIQUES 9

RAID – File Organization – Organization of Records in Files – Data dictionary Storage – Column Oriented Storage – Indexing and Hashing – Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for Selection, Sorting and join operations – Query optimization using Heuristics – Cost Estimation.

UNIT V ADVANCED TOPICS 9

Distributed Databases: Architecture, Data Storage, Transaction Processing, Query processing and optimization – NOSQL Databases: Introduction – CAP Theorem – Document Based systems – Key value Stores – Column Based Systems – Graph Databases. Database Security: Security issues – Access control based on privileges – Role Based access control – SQL Injection – Statistical Database security – Flow control – Encryption and Public Key infrastructures – Challenges

COURSE OUTCOMES:

Upon completion of this course, the students will be

able to

CO1:Construct SQL Queries using relational algebra

CO2:Design database using ER model and normalize the database

CO3:Construct queries to handle transaction processing and maintain consistency of the database

CO4:Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database

CO5:Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.

TOTAL:45 PERIODS

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts",Seventh Edition, McGraw Hill, 2020.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", SeventhEdition, Pearson Education, 2017

REFERENCES:

1. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

WEB RRESOURCES:

1. <https://www.coursera.org/courses?query=database%20management>
2. https://www.udemy.com/topic/databasemanagement/?srltid=AfmBOopbhTChLh0g3PsQtC8dac2Qf8iSoq_Q5tQ8D64OlbsVJidtRYRS
3. https://www.udemy.com/topic/database-management/?srltid=AfmBOopbhTChLh0g3PsQtC8dac2Qf8iSoq_Q5tQ8D64OlbsVJidtRYRS
4. https://onlinecourses.nptel.ac.in/noc19_cs46/preview
5. <https://www.geeksforgeeks.org/dbms/>

Online Resources:

1. https://www.cet.edu.in/noticefiles/279_DBMS%20Complete1.pdf
2. <https://www.slideshare.net/slideshow/dbms-notespdf/265549380>
3. <https://bcanpm.com/database-management-systems-notes/>
4. [https://webweb.ams3.cdn.digitaloceanspaces.com/data/simmcdev.webweb.ai.in/MCAdigitalbook/DBMS-20240629T071926Z-001/DBMS%20korth.pdf%20\(%20PDFDrive%20\).pdf](https://webweb.ams3.cdn.digitaloceanspaces.com/data/simmcdev.webweb.ai.in/MCAdigitalbook/DBMS-20240629T071926Z-001/DBMS%20korth.pdf%20(%20PDFDrive%20).pdf)
5. <https://github.com/AatmikJain/ComputerScienceBooks/blob/master/Database%20Systems%20-%20Navathe.pdf>

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	3	2	1	-	-	-	2	1	1	1			
2	3	1	1	1	1	-	-	-	2	3	3	3			
3	3	2	3	2	1	-	-	-	2	1	1	2			
4	1	2	3	2	-	-	-	-	3	2	3	3			
5	1	1	3	3	2	-	-	-	1	3	3	1			
AVg.	2	2	3	2	1	-	-	-	2	2	2	2			

COURSE OBJECTIVES:

- To comprehend and analyze the basic concepts of web programming and internet protocols.
- To describe how the client-server model of Internet programming works.
- To demonstrate the uses of scripting languages
- To write simple scripts for the creation of web sites
- To create database applications

UNIT I WEBSITE BASICS**9**

Internet Overview - Fundamental computer network concepts - Web Protocols - URL – Domain Name- Web Browsers and Web Servers- Working principle of a Website –Creating a Website - Client-side and server-side scripting

UNIT II WEB DESIGNING**9**

HTML – Form Elements - Input types and Media elements - CSS3 - Selectors, Box Model, Backgrounds and Borders, Text Effects, Animations, Multiple Column Layout, User Interface.

UNIT III CLIENT-SIDE PROCESSING AND SCRIPTING**9**

JavaScript Introduction – Variables and Data Types-Statements – Operators - Literals- Functions- Objects-Arrays-Built-in Objects- Regular Expression, Exceptions, Event handling, Validation - JavaScript Debuggers.

UNIT IV SERVER SIDE PROCESSING AND SCRIPTING – PHP**9**

PHP - Working principle of PHP - PHP Variables - Constants - Operators – Flow Control and Looping - Arrays - Strings - Functions - File Handling - File Uploading – Email Basics - Email with attachments - PHP and HTML - Simple PHP scripts - Databases with PHP

UNIT V SERVLETS AND DATABASE CONNECTIVITY**9**

Servlets: Java Servlet Architecture – Servlet Life cycle- Form GET and POST actions - Sessions – Cookies – Database connectivity – JDBC Creation of simple interactive applications - Simple database applications

45 PERIODS**PRACTICAL EXERCISES:****30 PERIODS**

1. Creation of interactive web sites - Design using HTML and authoring tools
2. Form validation using JavaScript
3. Creation of simple PHP scripts
4. Handling multimedia content in web sites
5. Write programs using Servlets:
 - a. To invoke servlets from HTML forms
 - b. Session tracking using hidden form fields and Session tracking for a hit count
6. Creation of information retrieval system using web, PHP and MySQL
7. Creation of personal Information System

COURSE OUTCOMES:

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

CO 1: Apply JavaScript, HTML and CSS effectively to create interactive and dynamic websites.

CO 2: Create simple PHP scripts

CO 3: Design and deploy simple web-applications.

CO 4: Create simple database applications.

CO 5: Handle multimedia components.

TOTAL:75 PERIODS

TEXT BOOKS

1. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, O'Reilly publishers, 2014.
2. Paul Deitel, Harvey Deitel, Abbey Deitel, "Internet & World Wide Web - How to Program", 5th edition, Pearson Education, 2012.

REFERENCES:

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.
2. James F. Kurose, "Computer Networking: A Top-Down Approach", Sixth Edition, Pearson Education, 2012
3. Steven Holzener, "PHP – The Complete Reference", 1st Edition, Mc-Graw Hill, 2017
4. Fritz Schneider, Thomas Powell, "JavaScript – The Complete Reference", 3rd Edition, Mc-Graw Hill Publishers, 2017
5. Bates, "Developing Web Applications", Wiley Publishers, 2006

WEB RESOURCES:

1. <https://www.coursera.org/courses?query=web%20technologies>
2. <https://www.geeksforgeeks.org/web-technology/>
3. https://onlinecourses.swayam2.ac.in/nou24_cs09/preview
4. <https://www.udemy.com/course/web-technology-for-entrepreneurs/?srsltid=AfmBOoot0CVGDmS9OZrcP86hrkyjDi4DXPw1bYCoNQ7Bn3A9Fgcs9vJL>
5. <https://www.shiksha.com/online-courses/web-technologies-certification>

Online Resources:

1. <https://www.scribd.com/document/507460884/Web-Technology-Notes>
2. <https://www.rgm cet.edu.in/assets/img/departments/CSE/materials/R15/3-2/Web%20Technologies.pdf>
3. <https://www.freebookcentre.net/Web/webCategory.html>
4. https://mec.edu.in/mvlc/ppt/1_mca/ppt_wt.pdf
5. <https://www.freebookcentre.net/networking-books-download/Internet-and-Web-Technology.html>

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3	3	3	3	2	3	2	0	0	2	2	2	3	3	2	1
4	3	3	3	3	3	1	0	0	1	1	2	3	3	2	1
5	3	3	3	3	3	1	0	0	0	0	2	3	3	2	1
AVg.	3	3	3	3	3	2	0	0	2	1	2	3	3	2	1

COURSE OBJECTIVES:

- To understand the basics and functions of operating systems.
- To understand processes and threads
- To analyze scheduling algorithms and process synchronization.
- To understand the concept of deadlocks.
- To analyze various memory management schemes.
- To be familiar with I/O management and file systems.
- To be familiar with the basics of virtual machines and Mobile OS like iOS and Android.

UNIT I INTRODUCTION 7

Computer System - Elements and organization; Operating System Overview - Objectives and Functions - Evolution of Operating System; Operating System Structures – Operating System Services - User Operating System Interface - System Calls – System Programs - Design and Implementation - Structuring methods.

UNIT II PROCESS MANAGEMENT 11

Processes - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication; CPU Scheduling - Scheduling criteria - Scheduling algorithms: Threads - Multithread Models – Threading issues; Process Synchronization - The Critical-Section problem - Synchronization hardware – Semaphores – Mutex - Classical problems of synchronization - Monitors; Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT III MEMORY MANAGEMENT 10

Main Memory - Swapping - Contiguous Memory Allocation – Paging - Structure of the Page Table - Segmentation, Segmentation with paging; Virtual Memory - Demand Paging – Copy on Write - Page Replacement - Allocation of Frames –Thrashing.

UNIT IV STORAGE MANAGEMENT 10

Mass Storage system – Disk Structure - Disk Scheduling and Management; File-System Interface - File concept - Access methods - Directory Structure - Directory organization - File system mounting - File Sharing and Protection; File System Implementation - File System Structure - Directory implementation - Allocation Methods - Free Space Management; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem.

UNIT V VIRTUAL MACHINES AND MOBILE OS 7

Virtual Machines – History, Benefits and Features, Building Blocks, Types of Virtual Machines and their Implementations, Virtualization and Operating-System Components; Mobile OS - iOS and Android.

TOTAL:45 PERIODS

COURSE OUTCOMES:

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

CO1 : Analyze various scheduling algorithms and process synchronization.

CO2 : Explain deadlock prevention and avoidance algorithms.

CO3 : Compare and contrast various memory management schemes.

CO4 : Explain the functionality of file systems, I/O systems, and Virtualization

CO5 : Compare iOS and Android Operating Systems.

TEXT BOOKS :

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 10th Edition, John Wiley and Sons Inc., 2018.
2. Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition, 2022 New Delhi.

REFERENCES :

1. Ramaz Elmasri, A. Gil Carrick, David Levine, “ Operating Systems – A Spiral Approach”, Tata McGraw Hill Edition, 2010.
2. William Stallings, "Operating Systems: Internals and Design Principles", 7th Edition, Prentice Hall, 2018.
3. Achyut S. Godbole, Atul Kahate, “Operating Systems”, McGraw Hill Education, 2016.

WEB RESOURCES:

1. <https://www.coursera.org/courses?query=operating%20system>
2. <https://www.coursera.org/learn/os-power-user>
3. https://onlinecourses.nptel.ac.in/noc20_cs04/preview
4. <https://www.scaler.com/topics/course/free-operating-system-course/>
5. <https://www.edx.org/learn/operating-systems>

Online Resources:

1. <https://csc-knu.github.io/sys-prog/books/Andrew%20S.%20Tanenbaum%20-%20Modern%20Operating%20Systems.pdf>
2. https://techiefood4u.files.wordpress.com/2020/02/operating_systems_three_easy_pieces.pdf
3. <https://web.uettaxila.edu.pk/CMS/AUT2011/seAOSbs/notes/Text%20-%20Silberschatz.Galvin%20-%20Operating.System.Concepts.7th.pdf>
4. [https://drive.uqu.edu.sa/_/mskhayat/files/MySubjects/2017SS%20Operating%20Systems/Abraham%20SilberschatzOperating%20System%20Concepts%20\(9th,2012_12\).pdf](https://drive.uqu.edu.sa/_/mskhayat/files/MySubjects/2017SS%20Operating%20Systems/Abraham%20SilberschatzOperating%20System%20Concepts%20(9th,2012_12).pdf)
5. [https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/William%20Stallings%20-%20Operating%20Systems%20\(1\).pdf](https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/William%20Stallings%20-%20Operating%20Systems%20(1).pdf)

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4	1	3	3	3	-	-	-	-	1	2	1	2			
5	3	1	2	1	1	-	-	-	3	2	3	2			
AVg.	2	2	2	2	1	-	-	-	2	2	2	2			

UNIT I ENVIRONMENT AND BIODIVERSITY 6

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

UNIT II ENVIRONMENTAL POLLUTION 9

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts .

UNIT III RENEWABLE SOURCES OF ENERGY 6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT IV SUSTAINABILITY AND MANAGEMENT 6

Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols- Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

UNIT V SUSTAINABILITY PRACTICES 6

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles- carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-economical and technological change.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi,2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies,

Prentice Hall.

5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication,London, 1998.

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1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances andStandards', Vol. I and II, Enviro Media. 38 . edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ.,House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi,2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press,Third Edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

COURSE OBJECTIVES:

- To install windows operating systems.
- To understand the basics of Unix command and shell programming.
- To implement various CPU scheduling algorithms.
- To implement Deadlock Avoidance and Deadlock Detection Algorithms
- To implement Page Replacement Algorithms
- To implement various memory allocation methods.
- To be familiar with File Organization and File Allocation Strategies.

LIST OF EXPERIMENTS:

1. Installation of windows operating system
2. Illustrate UNIX commands and Shell Programming
3. Process Management using System Calls : Fork, Exit, Getpid, Wait, Close
4. Write C programs to implement the various CPU Scheduling Algorithms
5. Illustrate the inter process communication strategy
6. Implement mutual exclusion by Semaphore
7. Write C programs to avoid Deadlock using Banker's Algorithm
8. Write a C program to Implement Deadlock Detection Algorithm
9. Write C program to implement Threading
10. Implement the paging Technique using C program
11. Write C programs to implement the following Memory Allocation Methods
 - a. First Fit
 - b. Worst Fit
 - c. Best Fit
12. Write C programs to implement the various Page Replacement Algorithms
13. Write C programs to Implement the various File Organization Techniques
14. Implement the following File Allocation Strategies using C programs
 - a. Sequential
 - b. Indexed
 - c. Linked
15. Write C programs for the implementation of various disk scheduling algorithms
16. Install any guest operating system like Linux using VMware.

TOTAL:45 PERIODS**COURSE OUTCOMES:****At the end of this course, the students will be able to:**

- CO1 :** Define and implement UNIX Commands.
- CO2 :** Compare the performance of various CPU Scheduling Algorithms.
- CO3 :** Compare and contrast various Memory Allocation Methods.
- CO4 :** Define File Organization and File Allocation Strategies.
- CO5 :** Implement various Disk Scheduling Algorithms.

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	3	1	1	-	-	-	1	3	3	3			
2	3	1	1	2	2	-	-	-	3	2	1	1			
3	3	3	2	1	2	-	-	-	3	3	1	2			
4	1	2	2	3	2	-	-	-	3	1	3	1			
5	2	2	1	1	3	-	-	-	1	2	2	3			
AVg.	2	2	2	2	2	-	-	-	2	2	2	2			

COURSE OBJECTIVES:

- To learn and implement important commands in SQL.
- To learn the usage of nested and joint queries.
- To understand functions, procedures and procedural extensions of databases.
- To understand design and implementation of typical database applications.
- To be familiar with the use of a front end tool for GUI based application development.

LIST OF EXPERIMENTS:

1. Create a database table, add constraints (primary key, unique, check, Not null), insert rows, update and delete rows using SQL DDL and DML commands.
2. Create a set of tables, add foreign key constraints and incorporate referential integrity.
3. Query the database tables using different 'where' clause conditions and also implement aggregate functions.
4. Query the database tables and explore sub queries and simple join operations.
5. Query the database tables and explore natural, equi and outer joins.
6. Write user defined functions and stored procedures in SQL.
7. Execute complex transactions and realize DCL and TCL commands.
8. Write SQL Triggers for insert, delete, and update operations in a database table.
9. Create View and index for database tables with a large number of records.
10. Create an XML database and validate it using XML schema.
11. Create Document, column and graph based data using NOSQL database tools.
12. Develop a simple GUI based database application and incorporate all the above-mentioned features
13. Case Study using any of the real life database applications from the following list
 - a) Inventory Management for a EMart Grocery Shop
 - b) Society Financial Management
 - c) Cop Friendly App – Eseva
 - d) Property Management – eMall
 - e) Star Small and Medium Banking and Finance
 - Build Entity Model diagram. The diagram should align with the business and functional goals stated in the application.
 - Apply Normalization rules in designing the tables in scope.
 - Prepared applicable views, triggers (for auditing purposes), and functions for enabling enterprise grade features.
 - Build PL SQL / Stored Procedures for Complex Functionalities, ex EOD Batch Processing for calculating the EMI for Gold Loan for each eligible Customer.
 - Ability to showcase ACID Properties with sample queries with appropriate settings

List of Equipments:(30 Students per Batch)

MYSQL / SQL : 30 Users

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1: Create databases with different types of key constraints.

CO2: Construct simple and complex SQL queries using DML and DCL commands.

CO3: Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.

CO4: Create an XML database and validate with meta-data (XML schema).

CO5: Create and manipulate data using NOSQL database.

CO's- PO's & PSO's MAPPING

CO's	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	-	-	-	-	3	1	3	2			
2	2	2	3	2	2	-	-	-	1	2	3	3			
3	3	3	2	1	1	-	-	-	1	1	1	3			
4	1	3	3	3	1	-	-	-	1	1	3	2			
5	3	2	1	1	1	-	-	-	2	2	3	1			
AVg.	2	3	2	2	1	-	-	-	2	1	3	2			