V.S.B. College of Engineering Technical Campus
(An Autonomous Institution)
Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai
NAAC Accredited Institution, NBA Accredited Courses
Coimbatore to Pollachi Road NH -209, Ealur Privu, Kinathukadavu Taluk,
Coimbatore - 642109, Tamilnadu, India. Email:office@vsbcetc.com website : www.vsbcetc.com

ANNEXURE - XII

B.E. COMPUTER SCIENCE AND ENGINEERING

CURRICULUM AND SYLLABI

FOR

SEMESTERS I AND II

REGULATIONS 2024

CHOICE BASED CREDIT SYSTEM

B.E. COMPUTER SCIENCE AND ENGINEERING

I. ABOUT THE DEPARTMENT

The faculty of Computer Science & Engineering is the soul of many engineering branches. This field is instrumental in bringing the world to where it is today. Computer Science & Engineering (CSE) course was started in our institution in the year 2012. Our department has dedicated, well-qualified and experienced faculty members who are specialists in the areas of Database, Data Mining, Computer Architecture, Operating Systems, Image Processing, Wireless Network, Artificial Neural Networks', Information Security and Programming Languages. They actively involve themselves in research activities in the field of their specialization. They have published a number of papers in Journals and Conferences of National and International repute. The department attributes its success to the creative and innovative outlook of its students also. It encourages students to participate in numerous symposiums and to present papers in them. Students are also made to undergo in-plant training programs, where they hone their technical skill in the realm of computers.

II. VISION OF THE DEPARTMENT

To offer a quality education in Computer Science and Engineering, encourage life-long learning and make graduates responsible for society by upholding social values in the field of emerging technology.

III. MISSION OF THE DEPARTMENT

The Department strives to contribute to the expansion of knowledge in the discipline of Computer Science and Engineering by,

To produce graduates with sound technical knowledge and good skills that prepare them for rewarding career in prominent industries.

To promote collaborative learning and research with Industry, Government and International Organizations for continuous knowledge transfer and enhancement.

To promote entrepreneurship and mould the graduates to be leaders by cultivating the spirit of social ethical values.

IV. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO #1: Graduates will have successful careers with high level of technical competency and problem

solving skills to produce innovative solutions for industrial needs.

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

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

V. PROGRAM OUTCOMES (POs)

PO 1: Engineering knowledge

Apply the Mathematical knowledge and the basics of Science and Engineering to solve the problems pertaining to Computer Science and Engineering.

PO2: Problem analysis

Identify and formulate Computer Science and Engineering problems from research literature and be able to analyze the problem using first principles of Mathematics and Engineering Sciences

PO3: Design/development of solutions

Come out with solutions for the complex problems and to design system components or process that fulfill the particular needs taking into account public health and safety and the social, cultural and environmental issues.

PO4: Conduct investigations of complex problems

Draw well-founded conclusions applying the knowledge acquired from research and research methods including design of experiments, analysis and interpretation of data and synthesis of information and to arrive at significant conclusion.

PO5: Modern tool usage

Form, select and apply relevant techniques, resources and Engineering and IT tools for Engineering activities like electronic prototyping, modeling and control of systems and also being conscious of the limitations.

PO6: The engineer and society

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Computer Science and Engineering practice.

PO7: Environment and sustainability

Be aware of the impact of professional Engineering solutions in societal and environmental contexts and exhibit the knowledge and the need for sustainable Development.

PO8: Ethics

Apply the principles of Professional Ethics to adhere to the norms of the engineering practice and to discharge ethical responsibilities.

PO9: Individual and team work

Function actively and efficiently as an individual or a member/leader of different teams and multidisciplinary projects.

PO10: Communication

Communicate efficiently the engineering facts with a wide range of engineering community and others, to understand and prepare reports and design documents; to make effective presentations and to frame and follow instructions

PO11: Project management and finance

Demonstrate the acquisition of the body of engineering knowledge and insight and Management Principles and to apply them as member / leader in teams and multidisciplinary environments.

PO12: Life-long learning

Recognize the need for self and life-long learning, keeping pace with technological challenges in the broadest sense.

VI. PROGRAM SPECIFIC OUTCOMES (PSOs)

The Students will be able to

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

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

B.E. COMPUTER SCIENCE AND ENGINEERING

CHOICE BASED CREDIT SYSTEM

CURRICULUM AND SYLLABI FOR SEMESTERS I TO VIII

SEMESTER I

S.No	COURSE CODE	COURSE TITLE	CATEGORY	INT / EXT	PERIODS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
					L	T	P		
1.	24IP101	Induction Programme	-	-	-	-	-	-	0
THEORY									
2.	24HST101	Professional English -I	HSMC	40 / 60	3	0	0	3	3
3.	24MAT101	Matrices and Calculus	BSC	40 / 60	3	1	0	4	4
4.	24PHT101	Engineering Physics	BSC	40 / 60	3	0	0	3	3
5.	24CYT101	Engineering Chemistry	BSC	40 / 60	3	0	0	3	3
6.	24GET101	Problem Solving and Python Programming	PSC	40 / 60	3	0	0	3	3
7.	24GET102	அறிவியல்தமிழ்/Scientific Thoughts in Tamil	HSMC	40 / 60	1	0	0	1	1
PRACTICALS									
8.	24GEP101	Problem Solving and Python Programming Laboratory	PSC	75 / 25	0	0	4	4	2
9.	24BSP101	Physics and Chemistry Laboratory	BSC	75 / 25	0	0	4	4	2
10.	24GEP102	English Laboratory[$]	EEC	75 / 25	0	0	2	2	1
TOTAL				**900**	**16**	**1**	**10**	**27**	**24**

[$]Skill Based Course

SEMESTER II

S.No	COURSE CODE	COURSE TITLE	CATEGORY	INT / EXT	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
					L	T	P		
THEORY									
1.	24HST201	Professional English II	HSMC	40 / 60	2	0	0	2	2
2.	24MAT201	Statistics and Numerical Methods	BSC	40 / 60	3	1	0	4	4
3.	24PHT201	Physics for Information Science	BSC	40 / 60	3	0	0	3	3
4.	24BET202	Basic Electrical and Electronics Engineering	ESC	40 / 60	3	0	0	3	3

5.	24GET201	Engineering Graphics	ESC	40 / 60	2	0	4	6	4
6.	24CST201	Programming in C	ESC	40 / 60	3	0	0	3	3
7.	24GET202	தமிழர்மரபு /Heritage of Tamils	HSMC	40 / 60	1	0	0	1	1
8.		NCC Credit Course Level 1[#]	-	-	2	0	0	2	2#
PRACTICALS									
9.	24GEP201	Engineering Practices Laboratory	ESC	75 / 25	0	0	4	4	2
10.	24CSP201	Programming in C Laboratory	ESC	75 / 25	0	0	4	4	2
11.	24GEP202	Communication Laboratory / Foreign Language[$]	EEC	75 / 25	0	0	4	4	2
TOTAL				**1000**	**17**	**1**	**16**	**34**	**26**

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

$ Skill Based Course

SEMESTER III

S.No	COURSE CODE	COURSE TITLE	CATEGORY	INT / EXT	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
					L	T	P		
THEORY									
1.	24MAT301	Discrete Mathematics	BSC	40 / 60	3	1	0	4	4
2.	24CST301	Digital Principles and Computer Organization	ESC	40 / 60	3	0	2	5	4
3.	24CST302	Foundations of Data Science	PCC	40 / 60	3	0	0	3	3
4.	24CST303	Data Structures	PCC	40 / 60	3	0	0	3	3
5.	24CST304	Object Oriented Programming	PCC	40 / 60	3	0	0	3	3
PRACTICALS									
6.	24CSP301	Data Structures Laboratory	PCC	75 / 25	0	0	3	3	1.5
7.	24CSP302	Object Oriented Programming Laboratory	PCC	75 / 25	0	0	3	3	1.5
8.	24CSP303	Data Science Laboratory	PCC	75 / 25	0	0	4	4	2
9.	24GEP301	Professional Development$	EEC	75 / 25	0	0	2	2	1
TOTAL				**900**	**15**	**1**	**14**	**30**	**23**

[$]Skill Based Course

SEMESTER IV

S.No	COURSE CODE	COURSE TITLE	CATEGORY	INT / EXT	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
					L	T	P		
THEORY									
1.	24CST401	Theory of Computation	PCC	40 / 60	3	0	0	3	3
2.	24CST402	Artificial Intelligence and Machine Learning	PCC	40 / 60	3	0	2	5	4
3.	24CST403	Database Management Systems	PCC	40 / 60	3	0	0	3	3
4.	24CST404	Algorithms	PCC	40 / 60	3	0	2	5	4
5.	24CST405	Introduction to Operating Systems	PCC	40 / 60	3	0	0	3	3
6.	24GET401	Environmental Sciences and Sustainability	BSC	40 / 60	2	0	0	2	2
7.		NCC Credit Course Level 2#			3	0	0	3	3#
PRACTICALS									
8.	24CSP401	Operating Systems Laboratory	PCC	75 / 25	0	0	3	3	1.5
9.	24CSP402	Database Management Systems Laboratory	PCC	75 / 25	0	0	3	3	1.5
TOTAL				**800**	**20**	**0**	**10**	**30**	**24**

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

SEMESTER V

S.No	COURSE CODE	COURSE TITLE	CATEGORY	INT / EXT	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
					L	T	P		
THEORY									
1.	24CST501	Computer Networks	PCC	40 / 60	3	0	2	5	4
2.	24CST502	Compiler Design	PCC	40 / 60	3	0	2	5	4
3.	24CST503	Cryptography and Cyber Security	PCC	40 / 60	3	0	0	3	3
4.	24CST504	Distributed Computing	PCC	40 / 60	3	0	0	3	3
5.		Professional Elective I	PEC	40 / 60	-	-	-	-	3
6.		Professional Elective II	PEC	40 / 60	-	-	-	-	3
7.		Mandatory Course-I[&]	MC	-	3	0	0	3	0
TOTAL				**600**	**-**	**-**	**-**	**-**	**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	INT / EXT	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
					L	T	P		
THEORY									
1.	24CST601	Object Oriented Software Engineering	PCC	40 / 60	3	0	2	5	4
2.	24CST602	Embedded Systems and IoT	PCC	40 / 60	3	0	2	5	4
3.		Open Elective – I*	OEC	40 / 60	3	0	0	3	3
4.		Professional Elective III	PEC	40 / 60	-	-	-	-	3
5.		Professional Elective IV	PEC	40 / 60	-	-	-	-	3
6.		Professional Elective V	PEC	40 / 60	-	-	-	-	3
7.		Professional Elective VI	PEC	40 / 60	-	-	-	-	3
8.		Mandatory Course-II &	MC		3	0	0	3	0
9.		NCC Credit Course Level 3#			3	0	0	3	3#
TOTAL				**700**	**-**	**-**	**-**	**-**	**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	INT / EXT	PEROIDS PER WEEK			TOTAL CONTACT S PERIOD	CREDIT S
					L	T	P		
THEORY									
1.	24GET701	Human Values and Ethics	HSMC	40 / 60	2	0	0	2	2
2.		Elective - Management#	HSMC	40 / 60	3	0	0	3	3
3.		Open Elective – II**	OEC	40 / 60	3	0	0	3	3
4.		Open Elective – III**	OEC	40 / 60	3	0	0	3	3
5.		Open Elective – IV**	OEC	40 / 60	3	0	0	3	3
PRACTICALS									
6.	24CSP701	Summer Internship	EEC	75 / 25	0	0	0	0	2
TOTAL				**900**	**14**	**0**	**0**	**14**	**16**

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

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

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

SEMESTER VIII / VII*

S.No	COURSE CODE	COURSE TITLE	CATEGORY	INT / EXT	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
					L	T	P		
PRACTICALS									
1.	24CSP801	Project Work / Internship	EEC	75 / 25	0	0	20	20	10
TOTAL				**100**	**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	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	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	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	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 Management	MC	3	0	0	3	0

MANDATORY COURSES II

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	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

PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Data Science	Vertical II Full Stack Development	Vertical III Cloud Computing and Data Centre Technologies	Vertical IV Cyber Security and Data Privacy	Vertical V Creative Media	Vertical VI Emerging Technologies	Vertical VII Artificial Intelligence and Machine Learning
Exploratory Data Analysis	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	Crypto currency and Block chain Technologies	Visual Effects	Crypto currency and Block chain Technologies	Game Theory
Computer Vision	Dev-ops	Stream Processing	Network Security	Game Development	Game Development	Cognitive Science
Big Data Analytics	Principles of Programming Languages	Security and Privacy in Cloud	Security and Privacy in Cloud	Multimedia Data Compression and Storage	3D Printing and Design	Ethics And AI

Registration of Professional Elective Courses from Verticals:

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

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1: DATA SCIENCE

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				L	T	P		
1.	24CSET01	Exploratory Data Analysis	PEC	2	0	2	4	3
2.	24CSET02	Recommender Systems	PEC	2	0	2	4	3
3.	24CSET03	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	24CSET04	Text and Speech Analysis	PEC	2	0	2	4	3
5.	24CSET05	Business Analytics	PEC	2	0	2	4	3
6.	24CSET06	Image and video analytics	PEC	2	0	2	4	3
7.	24CSET07	Computer Vision	PEC	2	0	2	4	3
8.	24CSET08	Big Data Analytics	PEC	2	0	2	4	3

VERTICAL 2: FULL STACK DEVELOPMENT

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				L	T	P		
1.	24CSET09	Web Technologies	PEC	2	0	2	4	3
2.	24CSET10	App Development	PEC	2	0	2	4	3
3.	24CSET11	Cloud Services Management	PEC	2	0	2	4	3
4.	24CSET12	UI and UX Design	PEC	2	0	2	4	3
5.	24CSET13	Software Testing and Automation	PEC	2	0	2	4	3
6.	24CSET14	Web Application Security	PEC	2	0	2	4	3
7.	24CSET15	Dev-ops	PEC	2	0	2	4	3
8.	24CSET16	Principles of Programming Languages	PEC	2	0	2	4	3

VERTICAL 3: CLOUD COMPUTING AND DATA CENTRE TECHNOLOGIES

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
				L	T	P		
1.	24CSET17	Cloud Computing	PEC	2	0	2	4	3
2.	24CSET18	Virtualization	PEC	2	0	2	4	3
3.	24CSET19	Cloud Services Management	PEC	2	0	2	4	3
4.	24CSET20	Data Warehousing	PEC	2	0	2	4	3
5.	24CSET21	Storage Technologies	PEC	2	0	2	4	3
6.	24CSET24	Software Defined Networks	PEC	2	0	2	4	3
7.	24CSET23	Stream Processing	PEC	2	0	2	4	3
8.	24CSET24	Security and Privacy in Cloud	PEC	2	0	2	4	3

VERTICAL 4: CYBER SECURITY AND DATA PRIVACY

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDITS
				L	T	P		
1.	24CSET25	Ethical Hacking	PEC	2	0	2	4	3
2.	24CSET26	Digital and Mobile Forensics	PEC	2	0	2	4	3
3.	24CSET27	Social Network Security	PEC	2	0	2	4	3
4.	24CSET28	Modern Cryptography	PEC	2	0	2	4	3
5.	24CSET29	Engineering Secure Software Systems	PEC	2	0	2	4	3
6.	24CSET30	Crypto currency and Blockchain Technologies	PEC	2	0	2	4	3
7.	24CSET40	Network Security	PEC	2	0	2	4	3
8.	24CSET41	Security and Privacy in Cloud	PEC	2	0	2	4	3

VERTICAL 5: CREATIVE MEDIA

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				L	T	P		
1.	24CSET42	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3
2.	24CSET43	Multimedia and Animation	PEC	2	0	2	4	3
3.	24CSET44	Video Creation and Editing	PEC	2	0	2	4	3
4.	24CSET45	UI and UX Design	PEC	2	0	2	4	3
5.	24CSET46	Digital marketing	PEC	2	0	2	4	3
6.	24CSET47	Visual Effects	PEC	2	0	2	4	3
7.	24CSET48	Game Development	PEC	2	0	2	4	3
8.	24CSET49	Multimedia Data Compression and Storage	PEC	2	0	2	4	3

VERTICAL 6: EMERGING TECHNOLOGIES

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				L	T	P		
1.	24CSET50	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3
2.	24CSET51	Robotic Process Automation	PEC	2	0	2	4	3
3.	24CSET52	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	24CSET53	Cyber security	PEC	2	0	2	4	3
5.	24CSET54	Quantum Computing	PEC	2	0	2	4	3
6.	24CSET55	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	24CSET56	Game Development	PEC	2	0	2	4	3
8.	24CSET57	3D Printing and Design	PEC	2	0	2	4	3

VERTICAL 7: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CRED
				L	T	P		
1.	24CSET58	Augmented Reality/Virtual Reality	PEC	2	0	2	4	3
2.	24CSET59	Robotic Process Automation	PEC	2	0	2	4	3
3.	24CSET60	Neural Networks and Deep Learning	PEC	2	0	2	4	3
4.	24CSET61	Cyber security	PEC	2	0	2	4	3
5.	24CSET62	Quantum Computing	PEC	2	0	2	4	3
6.	24CSET63	Cryptocurrency and Blockchain Technologies	PEC	2	0	2	4	3
7.	24CSET64	Game Development	PEC	2	0	2	4	3
8.	24CSET65	3D Printing and Design	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	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CRED
				L	T	P		
1.	24OAS351	Space Science	OEC	3	0	0	3	3
2.	24OIE351	Introduction to Industrial Engineering	OEC	3	0	0	3	3
3.	24OBT351	Climate Change and its Impact	OEC	3	0	0	3	3
4.	24OCE351	Environment and Social Impact Assessment	OEC	3	0	0	3	3
5.	24OEE351	Renewable Energy System	OEC	3	0	0	3	3
6.	24OEI351	Introduction to Industrial Instrumentation and Control	OEC	3	0	0	3	3
7.	24OMA351	Graph Theory	OEC	3	0	0	3	3

OPEN ELECTIVES – II

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CRED
				L	T	P		
1.	24OIE352	Resource Management Techniques	OEC	3	0	0	3	3
2.	24OMG351	Fintech Regulations	OEC	3	0	0	3	3
3.	24OFD351	Holistic Nutrition	OEC	3	0	0	3	3
4.	24OCE352	ICT in Agriculture	OEC	3	0	0	3	3
5.	24OEI352	Introduction to Control Engineering	OEC	3	0	0	3	3
6.	24OPY351	Pharmaceutical Nanotechnology	OEC	3	0	0	3	3
7.	24OAE351	Aviation Management	OEC	3	0	0	3	3

OPEN ELECTIVES – III

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CRED
				L	T	P		
1.	24OHS351	English for competitive Examinations	OEC	3	0	0	3	3
2.	24OMG352	NGOs and sustainable Development	OEC	3	0	0	3	3
3.	24OMG353	Democracy and Good Governance	OEC	3	0	0	3	3
4.	24OME353	Renewable Energy Technologies	OEC	3	0	0	3	3
5.	24OME354	Applied Design Thinking	OEC	3	0	0	3	3
6.	24OMF351	Reverse Engineering	OEC	3	0	0	3	3
7.	24OMF353	Sustainable Manufacturing	OEC	3	0	0	3	3
8.	24OAU351	Electric and Hybrid Vehicle	OEC	3	0	0	3	3
9.	24OAS352	Space Engineering	OEC	3	0	0	3	3
10.	24OIM351	Industrial Management	OEC	3	0	0	3	3
11.	24OIE354	Quality Engineering	OEC	3	0	0	3	3
12.	24OSF351	Fire Safety Engineering	OEC	3	0	0	3	3
13.	24OML351	Introduction to non-destructive testing	OEC	3	0	0	3	3
14.	24OMR351	Mechatronics	OEC	3	0	0	3	3
15.	24ORA351	Foundation of Robotics	OEC	3	0	0	3	3
16.	24OAE352	Fundamentals of Aeronautical Engineering	OEC	3	0	0	3	3

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CRED
				L	T	P		
17.	24OGI351	Remote Sensing Concepts	OEC	3	0	0	3	3
18.	24OAI351	Urban Agriculture	OEC	3	0	0	3	3
19.	24OEN351	Drinking Water Supply and Treatment	OEC	3	0	0	3	3
20.	24OEE352	Electric Vehicle technology	OEC	3	0	0	3	3
21.	24OEI353	Introduction to PLC Programming	OEC	3	0	0	3	3
22.	24OCH351	Nano Technology	OEC	3	0	0	3	3
23.	24OCH352	Functional Materials	OEC	3	0	0	3	3
24.	24OBT352	Biomedical Instrumentation	OEC	3	0	0	3	3
25.	24OFD352	Traditional Indian Foods	OEC	3	0	0	3	3
26.	24OFD353	Introduction to food processing	OEC	3	0	0	3	3
27.	24OPY352	IPR for Pharma Industry	OEC	3	0	0	3	3
28.	24OTT351	Basics of Textile Finishing	OEC	3	0	0	3	3
29.	24OTT352	Industrial Engineering for Garment Industry	OEC	3	0	0	3	3
30.	24OTT353	Basics of Textile Manufacture	OEC	3	0	0	3	3
31.	24OPE351	Introduction to Petroleum Refining and Petrochemicals	OEC	3	0	0	3	3
32.	24OPE352	Energy Conservation and Management	OEC	3	0	0	3	3
33.	24OPT351	Basics of Plastics Processing	OEC	3	0	0	3	3
34.	24OEC351	Signals and Systems	OEC	3	0	0	3	3
35.	24OEC352	Fundamentals of Electronic Devices and Circuits	OEC	3	0	0	3	3
36.	24OBM351	Foundation Skills in integrated product Development	OEC	3	0	0	3	3
37.	24OBM352	Assistive Technology	OEC	3	0	0	3	3
38.	24OMA352	Operations Research	OEC	3	0	0	3	3
39.	24OMA353	Algebra and Number Theory	OEC	3	0	0	3	3
40.	24OMA354	Linear Algebra	OEC	3	0	0	3	3
41.	24OCE353	Leans Concepts Tools And Practices	OEC	3	0	0	3	3

OPEN ELECTIVES – IV

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CRED
				L	T	P		
1.	24OHS352	Project Report Writing	OEC	3	0	0	3	3
2.	24OMA355	Advanced Numerical Methods	OEC	3	0	0	3	3
3.	24OMA356	Random Processes	OEC	3	0	0	3	3
4.	24OMA357	Queuing and Reliability Modeling	OEC	3	0	0	3	3
5.	24OMG354	Production and Operations Management for Entrepreneurs	OEC	3	0	0	3	3
6.	24OMG355	Multivariate Data Analysis	OEC	3	0	0	3	3
7.	24OME352	Additive Manufacturing	OEC	3	0	0	3	3
8.	24OME353	New Product Development	OEC	3	0	0	3	3
9.	24OME355	Industrial Design & Rapid Prototyping Techniques	OEC	3	0	0	3	3
10.	24OMF352	Micro and Precision Engineering	OEC	3	0	0	3	3
11.	24OMF354	Cost Management of Engineering Projects	OEC	3	0	0	3	3
12.	24OAU352	Batteries and Management system	OEC	3	0	0	3	3
13.	24OAU353	Sensors and Actuators	OEC	3	0	0	3	3
14.	24OAS353	Space Vehicles	OEC	3	0	0	3	3
15.	24OIM352	Management Science	OEC	3	0	0	3	3
16.	24OIM353	Production Planning and Control	OEC	3	0	0	3	3
17.	24OIE353	Operations Management	OEC	3	0	0	3	3
18.	24OSF352	Industrial Hygiene	OEC	3	0	0	3	3
19.	24OSF353	Chemical Process Safety	OEC	3	0	0	3	3
20.	24OML352	Electrical, Electronic and Magnetic materials	OEC	3	0	0	3	3
21.	24OML353	Nano materials and applications	OEC	3	0	0	3	3
22.	24OMR352	Hydraulics and Pneumatics	OEC	3	0	0	3	3
23.	24OMR353	Sensors	OEC	3	0	0	3	3
24.	24ORA352	Foundation of Automation	OEC	3	0	0	3	3
25.	24ORA353	Concepts in Mobile Robotics	OEC	3	0	0	3	3
26.	24OMV351	Marine Propulsion	OEC	3	0	0	3	3
27.	24OMV352	Marine Merchant Vehicles	OEC	3	0	0	3	3
28.	24OMV353	Elements of Marine Engineering	OEC	3	0	0	3	3
29.	24OAE353	Drone Technologies	OEC	3	0	0	3	3
30.	24OGI352	Geographical Information System	OEC	3	0	0	3	3

S.No	COURSE CODE	COURSE TITLE	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CRED
				L	T	P		
31.	24OAI352	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
32.	OEN352	Biodiversity Conservation	OEC	3	0	0	3	3
33.	24OEE353	Introduction to control systems	OEC	3	0	0	3	3
34.	24OEI354	Introduction to industrial automation Systems	OEC	3	0	0	3	3
35.	24OCH353	Energy Technology	OEC	3	0	0	3	3
36.	24OCH354	Surface Science	OEC	3	0	0	3	3
37.	24OBT353	Environment and Agriculture	OEC	3	0	0	3	3
38.	24OFD354	Fundamentals of Food Engineering	OEC	3	0	0	3	3
39.	24OFD355	Food Safety and Quality Regulations	OEC	3	0	0	3	3
40.	24OPY353	Nutraceuticals	OEC	3	0	0	3	3
41.	24OTT354	Basics of Dyeing and Printing	OEC	3	0	0	3	3
42.	24OTT355	Fibre Science	OEC	3	0	0	3	3
43.	24OTT356	Garment Manufacturing Technology	OEC	3	0	0	3	3
44.	24OPE353	Industrial safety	OEC	3	0	0	3	3
45.	24OPE354	Unit Operations in Petro Chemical Industries	OEC	3	0	0	3	3
46.	24OPT352	Plastic Materials for engineers	OEC	3	0	0	3	3
47.	24OPT353	Properties and Testing of Plastics	OEC	3	0	0	3	3
48.	24OEC353	VLSI Design	OEC	3	0	0	3	3
49.	24OEC354	Industrial IoT and Industry 4.0	OEC	3	0	0	3	3
50.	24OBM353	Wearable devices	OEC	3	0	0	3	3
51.	24OBM354	Medical Informatics	OEC	3	0	0	3	3
52.	24OCE354	Basics of Integrated Water Resources Management	OEC	3	0	0	3	3

SUMMARY

NAME OF THE PROGRAMME: B.E. COMPUTER SCIENCE AND ENGINEERING										
S.NO	SUBJECT AREA	CREDITS PER SEMESTER								TOTAL CREDITS
		I	II	III	IV	V	VI	VII / VIII	VIII / VII	
1.	HSMC	4	3					5		12
2.	BSC	12	7	4	2					25
3.	ESC	5	9	4						18
4.	PCC		5	14	20	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	22	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 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 Environmental 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	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				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	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				L	T	P		
1.	24CMG337	Foundations of Entrepreneurship	PEC	3	0	0	3	3
2.	24CMG338	TeamBuilding&LeadershipManagement for Business	PEC	3	0	0	3	3
3.	24CMG339	Creativity & Innovation in Entrepreneurship	PEC	3	0	0	3	3
4.	24CMG340	PrinciplesofMarketingManagement 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	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				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	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				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	CATEGORY	PEROIDS PER WEEK			TOTAL CONTACTS PERIOD	CREDIT
				L	T	P		
1.	24CES331	Sustainable infrastructure Development	PEC	3	0	0	3	3
2.	24CES332	SustainableAgriculture and Environmental Management	PEC	3	0	0	3	3
3.	24CES333	Sustainable Bio Materials	PEC	3	0	0	3	3
4.	24CES334	Materialsfor 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	IntegratedEnergy Planning for SustainableDevelopment	PEC	3	0	0	3	3
8.	24CES338	Energy EfficiencyforSustainable 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 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 every day for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later.

(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, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and dont's, 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 givethe 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 under privileged.

(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 (becomea maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

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

References:

Guide to Induction program from AICTE

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 coursefocus 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 toget 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, andtravel & 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 vsFunction 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)
   English for Science & Technology Cambridge University Press, 2021.

2. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN.Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

REFERENCES:

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

Mapping of Cos with POs and PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	1	1	1	1	3	3	3	1	3	-	3	-	-
CO2	2	1	1	1	1	3	3	3	1	3	-	3	-	-
CO3	2	3	2	3	2	3	3	3	2	3	3	3	-	-
CO4	2	3	2	3	2	3	3	3	2	3	3	3	-	-
CO5	2	3	3	3	2	3	3	3	2	3	-	3	-	-
Average	2	2.2	1.8	2.2	1.6	3	3	3	1.6	3	3	3	-	-

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/learning to communicate/pdf/LtC_ParentHandbook.pdf
5. https://www.manage.gov.in/studymaterial/EC.pdf

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

Eigen values and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – 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 – Change of 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 IV INTEGRAL 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 and pressure, 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 double and 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 Sons, 10th Edition, New Delhi, 2016.
2. Grewal.B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi,44th Edition , 2018.
3. James Stewart, " Calculus : Early Transcendentals ", Cengage Learning, 8th Edition, New Delhi, 2015. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

REFERENCES:

1. Anton. H, Bivens. I and Davis. S, " Calculus", Wiley, 10th Edition, 2016
2. Bali. N., Goyal. M. and Watkins. C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
3. Jain . R.K. and Iyengar. S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 5th Edition, 2016.
4. Narayanan. S. and Manicavachagom Pillai. T. K., “Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
5. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
6. Srimantha Pal and Bhunia. S.C, "Engineering Mathematics" Oxford University Press, 2015.
7. Thomas. G. B., Hass. J, and Weir. M.D, " Thomas Calculus ", 14th Edition, Pearson India, 2018.

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO2	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO3	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO4	3	3	1	1	-	-	-	-	2	-	2	3	-	-
CO5	3	3	1	1	-	-	-	-	2	-	2	3	-	-
Average	3	3	1	1	-	-	-	-	2	-	2	3	-	-

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://www.udemy.com/course/learn-business-english/

ONLINE RESOURCES:

1 http://https//books.google.co.in/books/about/Engineering_Mathematics_I_Matrices_and_C.html?id

= iPvAEAAAQBAJ%20&redir_esc=y

2. https://easyengineering.net/ma3151-matrices-and-calculus-notes/#google_vignette3. https://learnengineering.in/ma3151-matrices-and-calculus/

4. https://menso88.weebly.com/uploads/1/7/5/8/17586891/textbook_og_engineering_matematics.pdf

5. https://www.scribd.com/document/595384513/MA3151-Matrices-and-Calculus-Lecture-Notes-1

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 – rotational kinetic energy and moment of inertia - theorems of M .I –moment of inertia of continuous bodies –of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope – torsional pendulum – double pendulum –Introduction to nonlinear oscillations.

UNIT II ELECTROMAGNETIC WAVES 9

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

UNIT III OSCILLATIONS, OPTICS AND LASERS 9

Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect. Reflection and refraction of light waves - total internal reflection - interference – Michelson interferometer –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, 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 Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle.

UNIT V APPLIED QUANTUM MECHANICS 9

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

TOTAL : 45 PERIODS

COURSE OUTCOMES:

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

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 (IndianEdition), 2017.
2. E.M.Purcell and D.J.Morin, Electricity and Magnetism, Cambridge Univ.Press, 2013.
3. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw-Hill (Indian Edition), 2017.

REFERENCES:

1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition),2009.
2. Paul A. Tipler, 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.

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	2	1	1	1	-	-	-	2	-	1	-	2
CO2	3	3	2	1	2	1	-	-	-	2	-	1	-	2
CO3	3	3	2	2	2	1	-	-	-	2	-	1	-	2
CO4	3	3	1	1	2	1	-	-	-	2	-	1	-	2
CO5	3	3	1	1	2	1	-	-	-	2	-	1	-	2
Average	3	3	1.6	1.2	1.8	1	-	-	-	2	-	1	-	2

WEB REFERENCES:

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

ONLINE RESOURCES:

1.https://www.mbit.edu.in/wp-content/uploads/2020/05/FULLBOOKPHYSICS.pdf
2. https://physicsrvce.files.wordpress.com/2022/03/unit-4-laser-and-of.pdf
3.http://www.gpcet.ac.in/wp-content/uploads/2018/09/UNIT-1-EP-PDF.pdf
4. https://www.ks.uiuc.edu/Services/Class/PHYS480/qm_PDF/QM_Book.pdf
5..https://books.google.co.in/books?id=61WJDAAAQBAJ&printsec=copyright#v=onepage&q&f=false

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

COURSE OBJECTIVES:

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

UNIT I WATER AND ITS TREATMENT 9

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

UNIT II NANOCHEMISTRY 9

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

UNIT III PHASE RULE AND COMPOSITES 9

Phase rule: Introduction, definition of terms with examples. One component system - water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Thermal analysis; Two component system: lead-silver system - Pattinson process.

Composites: Introduction: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites - definition and examples.

UNIT IV FUELS AND COMBUSTION 9

Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil - cetane number; Power alcohol and biodiesel.

Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. 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 the synthesis 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 in energy sectors.

TEXT BOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai PublishingCompany (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 MaterialsScience, 2018.
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
4. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and echnologists, Springer Science Business Media, New York, 2nd Edition, 2013.

APPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	1	-	1	2	-	-	2	-	2	-	2
CO2	2	2	1	1	-	1	2	-	-	2	-	2	-	2
CO3	3	2	1	1	-	1	2	-	-	2	-	2	-	2
CO4	3	2	1	1	-	1	2	-	-	2	-	2	-	2
CO5	3	2	2	1	-	1	2	-	-	2	-	2	-	2
Average	2.8	2	1.4	1	-	1	2	-	-	2	-	2	-	2

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-chemistry-1-47682

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

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 cardin 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.

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3	2	-	-	-	-	2	2	2	-	2

CO2	3	3	3	3	2	-	-	-	-	2	2	2	-	2
CO3	3	3	3	3	2	-	-	-	-	2	2	2	-	2
CO4	2	3	2	-	2	-	-	-	-	2	2	2	-	2
CO5	2	3	2	-	2	-	-	-	-	2	2	2	-	2
Average	2.6	3	2.6	3	2	-	-	-	-	2	2	2	-	2

WEB REFERENCES:

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

ONLINE RESOURCES:

1.https://www.cimat.mx/ciencia_para_jovenes/bachillerato/libros/%5BKernighan-Ritchie%5DThe_C_Programming_Language.pdf

2.https://www.vssut.ac.in/lecture_notes/lecture1424354156.pdf

3.https://progforperf.github.io/Expert_C_Programming.pdf

4.http://pdvpmtasgaon.edu.in/uploads/dptcomputer/Let%20us%20c%20-%20yashwantkanetkar.pdf

5.https://www.researchgate.net/publication/320371751_A_Text_Book_of C_Programming

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 inTamil 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.

UNIT IV 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 INDIANCULTURE 3

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

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை 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: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (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) – Reference Book.

24GET102 தமிழர் மரபு L T P C
1 0 0 1

அலகு I **மொழி மற்றும் இலக்கியம்**: 3

இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II **மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை**: 3

நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள்– பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரிமுனையில் திருவள்ளுவர் சிலை – இசைக் கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III **நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்**: 3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV **தமிழர்களின் திணைக் கோட்பாடுகள்**: 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறை முகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V **இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:** **3**

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை 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: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (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) – Reference Book.

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.

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3	2	-	-	-	-	-	2	2	2	2
CO2	3	3	3	3	2	-	-	-	-	-	2	2	2	2
CO3	3	3	3	3	2	-	-	-	-	-	2	2	2	2
CO4	2	3	-	-	2	-	-	-	-	-	2	2	2	2
CO5	2	3	-	-	2	-	-	-	-	-	2	2	2	2
Average	2.6	3	3	3	2	-	-	-	-	-	2	2	2	2

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://www.scribd.com/document/557844748/Exercise-macha
4. https://www.w3resource.com/python-exercises/file/python-io-exercise-8.php
5. https://www.geeksforgeeks.org/stimulate-bouncing-game-using-pygame/

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 ofregular 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 ofliquids
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.

COURSE OUTCOMES: **TOTAL: 30 PERIODS**

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.

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	1	1	-	-	-	-	-	-	-	-	2
CO2	3	3	3	1	1	-	-	-	-	-	-	-	-	2
CO3	3	3	3	1	1	-	-	-	-	-	-	-	-	2
CO4	3	3	2	1	1	-	-	-	-	-	-	-	-	2
CO5	3	3	3	1	1	-	-	-	-	-	-	-	-	2
Average	3	3	2.8	1	1	-	-	-	-	-	-	-	-	2

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 electro analytical 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 Na2CO3 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 (TiO2/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 and

DO.

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 Textbook of Quantitative Chemical Analysis (2009).

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	1	-	2	2	-	-	-	-	2	-	2
CO2	3	2	2	1	-	2	2	-	-	-	-	2	-	2
CO3	3	2	2	1	-	2	2	-	-	-	-	2	-	2
CO4	3	2	2	1	-	2	2	-	-	-	-	2	-	2
CO5	3	2	2	1	-	2	2	-	-	-	-	2	-	2
Average	3	2	2	1	-	2	2	-	-	-	-	2	-	2

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

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 and accurately

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

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3	1	3	3	3	3	3	3	3	-	2
CO2	3	3	3	3	1	3	3	3	3	3	3	3	-	2
CO3	3	3	3	3	1	3	3	3	3	3	3	3	-	2
CO4	3	3	3	3	1	3	3	3	3	3	3	3	-	2
CO5	3	3	3	3	1	3	3	3	3	3	3	3	-	2
Average	3	3	3	3	1	3	3	3	3	3	3	3	-	2

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 of complaint, 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 universitypress. 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.

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3	3	3	3	3	2	3	3	3	-	2
CO2	3	3	3	3	3	3	3	3	2	3	3	3	-	2
CO3	3	3	3	3	3	3	3	3	2	3	3	3	-	2
CO4	3	3	3	3	3	3	3	3	2	3	3	3	-	2
CO5	=	=	=	=	=	=	=	=	2	3	3	3	-	2
Average	3	3	3	3	3	3	3	3	2	3	3	3	-	2

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

24MAT201 STATISTICS AND NUMERICAL METHODS L T PC

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'sand 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 the numerical techniques of differentiation and integration for engineering problems.

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

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

TEXT BOOKS:

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

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	2	1	1	-	-	-	2	-	2	3	-	1
CO2	3	3	2	1	1	-	-	-	2	-	2	3	-	1
CO3	3	3	2	1	1	-	-	-	2	-	2	3	-	1
CO4	3	3	2	1	1	-	-	-	2	-	2	3	-	1
CO5	3	3	2	1	1	-	-	-	2	-	2	3	-	1
Average	3	3	2	1	1	-	-	-	2	-	2	3	-	

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 of materials.
- To enable the students to gain knowledge in semiconductor physics
- To instill knowledge on magnetic properties of materials.
- To establish a sound grasp of knowledge on different optical properties of materials, opticaldisplays and applications
- To inculcate an idea of significance of nano structures, quantum confinement, ensuingnano 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 various devices

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.

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	-	1	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	1	2	-	2	-	-	-	-	-	-	-	-
CO3	3	2	2	-	2	-	-	-	-	-	-	-	-	-
CO4	3	-	1	-	3	2	3	-	-	-	-	1	-	-
CO5	3	-	2	1	-	2	-	-	-	-	-	1	-	-
Average	3	2	1.4	1.5	2.5	2	3	-	-	-	-	1	-	-

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

24BET202 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LT 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

MAPPING OF COs WITH POs AND PSOs

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

CONCEPTS AND CONVENTIONS (Not for Examination)

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

UNIT I PLANE CURVES 6+12

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

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

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

UNIT III PROJECTION OF SOLIDS AND FREEHAND SKETCHING 6+12

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

objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects.
Practicing three dimensional modeling of simple objects by CAD Software (Not for examination)

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

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the 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 —lsometric 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 BOOKS:

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

REFERENCES:

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

Publication of Bureau of Indian Standards:

1. IS 10711 — 2001: Technical products Documentation — Sizeandlayout of drawing sheets.
2. IS 9609 (Parts 0 & 1) — 2001: Technical products Documentation — Lettering.

3. IS 10714 (Part 20) — 2001 & SP 46 — 2003: Lines for technical drawings.
4. IS 11669 — 1986 & SP 46 —2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) — 2001: Technical drawings — Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

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

MAPPING OF COs WITH POs AND PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	1	2	-	2	1	-	-	-	2	-	2	-	2
CO2	3	1	2	-	2	1	-	-	-	2	-	2	-	2
CO3	3	1	2	-	2	1	-	-	-	2	-	2	-	2
CO4	3	1	2	-	2	1	-	-	-	2	-	2	-	2
CO5	3	1	2	-	2	1	-	-	-	2	-	2	-	2
Average	3	1	2	-	2	1	-	-	-	2	-	2	-	2

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

24CST201 PROGRAMMING IN C L T P C

3 1 0 4

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.

TOTAL : **45 PERIODS**

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.

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”, 1stEdition, Pearson Education, 2013.

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

WEB REFERENCES:

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

ONLINE RESOURCES:

1. https://www.cimat.mx/ciencia_para_jovenes/bachillerato/libros/%5BKernighan-Ritchie%5DThe_C_Programming_Language.pdf
2. https://www.vssut.ac.in/lecture_notes/lecture1424354156.pdf
3. https://progforperf.github.io/Expert_C_Programming.pdf

24GET202 TAMILS AND TECHNOLOGY L T P C

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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. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை 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: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (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) – Reference Book.

GE3252 **தமிழரும் தொழில்நுட்பமும்** **L T P C**
1 0 0 1

அலகு I **நெசவு மற்றும் பானைத் தொழில்நுட்பம்**: **3**

சங்க காலத்தில் நெசவுத் தொழில் – பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் – பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II **வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்**: **3**

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் – நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள் – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.

அலகு III **உற்பத்தித் தொழில் நுட்பம்**: **3**

கப்பல் கட்டும் கலை – உலோகவியல் – இரும்புத் தொழிற்சாலை – இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் – நாணயங்கள் அச்சடித்தல் – மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் – சுடுமண் மணிகள் – சங்கு மணிகள் – எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV **வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்**: **3**

அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு – அறிவுசார் சமூகம்.

அலகு V **அறிவியல் தமிழ் மற்றும் கணித்தமிழ்**: **3**

அறிவியல் தமிழின் வளர்ச்சி –கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின் நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.

TOTAL : 15 PERIODS

TOTAL : 15 PERIODS

NX3251 NCC Credit Course Level 1*

(ARMY WING)

NCC Credit Course Level 1	L	T	P	C
	2	0	0	2

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, Decision Making and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, Moral Values, Honour Code 3	
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, Contribution of Youth NGOs,3	
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL: 30 PERIODS

NX3252 **NCC Credit Course Level 1*(NAVAL WING)**

	NCC Credit Course Level - I	L	T	P	C
		2	0	0	2

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking, DecisionMaking and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, MoralValues,Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contribution oYouth f	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL : 30 PERIODS

NX3253 **NCC Credit Course Level 1*(AIR FORCE WING)**

NCC Credit Course Level -I	L	T	P	C
	2	0	0	2

NCC GENERAL		**6**
NCC 1	Aims, Objectives & Organization of NCC	1
NCC 2	Incentives	2
NCC 3	Duties of NCC Cadet	1
NCC 4	NCC Camps: Types & Conduct	2
NATIONAL INTEGRATION AND AWARENESS		**4**
NI 1	National Integration: Importance & Necessity	1
NI 2	Factors Affecting National Integration	1
NI 3	Unity in Diversity & Role of NCC in Nation Building	1
NI 4	Threats to National Security	1
PERSONALITY DEVELOPMENT		**7**
PD 1	Self-Awareness, Empathy, Critical & Creative Thinking,DecisionMaking and Problem Solving	2
PD 2	Communication Skills	3
PD 3	Group Discussion: Stress & Emotions	2
LEADERSHIP		**5**
L 1	Leadership Capsule: Traits, Indicators, Motivation, MoralValues,Honour Code	3
L 2	Case Studies: Shivaji, Jhasi Ki Rani	2
SOCIAL SERVICE AND COMMUNITY DEVELOPMENT		**8**
SS 1	Basics, Rural Development Programmes, NGOs, Contributionof Youth	3
SS 4	Protection of Children and Women Safety	1
SS 5	Road / Rail Travel Safety	1
SS 6	New Initiatives	2
SS 7	Cyber and Mobile Security Awareness	1

TOTAL : 30 PERIODS

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:

- Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planing; making joints in wood materials usedin commonhousehold wood work.
- Wiring various electrical joints in common household electrical wire work.
- 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 metalsheet using sheet metal work.
- 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 commonlyused 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 andflexiblepipes 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 wiringwith 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 household plumbingwork; 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.

24CSP201	**PROGRAMMING IN C LABORATORY**	**L**	**T**	**P**	**C**
		0	**0**	**4**	**2**

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS:

Note: The lab instructor is expected to design problems based on the topics listed. The Examination shallnot be restricted to the sample experiments designed.

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- Demonstrate knowledge on C programming constructs.
- Develop programs in C using basic constructs.
- Develop programs in C using arrays.
- Develop applications in C using strings, pointers, functions.
- Develop applications in C using structures.
- 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.

REFERENCE BOOKS:

1. Paul Deitel and Harvey Deitel, “C How to Program with an Introduction to C++”, Eighth edition, Pearson Education, 2018.
2. YashwantKanetkar, 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. PradipDey, Manas Ghosh, “Computer Fundamentals and Programming in C”, Second Edition, Oxford University Press, 2013.
5. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, 1stEdition, Pearson Education, 2013.

WEB RESOURCES:

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

ONLINE RESOURCES:

1. https://karadev.net/uroci/filespdf/files/a%20book%20on%20c.pdf
2. c-programming-step-by-step-beginners-to-experts-edition_compress.pdf
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

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 effective discussions in a professional context.
- To be able to communicate effectively through formal and informal writing.

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-describingarrangements-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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2	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.