VSB College of Engineering Technical Campus
Accredited by NAAC with A+ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University
Coimbatore to pollachi Road NH - 209, Ealur Privu, Kinathukadavu Taluk,
Coimbatore - 642109, Tamilnadu, India. Email: office@vsbcetc.com Website : www.vsbcetc.com

B.E. COMPUTER SCIENCE ENGINEERING (AIML)

I. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates will be able to

- Demonstrate technical competence with analytical and critical thinking to understand and meet the diversified requirements of industry, academia and research.
- Exhibit technical leadership, team skills and entrepreneurship skills to provide business solutions to real world problems.
- Work in multi-disciplinary industries with social and environmental responsibility, workethics and adaptability to address complex engineering and social problems
- Pursue lifelong learning, use cutting edge technologies and involve in applied research todesign optimal solutions.

II. PROGRAM OUTCOMES (POs)

1 **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineeringproblems.

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

3 **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4 **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.

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

6 **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

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

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

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

11 **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 andleader in a team, to manage projects and in multidisciplinary environments

12 **Life-long learning**: Recognize the need for, and have the preparation and ability to Engage in independent and life-long learning in the broadest context of technologicalchange.

III. PROGRAM SPECIFIC OUTCOMES (PSOs)

To ensure graduates

- Have proficiency in programming skills to design, develop and apply appropriate techniques, to solve complex engineering problems.
- Have knowledge to build, automate and manage business solutions using cutting edge technologies.
- Have excitement towards research in applied computer technologies.

Mapping of Course Outcome and Programme Outcome																	
Year	**Sem**	**Course name**	**PO**												**PSO**		
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
I	**I**	Induction Programme															
		Professional English - I	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	3	-	-	-
		Matrices and Calculus	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
		Engineering Physics	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-	-	-
		Engineering Chemistry	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-	-	-
		Problem Solving and Python Programming	2	3	3	3	2	-	-	-	-	-	2	2	3	3	
		தமிழர்மரபு /Heritage of Tamils															
		Problem Solving and Python Programming Laboratory	2	3	3	3	2	-	-	-	-	-	2	2	3	3	-
		Physics and Chemistry Laboratory	3	2.4	2.6	1	1										
			2.6	1.3	1.6	1	1	1.4	1.8	-	-	-	-	1.3	-	-	-
		English Laboratory [$]	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
	II	Professional English - II	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-
		Statistics and Numerical Methods	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
		Physics for Information Science	3	1.3	2	1.3	2.3	1	1.3	-	-	-	-	2	-	-	-
		Basic Electrical and Electronics Engineering	2	1.8	1	-	-	-	-	1	-	-	-	2	-	-	1
		Engineering Graphics	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
		Programming in C	2	2	2	1	2	1	1	1	2	-	3	2	2	2	-
		தமிழரும் தொழில்நுட்பமும் /Tamils and Technology															
		Engineering Practices Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
		Programming in C Laboratory	2	2	3	2	1	2	-	-	2	1	2	2	2	2	
		Communication Laboratory / Foreign Language [$]	2.4	2.8	3	3	1.8	3	3	3	3	3	3	3	-	-	-
II	**III**	Discrete Mathematics	1	3	2	1	-	-	-	-	-	1	-	-	-	-	-
		Digital Principles and Computer Organization	3	3	3	3	1.8	1.6	1	1	1	1	1.6	2.6	1.4	2.6	1.6
		Foundations of Data Science	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
		Data Structures	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2

		Object Oriented Programming	2	1	2	2	2	-	-	-	2	2	1	2	3	2	2
		Data Structures Laboratory	2	2	2	1	2	-	-	-	2	2	2	2	2	2	3
		Object Oriented Programming Laboratory	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2
		Data Science Laboratory	2	2	2	2	1	-	-	-	2	2	2	2	2	3	2
		Professional Development[$]															
	IV	Theory of Computation	2	2	2	2	1	-	-	-	1	2	2	2	2	2	2
		Artificial Intelligence and Machine Learning	2	1	2	2	1	-	-	-	2	2	2	3	2	2	2
		Database Management Systems	2	2	3	2	1	-	-	-	2	2	2	2	2	2	3
		Algorithms	2.67	1.8	3	1			1.33					1		1	1
		Introduction to Operating Systems	2	2	2	2	1	-	-	-	2	2	2	2	1	2	2
		Environmental Sciences and Sustainability	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-
		Operating Systems Laboratory	2	2	2	2	2	-	-	-	2	2	2	2	2	2	2
		Database Management Systems Laboratory	2	3	2	2	1	-	-	-	2	1	3	2	2	2	2
III	**V**	Computer Networks	-	1	-	-	1	-	-	-	-	1	-	-	-	1	1
		Full Stack Web Development	3	3	3	2	3	1	1	1	1	1	1	1	2	2	1
		Cryptography and Cyber Security	3	2.6	2.6	2.6	2.8	-	-	-	2	-	-	1.2	2.8	2.8	3
		Distributed Computing	1.8	2.4	1.8	2.4	2	-	-	-	2.6	2.2	2.2	1.6	2	1.8	1.6
		Full Stack Web Development Laboratory	3	3	3	2	3	1	1	1	1	1	1	1	2	2	1
	VI	Object Oriented Software Engineering	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
		Embedded Systems and IoT	2.6	2	3	2.4	1.5	-	-	-	1	2.2	2.2	2.4	2.2	1.6	2.6
IV	**VII**	Human Values and Ethics															
		Summer internship															
	VIII	Project Work/ Internship															

1 - low, 2 - medium, 3 - high, '-' - no correlation

B.E. CSE (AIML)
CHOICE BASED CREDIT SYSTEM

CURRICULUM AND SYLLABI FOR SEMESTERS I TO VIII

SEMESTER I

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

[$] **Skill Based Course**

SEMESTER II

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24HST201	Professional English - II	HSMC	2	0	0	2	2
2.	24MAT201	Statistics and Numerical Methods	BSC	3	1	0	4	4
3.	24PHT201	Physics for Information Science	BSC	3	0	0	3	3
4.	24BET202	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3
5.	24GET201	Engineering Graphics	ESC	2	0	4	6	4
6.	24CST201	Programming in C	PCC	3	0	0	3	3
7.	24GET202	தமிழரும் தொழில்நுட்பமும் /Tamils and Technology	HSMC	1	0	0	1	1
8.		NCC Credit Course Level 1[#]	-	2	0	0	2	2[#]
PRACTICALS								
9.	24GEP201	Engineering Practices Laboratory	ESC	0	0	4	4	2
10.	24CSP201	Programming in C Laboratory	PCC	0	0	4	4	2
11.	24GEP202	Communication Laboratory / Foreign Language [$]	EEC	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 willbe 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	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24MAT301	Discrete Mathematics	BSC	3	1	0	4	4
2.	24CST301	Digital Principles and Computer Organization	ESC	3	0	2	5	4
3.	24CST302	Foundations of Data Science	PCC	3	0	0	3	3
4.	24ALT301	Data Structures and Algorithms	PCC	3	0	0	3	3
5.	24CST304	Object Oriented Programming	PCC	3	0	0	3	3
PRACTICALS								
6.	24ALP301	Data Structures and Algorithms Laboratory	PCC	0	0	4	4	2
7.	24CSP302	Object Oriented Programming Laboratory	PCC	0	0	3	3	1.5
8.	24CSP303	Data Science Laboratory	PCC	0	0	4	4	2
9.	24GEP301	Professional Development[$]	EEC	0	0	2	2	1
TOTAL				**15**	**1**	**15**	**31**	**23.5**

[$] **Skill Based Course**

SEMESTER IV

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24CST401	Theory of Computation	PCC	3	0	0	3	3
2.	24ALT402	OperatingSystems	PCC	3	0	2	5	4
3.	24ADT403	Database Design and Management	PCC	3	0	0	3	3
4.	24ALT404	Machine Learning	PCC	3	0	0	3	3
5.	24ALT405	Artificial Intelligence	PCC	3	0	0	3	3
6.	24GET401	Environmental Sciences and Sustainability	BSC	2	0	0	2	2
7.		NCC Credit Course Level 2[#]	-	3	0	0	3	3 [#]
PRACTICALS								
8.	24ALP401	Artificial Intelligence and Machine Learning Laboratory	PCC	0	0	4	4	2
9.	24ADP402	Database Design and Management Laboratory	PCC	0	0	3	3	1.5
TOTAL				**17**	**0**	**9**	**26**	**21.5**

[#] 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 ofCGPA.

SEMESTER V

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24ALT501	Natural Language Processing	PCC	3	0	2	5	4
2.	24ALT502	Deep Learning for Vision	PCC	3	0	2	5	4
3.	24CBT503	Cryptography and Cyber security	PCC	3	0	0	3	3
4.	24CST504	Distributed Computing	PCC	3	0	0	3	3
5.		Professional Elective I	PEC	-	-	-	-	3
6.		Professional Elective II	PEC	-	-	-	-	3
7.		Mandatory Course- I[&]	MC	3	0	0	3	Non-credit course
TOTAL				-	-	-	-	**20**

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

SEMESTER VI

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24CST601	Object Oriented Software Engineering	PCC	3	0	2	5	4
2.	24CST3602	Embedded Systems and IoT	PCC	3	0	2	5	4
3.		Open Elective – I*	OEC	3	0	0	3	3
4.		Professional Elective III	PEC	-	-	-	-	3
5.		Professional Elective IV	PEC	-	-	-	-	3
6.		Professional Elective V	PEC	-	-	-	-	3
7.		Professional Elective VI	PEC	-	-	-	-	3
8.		Mandatory Course-II [&]	MC	3	0	0	3	Non-credit course
9.		NCC Credit Course Level 3[#]	-	3	0	0	3	3[#]
TOTAL				-	-	-	-	**23**

***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. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	24GET701	Human Values and Ethics	HSMC	2	0	0	2	2
2.		Elective - Management#	HSMC	3	0	0	3	3
3.		Open Elective – II**	OEC	3	0	0	3	3
4.		Open Elective – III**	OEC	3	0	0	3	3
5.		Open Elective – IV**	OEC	3	0	0	3	3
PRACTICALS								
6.	24ALP701	Summer internship	EEC	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	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
PRACTICALS								
1.	24ALP801	Project Work/Internship	EEC	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	CATEGORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24GET01	Principles of Management	HSMC	3	0	0	3	3
2.	24GET02	Total Quality Management	HSMC	3	0	0	3	3
3.	24GET03	Engineering Economics and Financial Accounting	HSMC	3	0	0	3	3
4.	24GET04	Human Resource Management	HSMC	3	0	0	3	3
5.	24GET05	Knowledge Management	HSMC	3	0	0	3	3
6.	24GET06	Industrial Management	HSMC	3	0	0	3	3

MANDATORY COURSES I*

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24MXT01	Introduction to Women and Gender Studies	MC	3	0	0	3	0
2.	24MXT02	Elements of Literature	MC	3	0	0	3	0
3.	24MXT03	Film Appreciation	MC	3	0	0	3	0
4.	24MXT04	Disaster Risk Reduction and Management	MC	3	0	0	3	0

***Mandatory Courses are offered as Non-Credit Courses**

MANDATORY COURSES II*

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24MXT05	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	MC	3	0	0	3	0
2.	24MXT06	History of Science and Technology in India	MC	3	0	0	3	0
3.	24MXT07	Political and Economic Thought for a Humane Society	MC	3	0	0	3	0
4.	24MXT08	State, Nation Building and Politics in India	MC	3	0	0	3	0
5.	24MXT09	Industrial Safety	MC	3	0	0	3	0

***Mandatory Courses are offered as Non-Credit Courses**

PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Data Science	Vertical II Full Stack Development	Vertical III Cloud Computing and Data Center 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	Web Technologies	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 Blockchain Technologies	Visual Effects	Cryptocurrency and Blockchain Technologies	Game Theory
Computer Vision	DevOps	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

Refer to the Regulations 2021,

PROFESSIONAL ELECTIVE COURSES
VERTICALS

VERTICAL 1: DATA SCIENCE

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CCT01	Exploratory Data Analysis	PEC	2	0	2	4	3
2.	24CCT02	Recommender Systems	PEC	2	0	2	4	3
3.	24CCT03	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	24CCT04	Text and Speech Analysis	PEC	2	0	2	4	3
5.	24CCT05	Business Analytics	PEC	2	0	2	4	3
6.	24CCT06	Image and Video Analytics	PEC	2	0	2	4	3
7.	24CCT07	Computer Vision	PEC	2	0	2	4	3
8.	24CCT08	Big Data Analytics	PEC	2	0	2	4	3

VERTICAL 2: FULL STACK DEVELOPMENT

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

VERTICAL 3: CLOUD COMPUTING AND DATA CENTER TECHNOLOGIES

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CCT17	Cloud Computing	PEC	2	0	2	4	3
2.	24CCT18	Virtualization	PEC	2	0	2	4	3
3.	24CCT19	Cloud Services Management	PEC	2	0	2	4	3
4.	24CCT20	Data Warehousing	PEC	2	0	2	4	3
5.	24CCT21	Storage Technologies	PEC	3	0	0	3	3
6.	24CCT22	Software Defined Networks	PEC	2	0	2	4	3
7.	24CCT23	Stream Processing	PEC	2	0	2	4	3
8.	24CCT24	Security and Privacyin Cloud	PEC	2	0	2	4	3

VERTICAL 4: CYBER SECURITY AND DATA PRIVACY

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CCT25	Ethical Hacking	PEC	2	0	2	4	3
2.	24CCT26	Digital and Mobile Forensics	PEC	2	0	2	4	3
3.	24CCT27	Social Network Security	PEC	2	0	2	4	3
4.	24CCT28	Modern Cryptography	PEC	2	0	2	4	3
5.	24CCT29	Engineering Secure Software Systems	PEC	2	0	2	4	3
6.	24CCT30	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	24CCT31	Network Security	PEC	2	0	2	4	3
8.	24CCT32	Security and Privacy in Cloud	PEC	2	0	2	4	3

VERTICAL 5: CREATIVE MEDIA

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

VERTICAL 6: EMERGING TECHNOLOGIES

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CCT41	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3
2.	24CCT42	Robotic Process Automation	PEC	2	0	2	4	3
3.	24CCT43	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	24CCT44	Cyber Security	PEC	2	0	2	4	3
5.	24CCT45	Quantum Computing	PEC	2	0	2	4	3
6.	24CCT46	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	24CCT47	Game Development	PEC	2	0	2	4	3
8.	24CCT48	3D Printing and Design	PEC	2	0	2	4	3

VERTICAL 7: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CCT49	Knowledge Engineering	PEC	2	0	2	4	3
2.	24CCT50	Soft Computing	PEC	2	0	2	4	3
3.	24CCT51	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	24CCT52	Text and Speech Analysis	PEC	2	0	2	4	3
5.	24CCT53	Optimization Techniques	PEC	2	0	2	4	3
6.	24CCT54	Game Theory	PEC	2	0	2	4	3
7.	24CCT55	Cognitive Science	PEC	2	0	2	4	3
8.	24CCT56	Ethics and AI	PEC	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	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24OET01	Space Science	OEC	3	0	0	3	3
2.	24OET02	Introduction to Industrial Engineering	OEC	3	0	0	3	3
3.	24OET03	Food, Nutrition and Health	OEC	3	0	0	3	3
4.	24OET04	Environmental and Social Impact Assessment	OEC	3	0	0	3	3
5.	24OET05	Renewable Energy System	OEC	3	0	0	3	3
6.	24OET06	Introduction to Industrial Instrumentation and Control	OEC	3	0	0	3	3
7.	24OET07	Graph Theory	OEC	3	0	0	3	3

OPEN ELECTIVES – II

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24OET08	Resource Management Techniques	OEC	3	0	0	3	3
2.	24OET09	Fintech Regulation	OEC	3	0	0	3	3
3.	24OET10	Holistic Nutrition	OEC	3	0	0	3	3
4.	24OET11	IT in Agricultural System	OEC	3	0	0	3	3
5.	24OET12	Introduction to Control Engineering	OEC	3	0	0	3	3
6.	24OET13	Pharmaceutical Nanotechnology	OEC	3	0	0	3	3
7.	24OET14	Aviation Management	OEC	3	0	0	3	3

OPEN ELECTIVES – III

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24OET15	English for Competitive Examinations	OEC	3	0	0	3	3
2.	24OET16	NGOs and Sustainable Development	OEC	3	0	0	3	3
3.	24OET17	Democracy and Good Governance	OEC	3	0	0	3	3
4.	24OET18	Renewable Energy Technologies	OEC	3	0	0	3	3
5.	24OET19	Applied Design Thinking	OEC	3	0	0	3	3
6.	24OET20	Reverse Engineering	OEC	3	0	0	3	3
7.	24OET21	Sustainable Manufacturing	OEC	3	0	0	3	3
8.	24OET22	Electric and Hybrid Vehicles	OEC	3	0	0	3	3
9.	24OET23	Space Engineering	OEC	3	0	0	3	3
10.	24OET24	Industrial Management	OEC	3	0	0	3	3
11.	24OET25	Quality Engineering	OEC	3	0	0	3	3
12.	24OET26	Fire Safety Engineering	OEC	3	0	0	3	3
13.	24OET27	Introduction to Non-destructive Testing	OEC	3	0	0	3	3
14.	24OET28	Mechatronics	OEC	3	0	0	3	3
15.	24OET29	Foundation of Robotics	OEC	3	0	0	3	3
16.	24OET30	Fundamentals of Aeronautical Engineering	OEC	3	0	0	3	3
17.	24OET31	Remote Sensing Concepts	OEC	3	0	0	3	3
18.	24OET32	Urban Agriculture	OEC	3	0	0	3	3
19.	24OET33	Drinking Water Supply and Treatment	OEC	3	0	0	3	3

20.	24OET34	Electric Vehicle Technology	OEC	3	0	0	3	3
21.	24OET35	Introduction to PLC Programming	OEC	3	0	0	3	3
22.	24OET36	Nano Technology	OEC	3	0	0	3	3
23.	24OET37	Functional Materials	OEC	3	0	0	3	3
24.	24OET38	Traditional Indian Foods	OEC	3	0	0	3	3
25.	24OET39	Introduction to food processing	OEC	3	0	0	3	3
26.	24OET40	IPR for Pharma Industry	OEC	3	0	0	3	3
27.	24OET41	Basics of Textile Finishing	OEC	3	0	0	3	3
28.	24OET42	Industrial Engineering for Garment Industry	OEC	3	0	0	3	3
29.	24OET43	Basics of Textile Manufacture	OEC	3	0	0	3	3
30.	24OET44	Introduction to Petroleum Refining and Petrochemicals	OEC	3	0	0	3	3
31.	24OET45	Energy Conservation and Management	OEC	3	0	0	3	3
32.	24OET46	Basics of Plastics Processing	OEC	3	0	0	3	3
33.	24OET47	Signals and Systems	OEC	3	0	0	3	3
34.	24OET48	Fundamentals of Electronic Devices and Circuits	OEC	3	0	0	3	3
35.	24OET49	Foundation Skills in Integrated Product Development	OEC	3	0	0	3	3
36.	24OET50	Assistive Technology	OEC	3	0	0	3	3
37.	24OET51	Operations Research	OEC	3	0	0	3	3
38.	24OET52	Algebra and Number Theory	OEC	3	0	0	3	3
39.	24OET53	Linear Algebra	OEC	3	0	0	3	3
40.	24OET54	Lean Concepts, Tools and Practices	OEC	3	0	0	3	3
41.	24OET55	Basics of Microbial Technology	OEC	3	0	0	3	3
42.	24OET56	Basics of Biomolecules	OEC	3	0	0	3	3
43.	24OET57	Fundamentals of Cell and Molecular Biology	OEC	3	0	0	3	3

OPEN ELECTIVES – IV

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24OET58	Project Report Writing	OEC	3	0	0	3	3
2.	24OET59	Advanced Numerical Methods	OEC	3	0	0	3	3
3.	24OET60	Random Processes	OEC	3	0	0	3	3
4.	24OET61	Queuing and Reliability Modelling	OEC	3	0	0	3	3
5.	24OET62	Production and Operations Management for Entrepreneurs	OEC	3	0	0	3	3
6.	24OET63	Multivariate Data Analysis	OEC	3	0	0	3	3
7.	24OET64	Additive Manufacturing	OEC	3	0	0	3	3
8.	24OET65	New Product Development	OEC	3	0	0	3	3
9.	24OET66	Industrial Design & Rapid Prototyping Techniques	OEC	3	0	0	3	3
10.	24OET67	Micro and Precision Engineering	OEC	3	0	0	3	3
11.	24OET68	Cost Management of Engineering Projects	OEC	3	0	0	3	3
12.	24OET69	Batteries and Management system	OEC	3	0	0	3	3
13.	24OET70	Sensors and Actuators	OEC	3	0	0	3	3
14.	24OET71	Space Vehicles	OEC	3	0	0	3	3
15.	24OET72	Management Science	OEC	3	0	0	3	3
16.	24OET73	Production Planning and Control	OEC	3	0	0	3	3
17.	24OET74	Operations Management	OEC	3	0	0	3	3
18.	24OET75	Industrial Hygiene	OEC	3	0	0	3	3
19.	24OET76	Chemical Process Safety	OEC	3	0	0	3	3
20.	24OET77	Electrical, Electronic and Magnetic materials	OEC	3	0	0	3	3
21.	24OET78	Nano materials and Applications	OEC	3	0	0	3	3
22.	24OET79	Hydraulics and Pneumatics	OEC	3	0	0	3	3
23.	24OET80	Sensors	OEC	3	0	0	3	3
24.	24OET81	Concepts in Mobile Robots	OEC	3	0	0	3	3
25.	24OET82	Marine Propulsion	OEC	3	0	0	3	3
26.	24OET83	Marine Merchant Vessels	OEC	3	0	0	3	3
27.	24OET84	Elements of Marine Engineering	OEC	3	0	0	3	3
28.	24OET85	Drone Technologies	OEC	3	0	0	3	3
29.	24OET86	Geographical Information System	OEC	3	0	0	3	3
30.	24OET87	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
31.	24OET88	Biodiversity Conservation	OEC	3	0	0	3	3

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

SUMMARY

Name of the Programme: B.E Computer Science and Engineering (Artificial Intelligence and Machine Learning)										
S.No	**Subject Area**	**Credits per Semester**								**Total Credits**
		I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	
1	**HSMC**	**4**	**3**					**5**		**12**
2	**BSC**	**12**	**7**	**4**	**2**					**25**
3	**ESC**	**5**	**9**	**4**						**18**
4	**PCC**		**5**	**14.5**	**19.5**	**14**	**8**			**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**	**23.5**	**21.5**	**20**	**23**	**16**	**10**	**162**

ENROLLMENT FOR B.E. / B. TECH. (HONOURS) / MINOR DEGREE (OPTIONAL)

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E. / B. Tech. (Honours) or Minor Degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes, Moreover, for minor degree the student can register for courses from any one of the following verticals also.
Complete details are available in clause 4.10 (Amendments) of Regulations 2021.

VERTICALS FOR MINOR DEGREE
(In addition to all the verticals of other programmes)

Vertical I Fintech and Block Chain	Vertical II Entrepreneurship	Vertical III Public Administration	Vertical IV Business Data Analytics	Vertical V Environment and Sustainability
Financial Management	Foundations of Entrepreneurship	Principles of Public Administration	Statistics for Management	Sustainable Infrastructure Development
Fundamentals of Investment	Team Building & Leadership Management for Business	Constitution of India	Datamining for Business Intelligence	Sustainable Agriculture and Environmental Management
Banking, Financial Services and Insurance	Creativity & Innovation in Entrepreneurship	Public Personnel Administration	Human Resource Analytics	Sustainable Bio Materials
Introduction to Blockchain and its Applications	Principles of Marketing Management for Business	Administrative Theories	Marketing and Social Media Web Analytics	Materials for Energy Sustainability
Fintech Personal Finance and Payments	Human Resource Management for Entrepreneurs	Indian Administrative System	Operation and Supply Chain Analytics	Green Technology
Introduction to Fintech	Financing New Business Ventures	Public Policy Administration	Financial Analytics	Environmental Quality Monitoring and Analysis
-	-	-	-	Integrated Energy Planning for Sustainable Development
-	-	-	-	Energy Efficiency for Sustainable Development

(choice of courses for Minor degree is to be made from any one vertical of other programmes or from anyone of the following verticals)

VERTICAL 1: FINTECH AND BLOCK CHAIN

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CMG331	Financial Management	PEC	3	0	0	3	3
2.	24CMG332	Fundamentals of Investment	PEC	3	0	0	3	3
3.	24CMG333	Banking, Financial Services and Insurance	PEC	3	0	0	3	3
4.	24CMG334	Introduction to Blockchain and its Applications	PEC	3	0	0	3	3
5.	24CMG335	Fintech Personal Finance and Payments	PEC	3	0	0	3	3
6.	24CMG336	Introduction to Fintech	PEC	3	0	0	3	3

VERTICAL 2: ENTREPRENEURSHIP

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CMG337	Foundations of Entrepreneurship	PEC	3	0	0	3	3
2.	24CMG338	Team Building & Leadership Management for Business	PEC	3	0	0	3	3
3.	24CMG339	Creativity & Innovation in Entrepreneurship	PEC	3	0	0	3	3
4.	24CMG340	Principles of Marketing Management for Business	PEC	3	0	0	3	3
5.	24CMG341	Human Resource Management for Entrepreneurs	PEC	3	0	0	3	3
6.	24CMG342	Financing New Business Ventures	PEC	3	0	0	3	3

VERTICAL 3: PUBLIC ADMINISTRATION

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CMG343	Principles of Public Administration	PEC	3	0	0	3	3
2.	24CMG344	Constitution of India	PEC	3	0	0	3	3
3.	24CMG345	Public Personnel Administration	PEC	3	0	0	3	3
4.	24CMG346	Administrative Theories	PEC	3	0	0	3	3
5.	24CMG347	Indian Administrative System	PEC	3	0	0	3	3
6.	24CMG348	Public Policy Administration	PEC	3	0	0	3	3

VERTICAL 4: BUSINESS DATA ANALYTICS

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CMG349	Statistics for Management	PEC	3	0	0	3	3
2.	24CMG350	Datamining for Business Intelligence	PEC	3	0	0	3	3
3.	24CMG351	Human Resource Analytics	PEC	3	0	0	3	3
4.	24CMG352	Marketing and Social Media Web Analytics	PEC	3	0	0	3	3
5.	24CMG353	Operation and Supply Chain Analytics	PEC	3	0	0	3	3
6.	24CMG354	Financial Analytics	PEC	3	0	0	3	3

VERTICAL 5: ENVIRONMENT AND SUSTAINABILITY

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CES331	Sustainable Infrastructure Development	PEC	3	0	0	3	3
2.	24CES332	Sustainable Agriculture and Environmental Management	PEC	3	0	0	3	3
3.	24CES333	Sustainable Bio Materials	PEC	3	0	0	3	3
4.	24CES334	Materials for Energy Sustainability	PEC	3	0	0	3	3
5.	24CES335	Green Technology	PEC	3	0	0	3	3
6.	24CES336	Environmental Quality Monitoring and Analysis	PEC	3	0	0	3	3
7.	24CES337	Integrated Energy Planning for Sustainable Development	PEC	3	0	0	3	3
8.	24CES338	Energy Efficiency for Sustainable Development	PEC	3	0	0	3	3

24IP101 **INDUCTION PROGRAMME**

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.

(ii) 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 everyday 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.

(iii) 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 anddon'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.

(v) Proficiency Modules

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

(vi) 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.

(vii) 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.

(viii) 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.

(ix) 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 beno tests / assessments during this programme.

References:
Guide to Induction program from AICTE

24HST101 **PROFESSIONAL ENGLISH I** **L T P C**

3 0 0 3

COURSE 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?

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 Communcation (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

CO1:To use appropriate words in a professional context

CO2:To gain understanding of basic grammatic structures and use them in right context.

CO3:To read and infer the denotative and connotative meanings of technical texts

CO4: 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 & SangeetaSharma, 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

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

CO	PO 1	PO2	PO 3	PO4	PO5	PO 6	PO 7	PO 8	PO 9	PO10	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
2	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
3	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
4	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
5	2	3	3	3	-	3	3	3	2	3	-	3	-	-	-
AVg .	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**	**-**	**-**

1 - low, 2 - medium, 3 - high, '-"- no correlation

24MAT101 **MATRICES AND CALCULUS** **L T P C**
3 1 0 4

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques that are 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 acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT I MATRICES **9 + 3**

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues 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 – Applications : Stretching of an elastic membrane.

UNIT II DIFFERENTIAL CALCULUS **9 + 3**

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications : Maxima and Minima of functions of one variable.

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

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Changeof variables – 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 IVINTEGRAL CALCULUS **9 + 3**

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force andpressure, moments and centres of mass.

UNIT V MULTIPLE INTEGRALS **9 + 3**

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in doubleand triple integrals – Applications: Moments and centres of mass, moment of inertia.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

CO1: Use the matrix algebra methods for solving practical problems.

CO2: Apply differential calculus tools in solving various application problems.

CO3: Able to use differential calculus ideas on several variable functions.

CO4: Apply different methods of integration in solving practical problems.

CO5: Apply multiple integral ideas in solving areas, volumes and other practical problems.

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

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

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
Avg	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

24PHT101 **ENGINEERING PHYSICS** **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 – rotationalkinetic energy and moment of inertia - theorems of M .I –moment of inertia of continuous bodieof a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angularmomentum – 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 oscillatingsystems - 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, CO_2 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 Schrodingerequation (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

CO1: Understand the importance of mechanics.

CO2: Express their knowledge in electromagnetic waves.

CO3: Demonstrate a strong foundational knowledge in oscillations, optics and lasers.

CO4: Understand the importance of quantum physics.

CO5: Comprehend and apply quantum mechanical principles towards the formation of energybands.

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 (IndianEdition), 2009.
2. Paul A. Tipler, Physic – 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

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

CO	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
2	3	3	2	1	2	1	-	-	-	-	-	-	-	-	-
3	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
4	3	3	1	1	2	1	-	-	-	-	-	-	-	-	
5	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
AV	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-	-	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

24CYT101 **ENGINEERING CHEMISTRY** **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To inculcate sound understanding of water quality parameters and water treatmenttechniques.
- 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 andapplications 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. CO_2 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: H_2-O_2 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:

CO1: To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.

CO2: To identify and apply basic concepts of nanoscience and nanotechnology in designing thesynthesis of nanomaterials for engineering and technology applications.

CO3: To apply the knowledge of phase rule and composites for material selection requirements.

CO4: To recommend suitable fuels for engineering processes and applications.

CO5: To recognize different forms of energy resources and apply them for suitable applications inenergy 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, NewDelhi, 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.O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
2. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi,2014.
3. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", CambridgeUniversity Press, Delhi, Second Edition, 2019.
4. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers andTechnologists, Springer Science Business Media, New York, 2nd Edition, 2013.

WEB REFERENCES:

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-chemistry1-47682

ONLINE RESOURCES:

1.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

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

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
2	2	-	-	1	-	2	2	-	-	-	-	-	-	-	-
3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
4	3	1	1	-	-	1	2	-	-	-	-	-	-	-	-
5	3	1	2	1	-	2	2	-	-	-	-	2	-	-	-
CO	**2.8**	**1.3**	**1.6**	**1**	-	**1.5**	**1.8**	-		-	-	**1.5**	-	-	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

24GET101 PROBLEM SOLVING AND PYTHON PROGRAMMING L T P C
3 0 0 3

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.

WEB REFERENCES:

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

CO’s-PO’s & PSO’s MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
2	3	3	3	3	2	-	-	-	-	-	2	2	3	-	-
3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
4	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
6	2	2	-	-	2	-	-	-	-	-	1	-	2	-	
AVg.	**2**	**3**	**3**	**3**	**2**	-	-	-	-	-	**2**	**2**	**3**	**3**	-

1 - low, 2 - medium, 3 - high, ‘-' - no correlation

24GET102 **HERITAGE OF TAMILS** **L T P C**
1 0 0 1

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 Systemsof 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.பொருநை -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 C ivilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & 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) (Publishedby: The Author)
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)

24GET102	**தமிழர்மரபு**	**L T P C**
		1 0 0 1

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 - பாறைஓவியங்கள்முதல்நவீனஓவியங்கள்வரை-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, ஒயிலாட்டம், 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 – மக்களும் பண்பாடும் - கே.கேபிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)

2.கணினி தமிழ்-முனைவர் இல.சுந்தரம் (விகடன்பிரசுரம்).

3.கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)

4.பொருநை -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 C ivilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & 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) (Publishedby: The Author)
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)

24GEP101 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY L T P C
0 0 4 2

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.

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/Components 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:

CO1: Develop algorithmic solutions to simple computational problems
CO2: Develop and execute simple Python programs.
CO3: Implement programs in Python using conditionals and loops for solving problems..
CO4: Deploy functions to decompose a Python program.
CO5: Process compound data using Python data structures.
CO6: Utilize Python packages in developing software applications.

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.

WEB REFERENCES:

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

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
2	3	3	3	3	2	-	-	-	-	-	2	2	3	-	-
3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
4	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
6	2	2	-	-	2	-	-	-	-	-	1	-	2	-	
AVg.	**2**	**3**	**3**	**3**	**2**	-	-	-	-	-	**2**	**2**	**3**	**3**	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

24BSP101 **PHYSICS AND CHEMISTRY LABORATORY** **L T P C**
0 0 4 2

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 an active participant in each part of all lab exercises.

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
7. a) Optical fibre -Determination of Numerical Aperture and acceptance angle
   b) Compact disc- Determination of width of the groove using laser.
8. Acoustic grating- Determination of velocity of ultrasonic waves in liquids.
9. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids
10. Post office box -Determination of Band gap of a semiconductor.
11. Photoelectric effect
12. Michelson Interferometer.
13. Melde's string experiment
14. Experiment with lattice dynamics kit.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1: Understand the functioning of various physics laboratory equipment.

CO2: Use graphical models to analyze laboratory data.

CO3: Use mathematical models as a medium for quantitative reasoning and describing physicalreality.

CO4: Access, process and analyze scientific information.

CO5: Solve problems individually and collaboratively.

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

CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
2	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
AVG	3	2.4	2.6	1	1	-	-	-	-	-	-	-	-	-	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

COURSE OBJECTIVES:

- To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper.
- To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
- To demonstrate the analysis of metals and alloys.
- To demonstrate the synthesis of nanoparticles

1. Preparation of Na_2CO_3 as a primary standard and estimation of acidity of a water sample using the primary standard
2. Determination of types and amount of alkalinity in a water sample.

- Split the first experiment into two

3. Determination of total, temporary & permanent hardness of water by EDTA method.
4. Determination of DO content of water sample by Winkler's method.
5. Determination of chloride content of water sample by Argentometric method.
6. Estimation of copper content of the given solution by Iodometry.
7. Estimation of TDS of a water sample by gravimetry.
8. Determination of strength of given hydrochloric acid using pH meter.
9. Determination of strength of acids in a mixture of acids using conductivity meter.
10. Conductometric titration of barium chloride against sodium sulphate (precipitation titration)
11. Estimation of iron content of the given solution using potentiometer.
12. Estimation of sodium /potassium present in water using a flame photometer.
13. Preparation of nanoparticles (TiO_2/ZnO/CuO) by Sol-Gel method.
14. Estimation of Nickel in steel
15. Proximate analysis of Coal

TOTAL : 30 PERIODS

COURSE OUTCOMES:

CO1: To analyse the quality of water samples with respect to their acidity, alkalinity, hardness andDO.
CO2: To determine the amount of metal ions through volumetric and spectroscopic techniques
CO3: To analyse and determine the composition of alloys.
CO4: To learn simple method of synthesis of nanoparticles
CO5: To quantitatively analyse the impurities in solution by electroanalytical techniques

TEXT BOOKS:

1. J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's Textbookof Quantitative Chemical Analysis (2009).

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.pdfhttps://magpi.raspberrypi.com/books/essentials-c-v1

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

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
2	3	1	2	-	-	1	2	-	-	-	-	1	-	-	-
3	3	2	1	1	-	-	1	-	-	-	-	-	-	-	-
4	2	1	2	-	-	2	2	-	-	-	-	-	-	-	-
5	2	1	2	-	1	2	2	-	-	-	-	1	-	-	-
Avg .	**2.6**	**1.3**	**1.6**	**1**	**1**	**1.4**	**1.8**	**-**	**-**	**-**	**-**	**1.3**	-	-	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

24GEP102 **ENGLISH LABORATORY** **L T P C**
0 0 2 1

COURSE 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

CO1: To listen to and comprehend general as well as complex academic information

CO2:To listen to and understand different points of view in a discussion

CO3:To speak fluently and accurately in formal and informal communicative contexts

CO4: To describe products and processes and explain their uses and purposes clearly andaccurately

CO5:To express their opinions effectively in both formal and informal discussions

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

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

1 - low, 2 - medium, 3 - high, '-"- no correlation

Note: The average value of this course to be used for program articulation matrix.

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

24HST201	PROFESSIONAL ENGLISH – II	L T P C 2 0 0 2

COURSE OBJECTIVES :

- To engage learners in meaningful language activities to improve their reading and writing skills
- To learn various reading strategies and apply in comprehending documents in professional context.
- To help learners understand the purpose, audience, contexts of different types of writing
- To develop analytical thinking skills for problem solving in communicative contexts
- To demonstrate an understanding of job applications and interviews for internship and placements

UNIT I MAKING COMPARISONS **6**

Reading - Reading advertisements, user manuals, brochures; Writing – Professional emails, Email etiquette - Compare and Contrast Essay; Grammar – Mixed Tenses, Prepositional phrases

UNIT II EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING **6**

Reading - Reading longer technical texts– Cause and Effect Essays, and Letters / emails ofcomplaint, Writing - Writing responses to complaints. Grammar - Active Passive Voice transformations, Infinitive and Gerunds

UNIT III PROBLEM SOLVING **6**

Reading - Case Studies, excerpts from literary texts, news reports etc. Writing – Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay. Grammar – Error correction; If conditional sentences

UNIT IV REPORTING OF EVENTS AND RESEARCH **6**

Reading –Newspaper articles; Writing – Recommendations, Transcoding, Accident Report, Survey Report Grammar – Reported Speech, Modals Vocabulary – Conjunctions- use of prepositions

UNIT V THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY **6**

Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; Writing – Job / Internship application – Cover letter & Resume; Grammar – Numerical adjectives, Relative Clauses.

TOTAL : 30 PERIODS

COURSE OUTCOMES:

At the end of the course, learners will be able

CO1: To compare and contrast products and ideas in technical texts.

CO2: To identify and report cause and effects in events, industrial processes through technical texts

CO3: To analyse problems in order to arrive at feasible solutions and communicate them in the written format.

CO4: To present their ideas and opinions in a planned and logical manner

CO5: To draft effective resumes in the context of job search.

TEXT BOOKS :

1. English for Engineers & Technologists (2020 edition) Orient Blackswan Private Ltd. Department of English, Anna University.
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.

REFERENCE BOOKS:

1. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, NewDelhi.
3. Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

ASSESSMENT PATTERN

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

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=EAIaIQobChMIhuOVq6CRhQMVJatmAh1SlgRAEAMYASAAEgK9uPD_BwE
4. https://learn.saylor.org/course/view.php?id=440
5. https://learn.saylor.org/course/view.php?id=481

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

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
2	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
3	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
4	3	3	3	3	2	3	3	3	2	3	3	3	-	-	-
5	-	-	-	-	-	-	-	-	3	3	3	3	-	-	-
AVg.	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

Note: The average value of this course to be used for program articulation matrix.

24MAT201 **STATISTICS AND NUMERICAL METHODS** **L T P C**
3 1 0 4

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 - 2^2 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 - Eigenvalues 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 derivates 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.

TOTAL: 60 PERIODS

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 thenumerical techniques of differentiation and integration for engineering problems.
CO4:Understandthe 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_Introduction ToComputationalTec.pdf

5.https://www.scribd.com/document/513474165/Computational-Techniques-Lecture-notes-

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
Avg	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

24PHT201 PHYSICS FOR INFORMATION SCIENCE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To make the students understand the importance in studying electrical properties ofmaterials.
- 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

CO1:gain knowledge on classical and quantum electron theories, and energy band structures

CO2:acquire knowledge on basics of semiconductor physics and its applications in variousdevices

CO3:get knowledge on magnetic properties of materials and their applications in data storage,

CO4:have the necessary understanding on the functioning of optical materials for optoelectronics

CO5: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

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	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-
3	3	-	-	1	2	1	1	-	-	-	-	-	-	-	-
4	3	-	2	1	3	-	1	-	-	-	-	-	-	-	-
5	3	2	2	2	2	1	2	-	-	-	-	2	-	-	-
AVG	3	1.3	2	1.3	2.3	1	1.3	-	-	-	-	2	-	-	-

1-Low,2-Medium,3-High,"-"-no correlation

Note: the average value of this course to be used for program articulation matrix.

24BET202 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING L T P C
3 0 0 3

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 RLC circuits (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

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
2	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
3	2	1	1	-	-	-	-	1	-	-	-	2	-	-	1
4	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
5	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO	2	1.8	1	-	-	-	-	1	-	-	-	2	-	-	1

1 - low, 2 - medium, 3 - high, '-"- no correlation

24GET201 **ENGINEERING GRAPHICS** **L T P C**

2 0 4 4

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 axisis 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 visual ray method.

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

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

COURSE OUTCOMES:

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

CO1: Use BIS conventions and specifications for engineering drawing.

CO2: Construct the conic curves, involutes and cycloid.

CO3: Solve practical problems involving projection of lines.

CO4: Draw the orthographic, isometric and perspective projections of simple solids.

CO5: Draw the development of simple solids.

TEXT BOOK:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House,
2. 53rdEdition, 2019.
3. Natarajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
4. 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 drawingsheets.
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. The students will be permitted to use appropriate scale to fit a solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

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

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
2	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
3	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
4	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
5	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-

1 - low, 2 - medium, 3 - high, '-"- no correlation

24CST201 **PROGRAMMING IN C** **L T P C**
3 0 0 3

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
5. Edition, Oxford University Press, 2013.
6. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.

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/alurikumaraswamya/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

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	4
1	1	2	2	1	2	1	1	1	2	-	3	2	1	2		
2	2	2	2	1	2	1	1	1	2	-	3	3	2	2		
3	2	3	2	1	2	1	1	1	2	-	3	2	2	2		
4	3	2	2	1	3	1	1	1	2	-	3	3	2	2		
5	2	3	3	1	2	1	2	1	2	-	3	2	2	3		
Avg	2	2	2	1	2	1	1	1	2	-	3	2	2	2		

1 - low, 2 - medium, 3 - high, '-"- no correlation

24GET202 TAMILS AND TECHNOLOGY L T P C

1 0 0 1

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 British Period.

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 beats - 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.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1.தமிழகவரலாறு - மக்களும்பண்பாடும் - கே.கேபிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்)

2.கணினிதமிழ்-முனைவர்இல.சுந்தரம் (விகடன்பிரசுரம்).

3.கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)

4.பொருநை -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 C ivilization on the banks of river Vaigai' (Jointly Published by: Department ofArchaeology & 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) (Publishedby: The Author)
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)

24GET202	தமிழரும்தொழில்நுட்பமும்	L	T	P	C
		1	0	0	1

அலகு 1 நெசவுமற்றும்பானைத்தொழில்நுட்பம்

சங்ககாலத்தில்நெசவுத்தொழில்-பானைத்தொழில்நுட்பம்-கருப்பு சிவப்பு பாண்டங்கள்-பான்டாங்கின் 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-இரும்புத்தொழிற்ச்சாலை-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 கனிணித் தமிழ்

அறிவியல் தமிழின் வளர்ச்சி – கணினித் தமிழ் வளர்ச்சி-தமிழ்நூல் களைமின் 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. கணினி தமிழ்-முனைவர் இல.சுந்தரம் (விகடன்பிரசுரம்).
3. கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல்துறைவெளியீடு)
4. பொருநை – 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 C ivilization on the banks of river Vaigai' (Jointly Published by: Department o Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
1. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) Published by: The Author)
2. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
3. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)

24GEP201 **ENGINEERING PRACTICES LABORATORY** **L T P C**

0 0 4 2

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 inhousehold 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

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

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:

CO1: Draw pipe line plan; lay and connect various pipe fittings used in common householdplumbing work; Saw; plan; make joints in wood materials used in common household wood work.

CO2: Wire various electrical joints in common household electrical wire work.

CO3: 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.

CO4: Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

1 - low, 2 - medium, 3 - high, '-"- no correlation

24CSP201 **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.

TheExamination 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 tofunction.
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, processordirectives.

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
5. Edition, Oxford University Press, 2013.
6. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, 1st Edition, 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
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

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	4
1	1	3	3	1	1	1	-	-	2	1	2	2	2	2		
2	2	3	3	2	1	1	-	-	2	1	2	2	2	3		
3	2	2	2	1	1	2	-	-	2	-	2	2	2	2		
4	2	2	2	2	1	2	-	-	3	-	3	3	3	2		
5	2	2	3	2	3	2	-	-	3	-	3	3	3	3		
Avg	2	2	3	2	1	2	-	-	2	1	2	2	2	2		

1 - low, 2 - medium, 3 - high, ‘-“- no correlation

24GEP202 **COMMUNICATION LABORATORY** **L T P C**
0 0 4 2

COURSE OBJECTIVES

- To identify varied group discussion skills and apply them to take part in effectivediscussions in a professional context.
- To analyse concepts and problems and make effective presentations explaining them clearly and precisely.
- To be able to communicate effectively through formal and informal writing.
- To be able to use appropriate language structures to write emails, reports and essays
- To give instructions and recommendations that are clear and relevant to the context

UNIT I **12**

Speaking-Role Play Exercises Based on Workplace Contexts, - talking about competition- discussing progress toward goals-talking about experiences- talking about events in life- discussing past events-Writing: writing emails (formal & semi-formal).

UNIT II **12**

Speaking: discussing news stories-talking about frequency-talking about travel problems- discussing travel procedures- talking about travel problems- making arrangements-describing arrangements-discussing plans and decisions- discussing purposes and reasons- understanding common technology terms-Writing: - writing different types of emails.

UNIT III **12**

Speaking: discussing predictions-describing the climate-discussing forecasts and scenarios- talking about purchasing-discussing advantages and disadvantages- making comparisons- discussing likes and dislikes-discussing feelings about experiences-discussing imaginary scenarios Writing: short essays and reports-formal/semi-formal letters.

UNIT IV **12**

Speaking: discussing the natural environment-describing systems-describing position and movement-explaining rules-(example- discussing rental arrangements)- understanding technical instructions-Writing: writing instructions-writing a short article.

UNIT V **12**

Speaking: describing things relatively-describing clothing-discussing safety issues (making recommendations) talking about electrical devices-describing controlling actions- Writing:
job application(Cover letter + Curriculum vitae)-writing recommendations.

TOTAL: 60 PERIODS

LEARNING OUTCOMES

- Speak effectively in group discussions held in a formal/semi formal contexts.
- Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
- Write emails, letters and effective job applications.
- Write critical reports to convey data and information with clarity and precision
- Give appropriate instructions and recommendations for safe execution of tasks

Assessment Pattern

- One online / app based assessment to test speaking and writing skills

- Proficiency certification is given on successful completion of speaking and writing.

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

CO	PO 1	PO2	PO 3	PO 4	PO5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
2	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
3	2	2	3	3	1	3	3	3	3	3	3	3	-	-	-
4	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
5	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
AVg .	**2.4**	**2.8**	**3**	**3**	**1.8**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**

1 - low, 2 - medium, 3 - high, '-"- no correlation

Note: The average value of this course to be used for program articulation matrix.

24MAT301 **DISCRETE MATHEMATICS** **L T P C**

3 1 0 4

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 whichrelates 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 andfields.

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.

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

REFERENCES:

1. Grimaldi. R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 5thEdition, 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 McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

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

CO	PO 1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO 9	PO10	PO1 1	PO1 2	PSO1	PSO2	PSO3
1	3	3	2	-	-	-	-	-	-	-	-	2	-	-	-
2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	3	2	-	-	2	-	-	-	3	-	-	-	-	-
4	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-
5	-	2	2	2	-	-	-	-	-	2	-	-	-	-	-
Avg.	**1**	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**

1 - low, 2 - medium, 3 - high, '-"- no correlation

24CST301 DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION L T P C
3 0 2 4

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 VerilogHDL, 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	3	3	3	3	2	1	1	1	1	2	3	2	3	3
2	3	3	3	3	2	1	1	1	1	1	2	3	1	2	2
3	3	3	3	3	2	2	1	1	1	1	2	3	2	3	1
4	3	3	3	3	1	1	1	1	1	1	1	2	1	3	1
5	3	3	3	3	1	2	1	1	1	1	1	2	1	2	1
AVg.	3	3	3	3	1	2	1	1	1	1	1	2	1	2	1

1 - low, 2 - medium, 3 - high, '-"- no correlation

24CST302 **FOUNDATIONS OF DATA SCIENCE** **L T P C**
3 0 0 3

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 r2 –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		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	2	2	-	-	-	1	1	1	2	2	2	2
2	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
3	2	2	1	2	2	1	1	-	1	2	1	3	2	2	3
4	3	2	2	1	2	-	-	-	1	1	2	2	3	3	2
5	2	2	1	2	2	-	-	-	1	1	1	2	2	2	2
AVg.	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2

1 - low, 2 - medium, 3 - high, ‘-“- no correlation

24ALT301 DATA STRUCTURES AND ALGORITHMS L T P C
3 0 0 3

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

1 - low, 2 - medium, 3 - high, ‘-“- no correlation

24CST304 **OBJECT ORIENTED PROGRAMMING** **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To understand Object Oriented Programming concepts and basics of Java programminglanguage
- 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 JAVAFX

UNIT I INTRODUCTION TO OOP AND JAVA 9

Overview of OOP – Object oriented programming paradigms – Features of Object OrientedProgramming – 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 – DynamicMethod 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 JAVAFX EVENT HANDLING, CONTROLS AND COMPONENTS 9

JAVAFX 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 worldproblems

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", 11 th Edition, McGraw Hill Education, NewDelhi, 2019
2. Herbert Schildt, "Introducing JavaFX 8 Programming", 1 st Edition, McGraw Hill Education, NewDelhi, 2015

REFERENCE:

1. Cay S. Horstmann, "Core Java Fundamentals", Volume 1, 11 th 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% 20 ORIENTED%20PROGRAMMING-1825148287 CS8392%20OOPS%20%20notes.pdf
4. https://kp.kiit.ac.in/pdf_files/06/STUDY_MATERIAL_3RD_CSE_OBJECT_ORIENTED_METHODOLOGY.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	3	1	2
2	2	1	3	2	1	-	-	-	2	1	1	3	3	3	2
3	3	3	1	2	2	-	-	-	3	2	1	2	3	1	3
4	3	1	2	2	2	-	-	-	1	2	1	3	3	1	1
5	1	1	2	3	2	-	-	-	3	2	1	2	3	3	3
AVg.	2	1	2	2	2	-	-	-	2	2	1	2	3	2	2

1 - low, 2 - medium, 3 - high, '-"- no correlation

24ALP301 DATA STRUCTURES AND ALGORITHMS LABORATORY L T P C
0 0 4 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

TOTAL: 60 PERIODS

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

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. Necaise, “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

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**	**4**
1	3	2	1	1	1	-	-	-	2	3	1	2	1	2	1	
2	3	3	2	-	1	-	-	-	2	3	1	2	2	2	1	
3	2	2	2	1	1	-	-	-	2	3	1	2	1	3	1	
4	3	1	2	1	1	-	-	-	2	3	1	2	1	3	1	
AVg.	2.75	2	1.75	1	1				2	3	1	2	1.25	2.5	1	

1 - low, 2 - medium, 3 - high, '-"- no correlation

24CSP302 OBJECT ORIENTED PROGRAMMING LABORATORY L T P C
0 0 3 1.5

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

1 - low, 2 - medium, 3 - high, '-"- no correlation

24CSP303 **DATA SCIENCE LABORATORY** **L T P C**
0 0 4 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 thefollowing:
    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		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	-	1	3	3	3	1	3	2
2	3	2	2	3	1	-	-	-	3	1	3	2	1	3	3
3	3	2	1	3	1	-	-	-	2	1	1	1	3	2	3
4	2	3	1	3	-	-	-	-	2	3	2	3	3	3	1
5	1	2	3	1	1	-	-	-	2	1	3	1	1	3	3
AVg.	2	2	2	2	1	-	-	-	2	2	2	2	2	3	2

1 - low, 2 - medium, 3 - high, '-"- no correlation

24GEP301 **PROFESSIONAL DEVELOPMENT** **L T P C**
0 0 2 1

COURSE 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 document

Working with tables

Working with Bullets and Lists

Working with styles, shapes, smart art, charts

Inserting objects, charts and importing objects from other office tools

Creating and Using document templates

Inserting equations, symbols and special characters Working

with Table of contents and References, citations Insert and

review comments

Create bookmarks, hyperlinks, endnotes footnote

Viewing document in different modes

Working with document protection and security

Inspect 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 formats

Working 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

COURSE OUTCOMES:

On successful completion the students will be able to

CO1: Use MS Word to create quality documents, by structuring and organizing content for their dayto day technical and academic requirements

CO2:Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding

CO3: Use MS PowerPoint to create high quality academic presentations by including commontables, charts, graphs, interlinking other elements, and using media objects.

24CST401 **THEORY OF COMPUTATION** **L T P C**
3 0 0 3

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- Equivalenceof 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) andLanguages – 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 techniquesfor 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.

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

TOTAL:45 PERIODS

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, Tata McGraw 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/~michiel/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-Books Download.html

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

1 - low, 2 - medium, 3 - high, '-"- no correlation

24ALT402 **OPERATING SYSTEMS** **L T P C**
3 0 2 4

COURSEOBJECTIVES:

- 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**.**

UNITI 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.

UNITII 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.

UNITIII MEMORY MANAGEMENT 10

MainMemory-Swapping-ContiguousMemoryAllocation–Paging-StructureofthePageTable
- Segmentation, Segmentation with paging; Virtual Memory - Demand Paging – Copy on Write - Page Replacement - Allocation of Frames –Thrashing.

UNITIV STORAGE MANAGEMENT 10

MassStoragesystem–DiskStructure-DiskSchedulingandManagement;File-SystemInterface
- 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.

UNITV 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.

45PERIODS

PRACTICALEXERCISES: 30 PERIODS

1. Installation of Operating system: Windows/Linux
2. Illustrate UNIX commands and Shell Programming
3. ProcessManagementusingSystemCalls:Fork,Exec,Getpid,Exit,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 Semaphores
7. Write a C program to avoid Dead lock 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

COURSEOUTCOMES:

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

CO1: Analyze various schedulingalgorithmsandprocesssynchronization.
CO2: Explain deadlock,prevention and avoidancea lgorithms.
CO3: Compare and contrastvariousmemorymanagement schemes.
CO4: Explain the functionalityoffilesystemsI/Osystems,andVirtualization
CO5: Compare Ios and Android OperatingSystems.

TOTAL:75 PERIODS

TEXTBOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2018.
2. AndrewSTanenbaum,"ModernOperatingSystems",Pearson,4thEdition,NewDelhi,2016.

REFERENCES

1. Ramaz Elmasri,A.GilCarrick,DavidLevine,"OperatingSystems– Spiral Approach", Tata McGraw Hill Edition, 2010.
2. WilliamStallings,"Operating Systems: Internals and DesignPrinciples", 7thEdition, Prentice Hall, 2018.
3. AchyutS.Godbole,AtulKahate,"OperatingSystems",McGrawHillEducation,2016.

WEB RESOURCES:

1. https://www.coursera.org/courses?query=operating%20system
2. https://www.udemy.com/courses/it-and-software/operating-systems/?srsltid=AfmBOoqC1UCYsl0pxa7sOIHJX7Vw-yDOHHhu4CgNgcfAg896YFgz6q5y
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%20 Concepts%20(9th,2012_12).pdf
5. https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/William%20Stallings%20-%20Operating%20Systems%20(1).pdf

CO's-PO's&PSO'sMAPPING

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

1-low,2-medium,3-high,'-'-nocorrelation

24ADT403 DATABASE DESIGN AND MANAGEMENT L T P C
3 0 0 3

COURSEOBJECTIVES:

- To introduce database development lifecycle and conceptual modeling
- To learn SQL for data definition, manipulation and querying a database
- To learn relational database design using conceptual mapping and normalization
- To learn transaction concepts and Serializability of schedules
- To learn data model and querying in object-relational and No-SQL databases

UNITI CONCEPTUAL DATAMODELING 8

Database environment–Database system development lifecycle– Requirements collection– Database design -- Entity-Relationship model – Enhanced-ER model – UML class diagrams.

UNITII RELATIONAL MODEL AND SQL 10

Relational model concepts—Integrity constraints—SQL Data manipulation –SQL Data definition – Views -- SQL programming.

UNITIII RELATIONALDATABASEDESIGNANDNORMALIZATION 10

ER and EER-to-Relational mapping – Update anomalies – Functional dependencies – Inference rules – Minimal cover – Properties of relational decomposition – Normalization (up to BCNF).

UNITIV TRANSACTIONMANAGEMENT 8

Transactionconcepts–properties–Schedules–Serializability–ConcurrencyControl–Two- phase locking techniques.

UNITV OBJECTRELATIONALANDNO-SQLDATABASES 9

Mapping EER to ODB schema –Object identifier–reference types –row types –UDTs–Subtypes and super types – user-defined routines – Collection types – Object Query Language; No-SQL: CAP theorem – Document-based: Mongo DB data model and CRUD operations; Column-based: H base data model and CRUD operations.

TOTAL:45 PERIODS

COURSEOUTCOMES

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

CO1: Understand the database development life cycle and apply conceptual modeling
CO2: Apply SQL and programming in SQL to create, manipulate and query the database
CO3: Apply the conceptual -to-relational mapping and normalization to design relational database
CO4: Determine the serializability of any non-serial schedule using concurrency techniques
CO5:Apply the data model and querying in Object-relational and No-SQLdatabases.

TEXTBOOKS:

1. Thomas M. Connolly, Carolyn E. Begg, Database Systems – A Practical Approach to Design, Implementation, and Management, Sixth Edition, Global Edition, Pearson Education, 2015.
2. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 7th Edition, Pearson, 2017.

REFERENCES:

1. TobyTeorey,SamLightstone,TomNadeau,H.V.Jagadish,"DATABASEMODELING AND DESIGN - Logical Design", Fifth Edition, Morgan Kaufmann Publishers, 2011.
2. Carlos Coronel, Steven Morris, and Peter Rob, Database Systems: Design, Implementation, and Management, Ninth Edition, Cengage learning, 2012
3. Abraham Silberschatz, Henry F Korth, S Sudharshan, "Database System Concepts", 6thEdition, Tata Mc Graw Hill, 2011.
4. HectorGarcia-Molina,JeffreyDUllman,JenniferWidom,"DatabaseSystems:TheComplete Book", 2nd edition, Pearson.
5. Raghu Ramakrishnan, "Database Management Systems", 4th Edition, Tata McGraw Hill, 2010.

WEB RRESOURCES:

1. https://www.coursera.org/courses?query=database%20management
2. https://www.udemy.com/topic/databasemanagement/?srsltid=A fmBOopbhTChLh0g3PsQtC8dac2Qf8iSoq_Q5tQ8D64OlbsVJidtRYRS
3. https://www.udemy.com/topic/database-management/?srsltid=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
5. https://github.com/AatmikJain/ComputerScienceBooks/blob/master/Database%20Systems%20-%20Navathe.pdf

CO's-PO's&PSO'sMAPPING

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

1-low,2-medium,3-high,'-'-nocorrelation

COURSEOBJECTIVES:

- To understand the basic concepts of machine learning.
- To understand and build supervised learning models.
- To understand and build unsupervised learning models.
- To evaluate the algorithms based on corresponding metrics identified

UNITI INTRODUCTION TO MACHINE LEARNING 8

Review of Linear Algebra for machine learning; Introduction and motivation for machine learning; Examples of machine learning applications, Vapnik-Chervonenkis (VC) dimension, Probably Approximately Correct (PAC) learning, Hypothesis spaces, Inductive bias, Generalization, Bias variance trade-off.

UNITII SUPERVISED LEARNING 11

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

UNITIII 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.

UNITIV NEURAL NETWORKS 9

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

UNITV DESIGN AND ANALYSIS OF MACHINE LEARNING EXPERIMENTS 8

Guidelines for machine learning experiments, Cross Validation (CV) and resampling – K-fold CV, bootstrapping, measuring classifier performance, assessing a single classification algorithm and comparing two classification algorithms – *t* test, McNemar's test, K-fold CV paired *t* test

TOTAL:45 PERIODS

COURSE OUTCOMES:

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

CO1: Explain the basic concepts of machine learning.
CO2:Construct supervised learning models.
CO3:Construct unsupervised learning algorithms.
CO4:Evaluate and compare different models

TEXTBOOKS:

1. EthemAlpaydin,"IntroductiontoMachineLearning",MITPress,FourthEdition,2020.
2. StephenMarsland,"MachineLearning:AnAlgorithmicPerspective,"SecondEdition", CRC Press, 2014.

REFERENCES

1. Christopher M.Bishop,"PatternRecognitionandMachineLearning",Springer,2006.
2. Tom Mitchell,"MachineLearning",McGrawHill,3rdEdition,1997.
3. Mehryar Mohri, AfshinRostamizadeh,AmeetTalwalkar,"FoundationsofMachine Learning", Second Edition, MIT Press, ~~2012~~, 2018.
4. IanGoodfellow,YoshuaBengio,AaronCourville,"DeepLearning",MITPress,2016
5. SebastainRaschka,VahidMirjalili,"PythonMachineLearning",Packtpublishing3rd Edition, 2019.

WEB RESOURCES:

1. **https://www.guvi.in/zen-class/artificial-intelligence-and-machine-learning-course**
2. **https://www.coursera.org/courses?query=machine%20learning&skills=Machine%20Learning**
3. **https://www.udemy.com/topic/machine-learning/?srsltid=AfmBOoooSqGzefD-Vbnr-HZ2ZpHu1tfsBLhqM7f8xNiyv9faMr7Mx_yr**
4. **https://www.edx.org/learn/machine-learning**
5. **https://www.datacamp.com/category/machine-learning?page=1**

ONLINE RESOURCES:

1. **https://alex.smola.org/drafts/thebook.pdf**
2. **https://www.nrigroupindia.com/e-book/Introduction%20to%20Machine%20Learning%20with%20Python%20(%20PDFDrive.com%20)-min.pdf**
3. **https://aitskadapa.ac.in/ebooks/AI&ML/MACHINE%20LEARNING/Machine%20Learning%20(%20etc.)%20(z-lib.org).pdf**
4. https://www.microsoft.com/en-us/research/uploads/prod/2006/01/Bishop-Pattern-Recognition-and-Machine-Learning-2006.pdf
5. **https://ai.stanford.edu/~nilsson/MLBOOK.pdf**

CO's-PO's&PSO'sMAPPING

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

1-low,2-medium,3-high,'-'-nocorrelation

24ALT405 **ARTIFICIAL INTELLIGENCE** LT P C
3 0 0 3

COURSEOBJECTIVES:

The main objectives of this course are to:

- Learn the basic AI approaches
- Develop problem solving agents
- Perform logical and probabilistic reasoning

UNITI INTELLIGENT AGENTS 9

Introduction to AI – Agents and Environments – concept of rationality – nature of environments – structure of agents. Problem solving agents – search algorithms – uninformed search strategies.

UNITII PROBLEM SOLVING 9

Heuristic search strategies – heuristic functions. Local search and optimization problems – local search in continuous space – search with non-deterministic actions – search in partiallyobservable environments – online search agents and unknown environments

UNITIII GAME PLAYING AND CSP 9

Game theory – optimal decisions in games – alpha-beta search – monte-carlo tree search – stochastic games – partially observable games. Constraint satisfaction problems – constraint propagation – backtracking search for CSP – local search for CSP – structure of CSP.

UNITIV LOGICAL REASONING 9

Knowledge-based agents – propositional logic – propositional theorem proving – propositional model checking – agents based on propositional logic. First-order logic – syntax and semantics – knowledge representation and engineering – inferences in first-order logic – forward chaining – backward chaining – resolution.

UNITV 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.

TOTAL:45PERIODS

COURSEOUTCOMES:

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

CO1: Explain intelligent agent frameworks
CO2:Apply problem solving techniques
CO3:Apply game playing and CSP techniques
CO4:Perform logical reasoning
CO5:Perform probabilistic reasoning under uncertainty

TEXTBOOKS:

1. StuartRussellandPeterNorvig,“ArtificialIntelligence –AModernApproach”,Fourth Edition, Pearson Education, 2021.

REFERENCES

1. DanW.Patterson,“IntroductiontoAIandES”,PearsonEducation,2007
2. KevinNight,ElaineRich,andNairB.,“ArtificialIntelligence”,McGrawHill,2008
3. PatrickH.Winston,"ArtificialIntelligence",ThirdEdition,PearsonEducation,2006
4. DeepakKhemani,“ArtificialIntelligence”,TataMcGrawHillEducation,2013
5. http://nptel.ac.in/

WEB RESOURCES:

1. https://iitmadras.emeritus.com/iitmp-applied-aiml-tech-certificate-programme?
2. https://www.guvi.in/zen-class/artificial-intelligence-and-machine-learning-course
3. https://www.coursera.org/courses?query=artificial%20intelligence
4. https://www.coursera.org/courses?query=artificial%20intelligence
5. https://www.udemy.com/topic/artificial-intelligence/?srsltid=AfmBOoqsi-UW_mhFnl2w_M-o0avuvuTyqAahd2U-uHN9hWfi-iSrltjf

ONLINE RESOURCES:

1. https://www.freebookcentre.net/CompuScience/Free-Artificial-Intelligence-Books-Download.html
2. https://courses.csail.mit.edu/6.034f/ai3/rest.pdf
3. https://ia800201.us.archive.org/5/items/handbookofartific01barr/handbookofartific01barr.pdf
4. http://repo.darmajaya.ac.id/4229/1/Artificial%20Intelligence_%20The%20Basics%20%28%20PDFDrive%20%29.pdf
5. https://library.oapen.org/handle/20.500.12657/59329
6. https://www.benthamscience.com/ebook_volume/3615/related-ebooks

CO's-PO's&PSO'sMAPPING

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

1-low,2-medium,3-high,'-'-nocorrelation

24GET401 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY L T P C
2 0 0 2

COURSE OBJECTIVES:

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and nonrenewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmentalmanagement.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

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

COURSE OUTCOMES:

CO1: To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.

CO2:To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.

CO3:To identify and apply the understanding of renewable and non-renewable resources andcontribute to the sustainable measures to preserve them for future generations.

CO4:To recognize the different goals of sustainable development and apply them for suitabletechnological advancement and societal development.

CO5:To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

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 CaseStudies, 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.

REFERENCES :

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', 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.

WEB RESOURCES:

1. **https://www.coursera.org/browse/physical-science-and-engineering/environmental-science-and-sustainability**
2. **https://ocw.mit.edu/collections/environment/**
3. **https://www.unep.org/explore-topics/education-environment/what-we-do/massive-open-online-courses**
4. **https://onlinecourses.nptel.ac.in/noc23_hs155/preview**
5. **https://www.unep.org/explore-topics/education-environment/what-we-do/massive-open-online-courses**

ONLINE RESOURCES:

1. https://www.msajce-edu.in/academics/mech/LectureNote/GE3451-LN.pdf
2. https://www.eduengineering.net/src/Subject/Semester-4/Environmental-Sciences-and-Sustainability
3. https://www.scribd.com/document/662529624/Environmental-Sciences-and-Sustainability
4. https://www.bhumipublishing.com/wp-content/uploads/2022/12/Environment-and-Sustainability-Volume-IV.pdf
5. https://portals.iucn.org/library/sites/library/files/documents/hlth-022.pdf

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

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
Avg.	**2.8**	**1.8**	**1**	**1**	**-**	**2.2**	**2.4**	**-**	**-**	**-**	**-**	**1.8**	**-**	**-**	**-**

NCC Credit Course Level 2*

NX3451	**(ARMY WING) NCC Credit Course Level - II**	**L T P C** **3 0 0 3**

PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3
LEADERSHIP		**7**
L 2	Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965	7
DISASTER MANAGEMENT		**13**
DM 1	Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation	3
DM 2	Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters	9
DM 3	Fire Service & Fire Fighting	1
ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
ARMED FORCES		**6**
AF 1	Armed Forces, Army, CAPF, Police	6
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

NCC Credit Course Level 2*

NX3452	**(NAVAL WING) NCC Credit Course Level - II**	**L T P C** **3 0 0 3**

PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Change your mindset, Time Management, Social Skills	6
PD 5	Public Speaking	3

LEADERSHIP **7**

L 2 Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 7

DISASTER MANAGEMENT **13**

DM 1 Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation 3

DM 2 Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters 9

DM 3 Fire Service & Fire Fighting 1

ENVIRONMENTAL AWARENESS & CONSERVATION **3**

EA 1 Environmental Awareness and Conservation 3

GENERAL AWARENESS **4**

GA 1 General Knowledge 4

NAVAL ORIENTATION **6**

AF 1 Armed Forces and Navy Capsule 3

EEZ 1 EEZ Maritime Security and ICG 3

ADVENTURE **1**

AD 1 Introduction to Adventure Activities 1

BORDER & COASTAL AREAS **2**

BCA 1 History, Geography & Topography of Border/Coastal areas 2

TOTAL: 45 PERIODS

NCC Credit Course Level 2*

NX3453 **(AIR FORCE WING) NCC Credit Course Level - II** **L T P C**

3 0 0 3

PERSONALITY DEVELOPMENT **9**

PD 3 Group Discussion: Change your mindset, Time Management, Social Skills 6

PD 5 Public Speaking 3

LEADERSHIP **7**

L 2 Case Studies: APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murty, Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 7

DISASTER MANAGEMENT **13**

DM 1 Disaster Management Capsule: Organisation, Types of Disasters, Essential Services, Assistance, Civil Defence Organisation 3

DM 2 Initiative Training, Organising Skills, Do's & Don't's, Natural Disasters, Man Made Disasters 9

DM 3 Fire Service & Fire Fighting 1

ENVIRONMENTAL AWARENESS & CONSERVATION		**3**
EA 1	Environmental Awareness and Conservation	3
GENERAL AWARENESS		**4**
GA 1	General Knowledge	4
GENERAL SERVICE KNOWLEDGE		**6**
GSK 1	Armed Forces & IAF Capsule	2
GSK 2	Modes of Entry in IAF, Civil Aviation	2
GSK 3	Aircrafts - Types, Capabilities & Role	2
ADVENTURE		**1**
AD 1	Introduction to Adventure Activities	1
BORDER & COASTAL AREAS		**2**
BCA 1	History, Geography & Topography of Border/Coastal areas	2

TOTAL: 45 PERIODS

24ALP401 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LABORATOR L T P C
0 0 4 2

COURSE OBJECTIVES:

- To learn to implement uninformed and informed search techniques.
- To build a knowledge base in Prolog and process queries to perform inference.
- To build supervised learning models.
- To explore the regression models.
- To learn to compare and evaluate the performance of different models

LISTOF EXPERIMENTS:

1. BFS & DFS algorithm implementation
2. A*algorithm implementation
3. Hill Climbing implementation
4. Develop a small KB using Prolog and answer simple queries.
5. Inference through Prolog/Python.
6. Write a program to implement the naïve Bayesian classifier for credit card analysis and compute the accuracy with a few test data sets.
7. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate dataset for building the decision tree and apply this knowledge to classify a new sample.
8. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
9. Evaluate the performance of Linear regression ,logistic regression, naïve Bayes and SVM based prediction models for heart disease diagnosis.

List of Equipments:(30Studentsper Batch)

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

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

TOTAL:60PERIODS

COURSE OUTCOMES:

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

CO1: Implement uninformed and informed search techniques

CO2: Build a knowledge base in Prolog and process queries to perform inference

CO3: Develop supervised learning models

CO4: Develop regression models

CO5: Compare and evaluate the performance of different models

CO's-PO's&PSO'sMAPPING

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

1-low,2-medium,3-high,'-'-nocorrelation

24ADP402 DATABASE DESIGN AND MANAGEMENT LABORATORY L T P C

0 0 3 1.5

COURSE OBJECTIVES:

- To understand the database development life cycle
- To learn database design using conceptual modeling, Normalization
- To implement database using Data definition, Querying using SQL manipulation and SQL programming
- To implement database applications using IDE/RAD tools
- To learn querying Object-relational databases

SUGGESTIVE EXPERIMENTS

1. Database Development Lifecycle:
2. Problem definition and Requirement analysis Scope and Constraints
3. Database design using Conceptual modeling(ER-EER)–top-down approach
4. Mapping conceptual to relational database and validate using Normalization
5. Implement the database using SQL Data definition with constraints ,Views
6. Query the database using SQL Manipulation
7. Querying/Managing the database using SQL Programming
    a. Stored Procedures/Functions
    b. Constraints and security using Triggers
8. Database design using Normalization–bottom-up approach
9. Develop database applications using IDE/RAD tools(Eg., Net Beans, Visual Studio)
10. Database design using EER-to-ODB mapping/UML class diagrams
11. Object features of SQL-UDTs and sub-types, Tables using UDTs, Inheritance, Method definition
12. Querying the Object-relational database using Objet Query language

COURSE OUTCOMES

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

CO1: Understand the database development lifecycle

CO2: Design relational database using conceptual-to-relational mapping, Normalization

CO3:A pply SQL for creation, manipulation and retrieval of data

CO4: Develop a database applications for real-time problems

CO5: Design and query object-relational databases

TOTAL:45 PERIODS

HARDWARE:

- Standalone Desktops

SOFTWARE:

- Post gre SQL

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

1-low,2-medium,3-high,'-'-nocorrelation

NAVIGATION		**2**
N 1	Navigation of Ship - Basic Requirements	1
N 2	Chart Work	1
SEAMANSHIP		**15**
MH 1	Introduction to Anchor Work	2
MH 2	Rigging Capsule	6
MH 3	Boatwork - Parts of Boat	2
MH 4	Boat Pulling Instructions	2
MH 5	Whaler Sailing Instructions	3
FIRE FIGHTING FLOODING & DAMAGE CONTROL		**4**
FFDC 1	Fire Fighting	2
FFDC 2	Damage Control	2
SHIP MODELLING		**3**
SM	Ship Modelling Capsule	3
		TOTAL : 45 PERIODS

NCC Credit Course Level 3*

NX3653	**(AIR FORCE WING) NCC Credit Course Level - III**	**L T P C**
		3 0 0 3
PERSONALITY DEVELOPMENT		**9**
PD 3	Group Discussion: Team Work	2
PD 4	Career Counselling, SSB Procedure & Interview Skills	3
PD 5	Public Speaking	4
BORDER & COASTAL AREAS		**4**
BCA 2	Security Setup and Border/Coastal management in the area	2
BCA 3	Security Challenges & Role of cadets in Border management	2
AIRMANSHIP		**1**
A 1	Airmanship	1
BASIC FLIGHT INSTRUMENTS		**3**
FI 1	Basic Flight Instruments	3
AERO MODELLING		**3**
AM 1	Aero Modelling Capsule	3
GENERAL SERVICE KNOWLEDGE		**2**
GSK 4	Latest Trends & Acquisitions	2

AIR CAMPAIGNS		**6**
AC 1	Air Campaigns	6
PRINCIPLES OF FLIGHT		**6**
PF 1	Principles of Flight	3
PF 2	Forces acting on Aircraft	3
NAVIGATION		**5**
NM 1	Navigation	2
NM 2	Introduction to Met and Atmosphere	3
AERO ENGINES		**6**
E 1	Introduction and types of Aero Engine	3
E 2	Aircraft Controls	3

TOTAL : 45 PERIODS