V.S.B COLLEGE OF ENGINEERING TECHNICAL CAMPUS,

COIMBATORE

REGULATIONS 2025

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM

I. ABOUT DEPARTMENT

The Department of Electronics and Communication Engineering was established in the year 2012. It offers a UG Course namely B.E Electronics and Communication Engineering, which was started in the year 2012 with a sanctioned intake of 60. B.E. Electronics and Communication Engineering was accredited by the National Board of Accreditation for a period of three years (2023-2025). The department emphasizes the importance of collective effort in guiding students from a mere engineering background to becoming proficient professionals in their respective fields.

The Electronics and Communication Engineering department at V.S.B. College of Engineering Technical campus, Coimbatore, serves as a hub of knowledge where we cultivate and support budding talents across various engineering disciplines. Our primary focus in delivering technical training is to cultivate curiosity and foster innovation among our students. We strive to establish a strong foundation that enables them to swiftly acquire learning abilities and adeptly respond to the rapidly evolving demands of the industry.

II.VISION OF THE DEPARTMENT

To become a forerunner in producing skilled graduates with strong foundation in Electronics and Communication Engineering who can contribute significantly to the society.

III. MISSION OF THE DEPARTMENT

- To provide excellent infrastructure and enriched curriculum to train and develop highly competent engineers with research aptitude.
- To foster the skills of employability and entrepreneurship along with social responsibility among the students transforming them into intellectual professionals to support nation's growth.
- To motivate the students in gaining knowledge about the modern technologies to meet the dynamic industrial needs supporting lifelong learning.

IV. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1 - Graduates will have sound knowledge in the core areas of Electronics, Communication and allied Engineering to analyze and propose solutions for day-to-day engineering problems facing the society.

PEO2 – Graduates will have necessary skills to do research and work as an entrepreneur with selfconfidence in interdisciplinary fields of Engineering.

PEO3 – Graduates will have managerial and interpersonal skills to work as an individual and as a team with continuous learning to boost their organization's growth.

PEO4 – Graduates will have self-discipline, ethical values and social responsibility setting a good role model for future generations.

V. PROGRAM OUTCOMES (POs)

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

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

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

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

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

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

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

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

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

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

11 **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member andleader in a team, to manage projects and in multidisciplinary environments

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

VI. PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1 - Students will be trained in the field of electronics systems, to design and develop solutions enhancing their employability and entrepreneurship skills.

PSO2 - Students will be inspired to develop analytical, domain and soft skills which will enable them to crack national level competitive examinations for higher studies and employment.

V.S.B COLLEGE OF ENGINEERING TECHNICAL CAMPUS, COIMBATORE
REGULATIONS 2025
B. E. ELECTRONICS AND COMMUNICATION ENGINEERING
CURRICULA FOR SEMESTERS I TO VIII AND SYLLABI FOR SEMESTERS I AND II
SEMESTER I

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

$ Skill Based Course

SEMESTER II

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	25HST201	Professional English - II	HSMC	40/60	2	0	0	2	2
2	25MAT201	Computational Methods	BSC	40/60	3	1	0	4	4
3	25PHT204	Physics for Electronics Engineering	BSC	40/60	3	0	0	3	3
4	25BET204	Basic Electrical and Instrumentation Engineering	ESC	40/60	3	0	0	3	3
5	25GET201	Engineering Graphics	ESC	40/60	2	0	4	6	4
6	25ECT201	Circuit Analysis	PCC	40/60	3	1	0	4	4
7		NCC Credit Course Level 1#	-	-	2	0	0	2	2#
8	25GET202	□□□□□□□□ □□□□□□□□□□□□□□□ /Tamils and Technology	HSMC	40/60	1	0	0	1	1
PRACTICALS									
9	25GEP201	Engineering Practices Laboratory	ESC	75/25	0	0	4	4	2
10	25ECP201	Circuits Analysis Laboratory	PCC	75/25	0	0	4	4	2
11	25GEP202	Communication Laboratory / Foreign Language$	EEC	75/25	0	0	4	4	2
				TOTAL	**17**	**1**	**16**	**34**	**27**

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

[$] **Skill Based Course**

SEMESTER III

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	25MAT301	Transforms and Partial Differential Equation	BSC	40/60	3	1	0	4	4
2	25ECT301	Signals and Systems	PCC	40/60	3	1	0	4	4
3	25ECT302	Electronic Devices and Circuits	PCC	40/60	3	0	0	3	3
4	25ECT304	Digital Systems Design	PCC	40/60	3	0	2	5	4
5	25ECT303	Control Systems	PCC	40/60	3	0	0	3	3
6	25CST308	Data Structures	ESC	40/60	3	0	0	3	3
PRACTICALS									
7	25ECP301	Electronic Devices and Circuits Laboratory	PCC	75/25	0	0	3	3	1.5
8	25CSP304	Data Structures Laboratory	PCC	75/25	0	0	3	3	1.5
9	25GEP301	Professional Development[$]	EEC	75/25	0	0	2	2	1
				TOTAL	**18**	**2**	**10**	**30**	**25**

[$]**Skill Based Course**

SEMESTER IV

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	25ECT401	Engineering Electromagnetics	PCC	40/60	3	0	0	3	3
2	25ECT402	Networks and Security	PCC	40/60	3	0	2	5	4
3	25ECT403	Linear Integrated Circuits	PCC	40/60	3	0	0	3	3
4	25ECT404	Digital Signal Processing	PCC	40/60	3	0	2	5	4
5	25ECT405	Communication Systems	PCC	40/60	3	0	0	3	3
6	25GET401	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	25ECP401	Communication Systems Laboratory	PCC	75/25	0	0	3	3	1.5
9	25ECP402	Linear Integrated Circuits Laboratory	PCC	75/25	0	0	3	3	1.5
				TOTAL	**17**	**0**	**10**	**27**	**22**

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

SEMESTER V

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	25ECT501	Wireless Communication	PCC	40/60	3	0	0	3	3
2	25ECT502	Principles of VLSI Design	PCC	40/60	3	0	0	3	3
3	25ECT503	Microprocessors and Microcontrollers	PCC	40/60	3	0	0	3	3
4		Professional Elective I	PEC	40/60	-	-	-	-	3
5		Professional Elective II	PEC	40/60	-	-	-	-	3
6		Professional Elective III	PEC	40/60	-	-	-	-	3
7		Mandatory Course-I[&]	MC	40/60	3	0	0	3	0
PRACTICALS									
8	25ECP501	VLSI Laboratory	PCC	75/25	0	0	4	4	2
				TOTAL	-	-	-	-	**20**

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

SEMESTER VI

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	25ECT601	Embedded Systems and IOT Design	PCC	40/60	3	0	0	3	3
2	25CST602	Artificial Intelligence and Machine Learning	OEC	40/60	3	0	2	5	4
3		Open Elective– I*	PEC	40/60	3	0	0	3	3
4		Professional Elective V	PEC	40/60	-	-	-	-	3
5		Professional Elective VI	PEC	40/60	-	-	-	-	3
6		Professional Elective VII	PEC	40/60	-	-	-	-	3
7		Mandatory Course-II[&]	MC	40/60	3	0	0	3	0
8		NCC Credit Course Level 3[#]	-	-	3	0	0	3	3 [#]
9		Mini project	EEC	75/25	0	0	0	0	2
				TOTAL	-	-	-	-	**21**

***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	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1	25GET701	Human Values and Ethics	HSMC	40/60	2	0	0	2	2
2		Open Elective – II**	OEC	40/60	3	0	0	3	3
3		Open Elective – III**	OEC	40/60	3	0	0	3	3
PRACTICALS									
4	25ECP701	Summer Internship	EEC	75/25	0	0	0	0	2
				TOTAL	**14**	**0**	**0**	**8**	**10**

***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	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
PRACTICALS									
1	25ECP801	Project Work/Internship	EEC	75/25	0	0	20	20	10
		Elective - Management[#]	HSMC	40/60	3	0	0	3	3
		Open Elective – IV**	OEC	40/60	3	0	0	3	3
				TOTAL	**0**	**0**	**20**	**26**	**16**

TOTAL CREDITS: 161

ELECTIVE – MANAGEMENT COURSES

S.No	COURSE CODE	COURSE TITLE	CATE-GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25GET01	Principles of Management	HSMC	40/60	3	0	0	3	3
2	25GET02	Total Quality Management	HSMC	40/60	3	0	0	3	3
3	25GET03	Engineering Economics and Financial Accounting	HSMC	40/60	3	0	0	3	3
4	25GET04	Human Resource Management	HSMC	40/60	3	0	0	3	3
5	25GET05	Knowledge Management	HSMC	40/60	3	0	0	3	3
6	25GET06	Industrial Management	HSMC	40/60	3	0	0	3	3

MANDATORY COURSES I

S.No	OURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25MXT01	Introduction to Women and Gender Studies	MC	40/60	3	0	0	3	0
2.	25MXT02	Elements of Literature	MC	40/60	3	0	0	3	0
3.	25MXT03	Film Appreciation	MC	40/60	3	0	0	3	0
4.	25MXT04	Disaster Management	MC	40/60	3	0	0	3	0

MANDATORY COURSES II

S.No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25MXT05	Well Being with traditional Practices (Yoga, Ayurveda and Siddha)	MC	40/60	3	0	0	3	0
2	25MXT06	History of Science and Technology in India	MC	40/60	3	0	0	3	0
3	25MXT07	Political and Economic Thought for a Humane Society	MC	40/60	3	0	0	3	0
4	25MXT08	State, Nation Building and Politics in India	MC	40/60	3	0	0	3	0
5	25MXT09	Industrial Safety	MC	40/60	3	0	0	3	0

PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Semiconductor ChipDesign and Testing	Vertical II Signal Processing	Vertical III RF Technologies	Vertical IV Bio Medical Technologies	Vertical V Underwater Technologies	Vertical VI Sensor Technologies and IoT	Vertical VII Space Technologies	Vertical VIII High Speed Communications
Wide Band gap Devices	Advanced Digital Signal Processing	RF Transceivers	Wearable Devices	Underwater Instrumentation System	IoT Processors	Radar Technologies	Optical Communication & Networks
Validation and Testing Technology	Image processing	Signal Integrity	Human Assist Devices	Underwater Imaging Systems and Image Processing	IoT Based System Design	Avionics Systems	Wireless Broad Band Networks
Low Power IC Design	Speech processing	Antenna Design	Therapeutic Equipment	Underwater Communication	Wireless Sensor Network Design	Positioning and Navigation Systems	4G/5G Communicatio n Networks
VLSI Testing and Design For Testability	Software Defined Radio	MICs and RF System Design	Medical Imaging Systems	Ocean Observation Systems	Industrial IoT and Industry 4.0	Satellite Communication	Software Defined Networks
Mixed Signal IC Design Testing	DSP Architecture and Programming	EMI/EMC Pre compliance Testing	Brain Computer Interface and Applications	Underwater Navigation Systems	MEMS Design	Remote Sensing	Massive MIMO Networks
Analog IC Design	Computer Vision	RFID System Design & Testing	Body Area Networks	Ocean Acoustics	Fundamentals of Nano electronics	Rocketry and Space Mechanics	Advanced Wireless Communicatio n Techniques

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 2022, Clause 4.10.

PROFESSIONAL ELECTIVE COURSES VERTICALS

VERTICAL 1: SEMICONDUCTOR CHIP DESIGN AND TESTING

S.No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25ECT01	Wide Bandgap Devices	PEC	40/60	3	0	0	3	3
2	25ECT02	Validation and Testing Technology	PEC	40/60	3	0	0	3	3
3	25ECT03	Low Power IC Design	PEC	40/60	3	0	0	3	3
4	25ECT04	VLSI Testing and Design For Testability	PEC	40/60	3	0	0	3	3
5	25ECT05	Mixed Signal IC Design Testing	PEC	40/60	3	0	0	3	3
6	25ECT06	Analog IC Design	PEC	40/60	3	0	0	3	3

VERTICAL 2: SIGNAL PROCESSING

S.No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25ECT07	Advanced Digital Signal Processing	PEC	40/60	3	0	0	3	3
2	25ECT08	Image processing	PEC	40/60	2	0	2	4	3
3	25ECT09	Speech Processing	PEC	40/60	3	0	0	3	3
4	25ECT10	Software Defined Radio	PEC	40/60	3	0	0	3	3
5	25ECT11	DSP Architecture and Programming	PEC	40/60	3	0	0	3	3
6	25ECT12	Computer Vision	PEC	40/60	3	0	0	3	3

VERTICAL 3: RF TECHNOLOGIES

S. No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25ECT13	RF Transceivers	PEC	40/60	3	0	0	3	3
2	25ECT14	Signal Integrity	PEC	40/60	3	0	0	3	3
3	25ECT15	Antenna Design	PEC	40/60	3	0	0	3	3
4	25ECT16	MICs and RF System Design	PEC	40/60	3	0	0	3	3
5	25ECT17	EMI/EMC Precompliance Testing	PEC	40/60	3	0	0	3	3
6	25ECT18	RF ID System Design & Testing	PEC	40/60	3	0	0	3	3

VERTICAL 4: BIO MEDICAL TECHNOLOGIES

S. No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25ECT19	Wearable Devices	PEC	40/60	3	0	0	3	3
2	25ECT20	Human Assist Devices	PEC	40/60	3	0	0	3	3
3	25ECT21	Therapeutic Equipment	PEC	40/60	3	0	0	3	3
4	25ECT23	Medical Imaging Systems	PEC	40/60	3	0	0	3	3
5	25ECT23	Brain Computer Interface and Applications	PEC	40/60	3	0	0	3	3
6	25ECT24	Body Area Networks	PEC	40/60	3	0	0	3	3

VERTICAL 5: UNDERWATER TECHNOLOGIES

S. No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25ECT25	Underwater Instrumentation System	PEC	40/60	3	0	0	3	3
2	25ECT26	Underwater ImagingSystems and Image Processing	PEC	40/60	3	0	0	3	3
3	25ECT27	Underwater Communication	PEC	40/60	3	0	0	3	3
4	25ECT28	Ocean Observation Systems	PEC	40/60	3	0	0	3	3
5	25ECT29	Underwater Navigation Systems	PEC	40/60	3	0	0	3	3
6	25ECT30	Ocean Acoustics	PEC	40/60	3	0	0	3	3

VERTICAL 6: SENSOR TECHNOLOGIES AND IOT

S. No	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1	25ECT31	IoT Processors	PEC	40/60	3	0	0	3	3
2	25ECT32	IoT Based System Design	PEC	40/60	3	0	0	3	3
3	25ECT33	Wireless Sensor Network Design	PEC	40/60	3	0	0	3	3
4	25ECT34	Industrial IoT and Industry 4.0	PEC	40/60	3	0	0	3	3
5	25ECT35	MEMS Design	PEC	40/60	3	0	0	3	3
6	25ECT36	Fundamentals of Nanoelectronics	PEC	40/60	3	0	0	3	3

VERTICAL 7: SPACE TECHNOLOGIES

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25ECT37	Radar Technologies	PEC	40/60	3	0	0	3	3
2.	25ECT38	Avionics Systems	PEC	40/60	3	0	0	3	3
3.	25ECT39	Positioning and Navigation Systems	PEC	40/60	3	0	0	3	3
4.	25ECT40	Satellite Communication	PEC	40/60	3	0	0	3	3
5.	25ECT41	Remote Sensing	PEC	40/60	3	0	0	3	3
6.	25ECT42	Rocketry and Space Mechanics	PEC	40/60	3	0	0	3	3

VERTICAL 8: HIGH SPEED COMMUNICATIONS

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25ECT43	Optical Communication & Networks	PEC	40/60	3	0	0	3	3
2.	25ECT44	Wireless Broad Band Networks	PEC	40/60	3	0	0	3	3
3.	25ECT45	4G/5G Communication Networks	PEC	40/60	3	0	0	3	3
4.	25ECT46	Software Defined Networks	PEC	40/60	3	0	0	3	3
5.	25ECT47	Massive MIMO Networks	PEC	40/60	3	0	0	3	3
6.	25ECT48	Advanced Wireless Communication Techniques	PEC	40/60	3	0	0	3	3

OPEN ELECTIVES

(Students shall choose the open elective courses, such that the course contents are notsimilar to any other course contents/title under other course categories).

OPEN ELECTIVES – I

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25OAST351	Space Science	OEC	40/60	3	0	0	3	3
2.	25OIET351	Introduction to Industrial Engineering	OEC	40/60	3	0	0	3	3
3.	25OBTT351	Climate Change and its Impact	OEC	40/60	3	0	0	3	3
4.	25OCET351	Environment and Social Impact Assessment	OEC	40/60	3	0	0	3	3
5.	25OEET351	Renewable Energy System	OEC	40/60	3	0	0	3	3
6.	25OEIT351	Introduction to Industrial Instrumentation and Control	OEC	40/60	3	0	0	3	3
7.	25OMAT351	Graph Theory	OEC	40/60	3	0	0	3	3
8.	25OCST355	Deep Learning	OEC	40/60	3	0	0	3	3
9.	25OCST356	Digital Marketing	OEC	40/60	3	0	0	3	3

OPEN ELECTIVES – II

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25OIET352	Resource Management Techniques	OEC	40/60	3	0	0	3	3
2.	25OMGT351	Fintech Regulations	OEC	40/60	3	0	0	3	3
3.	25OFDT351	Holistic Nutrition	OEC	40/60	3	0	0	3	3
4.	25OCET352	ICT in Agriculture	OEC	40/60	3	0	0	3	3
5.	25OEIT352	Introduction to Control Engineering	OEC	40/60	3	0	0	3	3
6.	25OPYT351	Pharmaceutical Nanotechnology	OEC	40/60	3	0	0	3	3
7.	25OAET351	Aviation Management	OEC	40/60	3	0	0	3	3
8.	25OCST357	Dev-ops	OEC	40/60	3	0	0	3	3
9.	25OCST358	Robotics Process Automation	OEC	40/60	3	0	0	3	3

OPEN ELECTIVES – III

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25OHS351	English for Competitive Examinations	OEC	40/60	3	0	0	3	3
2.	25OMGT352	NGOs and Sustainable Development	OEC	40/60	3	0	0	3	3
3.	25OMGT353	Democracy and Good Governance	OEC	40/60	3	0	0	3	3
4.	25OMET353	Renewable Energy Technologies	OEC	40/60	3	0	0	3	3
5.	25OMET354	Applied Design Thinking	OEC	40/60	2	0	2	4	3
6.	25OMFT351	Reverse Engineering	OEC	40/60	3	0	0	3	3
7.	25OMFT353	Sustainable Manufacturing	OEC	40/60	3	0	0	3	3
8.	25OAUT351	Electric and Hybrid Vehicle	OEC	40/60	3	0	0	3	3
9.	25OAST352	Space Engineering	OEC	40/60	3	0	0	3	3
10.	25OIMT351	Industrial Management	OEC	40/60	3	0	0	3	3
11.	25OIET354	Quality Engineering	OEC	40/60	3	0	0	3	3
12.	25OSFT351	Fire Safety Engineering	OEC	40/60	3	0	0	3	3
13.	25OMLT351	Introduction to non-destructive testing	OEC	40/60	3	0	0	3	3
14.	25OMRT351	Mechatronics	OEC	40/60	3	0	0	3	3
15.	25ORAT351	Foundation of Robotics	OEC	40/60	3	0	0	3	3
16.	25OAET352	Fundamentals of Aeronautical engineering	OEC	40/60	3	0	0	3	3
17.	25OGIT351	Remote Sensing Concepts	OEC	40/60	3	0	0	3	3
18.	25OAIT351	Urban Agriculture	OEC	40/60	3	0	0	3	3
19.	25OENT351	Drinking Water Supply and Treatment	OEC	40/60	3	0	0	3	3
20.	25OEET352	Electric Vehicle technology	OEC	40/60	3	0	0	3	3
21.	25OEIT353	Introduction to PLC Programming	OEC	40/60	3	0	0	3	3
22.	25OCHT351	Nano Technology	OEC	40/60	3	0	0	3	3
23.	25OCHT352	Functional Materials	OEC	40/60	3	0	0	3	3
24.	25OBTT352	Biomedical Instrumentation	OEC	40/60	3	0	0	3	3
25.	25OFDT352	Traditional Indian Foods	OEC	40/60	3	0	0	3	3
26.	25OFDT353	Introduction to food processing	OEC	40/60	3	0	0	3	3
27.	25OPYT352	IPR for Pharma Industry	OEC	40/60	3	0	0	3	3
28.	25OTTT351	Basics of Textile Finishing	OEC	40/60	3	0	0	3	3
29.	25OTTT352	Industrial Engineering for Garment Industry	OEC	40/60	3	0	0	3	3
30.	25OTTT353	Basics of Textile Manufacture	OEC	40/60	3	0	0	3	3
31.	25OPET351	Introduction to Petroleum Refining and Petrochemicals	OEC	40/60	3	0	0	3	3

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
32.	25OPET352	Energy Conservation and Management	OEC	40/60	3	0	0	3	3
33.	25OPTT351	Basics of Plastics Processing	OEC	40/60	3	0	0	3	3
34.	25OBMT351	Foundation Skills in integrated product Development	OEC	40/60	3	0	0	3	3
35.	25OBMT352	Assistive Technology	OEC	40/60	3	0	0	3	3
36.	25OMAT352	Operations Research	OEC	40/60	3	0	0	3	3
37.	25OMAT353	Algebra and Number Theory	OEC	40/60	3	0	0	3	3
38.	25OMAT354	Linear Algebra	OEC	40/60	3	0	0	3	3
39.	25OCET353	Lean Concepts, Tools And Practices	OEC	40/60	3	0	0	3	3

OPEN ELECTIVES – IV

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25OHS352	Project Report Writing	OEC	40/60	3	0	0	3	3
2.	25OMA355	Advanced Numerical Methods	OEC	40/60	3	0	0	3	3
3.	25OMA356	Random Processes	OEC	40/60	3	0	0	3	3
4.	25OMA357	Queuing and Reliability Modelling	OEC	40/60	3	0	0	3	3
5.	25OMG354	Production and Operations Management for Entrepreneurs	OEC	40/60	3	0	0	3	3
6.	25OMG355	Multivariate Data Analysis	OEC	40/60	3	0	0	3	3
7.	25OME352	Additive Manufacturing	OEC	40/60	3	0	0	3	3
8.	25OME353	New Product Development	OEC	40/60	3	0	0	3	3
9.	25OME355	Industrial Design & Rapid Prototyping Techniques	OEC	40/60	2	0	2	4	3
10.	25OMF352	Micro and Precision Engineering	OEC	40/60	3	0	0	3	3
11.	25OMF354	Cost Management of Engineering Projects	OEC	40/60	3	0	0	3	3

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
12.	25OAU352	Batteries and Management system	OEC	40/60	3	0	0	3	3
13.	25OAU353	Sensors and Actuators	OEC	40/60	3	0	0	3	3
14.	25OAS353	Space Vehicles	OEC	40/60	3	0	0	3	3
15.	25OIM352	Management Science	OEC	40/60	3	0	0	3	3
16.	25OIM353	Production Planning and Control	OEC	40/60	3	0	0	3	3
17.	25OIE353	Operations Management	OEC	40/60	3	0	0	3	3
18.	25OSF352	Industrial Hygiene	OEC	40/60	3	0	0	3	3
19.	25OSF353	Chemical Process Safety	OEC	40/60	3	0	0	3	3
20.	25OML352	Electrical, Electronic and Magnetic materials	OEC	40/60	3	0	0	3	3
21.	25OML353	Nanomaterials and applications	OEC	40/60	3	0	0	3	3
22.	25OMR352	Hydraulics and Pneumatics	OEC	40/60	3	0	0	3	3
23.	25OMR353	Sensors	OEC	40/60	3	0	0	3	3
24.	25ORA352	Foundation of Automation	OEC	40/60	3	0	0	3	3
25.	25ORA353	Concepts in Mobile Robotics	OEC	40/60	3	0	0	3	3
26.	25OMV351	Marine Propulsion	OEC	40/60	3	0	0	3	3
27.	25OMV352	Marine Merchant Vehicles	OEC	40/60	3	0	0	3	3
28.	25OMV353	Elements of Marine Engineering	OEC	40/60	3	0	0	3	3
29.	25OAE353	Drone Technologies	OEC	40/60	3	0	0	3	3
30.	25OGI352	Geographical Information System	OEC	40/60	3	0	0	3	3
31.	25OAI352	Agriculture Entrepreneurship Development	OEC	40/60	3	0	0	3	3
32.	25OEN352	Biodiversity Conservation	OEC	40/60	3	0	0	3	3
33.	25OEE353	Introduction to control systems	OEC	40/60	3	0	0	3	3
34.	25OEI354	Introduction to Industrial Automation Systems	OEC	40/60	3	0	0	3	3
35.	25OCH353	Energy Technology	OEC	40/60	3	0	0	3	3
36.	25OCH354	Surface Science	OEC	40/60	3	0	0	3	3
37.	25OBT353	Environment and Agriculture	OEC	40/60	3	0	0	3	3
38.	25OFD354	Fundamentals of Food Engineering	OEC	40/60	3	0	0	3	3

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
39.	25OFD355	Food safety and Quality Regulations	OEC	40/60	3	0	0	3	3
40.	25OPY353	Nutraceuticals	OEC	40/60	3	0	0	3	3
41.	25OTT354	Basics of Dyeing and Printing	OEC	40/60	3	0	0	3	3
42.	25OTT355	Fibre Science	OEC	40/60	3	0	0	3	3
43.	25OTT356	Garment Manufacturing Technology	OEC	40/60	3	0	0	3	3
44.	25OPE353	Industrial safety	OEC	40/60	3	0	0	3	3
45.	23OPE354	Unit Operations in Petro Chemical Industries	OEC	40/60	3	0	0	3	3
46.	25OPT352	Plastic Materials for Engineers	OEC	40/60	3	0	0	3	3
47.	25OPT353	Properties and Testing of Plastics	OEC	40/60	3	0	0	3	3
48.	25OBM353	Wearable devices	OEC	40/60	3	0	0	3	3
49.	25OBM354	Medical Informatics	OEC	40/60	3	0	0	3	3
50.	25OCE354	Basics of Integrated Water Resources Management	OEC	40/60	3	0	0	3	3

SUMMARY

Name of the Programme: B.E. Electronics and Communication Engineering										
S.No	Subject Area	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII/VIII	VIII/VII	
1	HSMC	4	3					2	3	12
2	BSC	12	7	4	2					25
3	ESC	5	9	3			3			17
4	PCC		6	17	20	11	12			57
5	PEC					9	4			21
6	OEC						2	6	3	13
7	EEC	1	2	1				2	10	18
8	Non-Credit / (Mandatory)					√	√			
Total		22	27	25	22	20	21	10	16	163

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 verticalsalso.
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 andSustainability
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 forBusiness 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	Administrativ eTheories	Marketing andSocial 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 toFintech	Financing New Business Ventures	Public Policy Administration	Financial Analytic s	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	CATE GORY	Int/ Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25CMGT331	Financial Management	PEC	40/60	3	0	0	3	3
2.	25CMGT332	Fundamentals ofInvestment	PEC	40/60	3	0	0	3	3
3.	25CMGT333	Banking, Services and Insurance	PEC	40/60	3	0	0	3	3
4.	25CMGT334	Introduction to Block chainand its Applications	PEC	40/60	3	0	0	3	3
5.	25CMGT335	Fintech Personal Finance and Payments	PEC	40/60	3	0	0	3	3
6.	25CMGT336	Introduction to Fintech	PEC	40/60	3	0	0	3	3

VERTICAL 2: ENTREPRENEURSHIP

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/ Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25CMGT337	Foundations of Entrepreneurship	PEC	40/60	3	0	0	3	3
2.	25CMGT338	Team Building & Leadership Management for Business	PEC	40/60	3	0	0	3	3
3.	25CMGT339	Creativity & Innovation in Entrepreneurship	PEC	40/60	3	0	0	3	3
4.	25CMGT340	Principles of Marketing Management For Business	PEC	40/60	3	0	0	3	3
5.	25CMGT341	Human Resource Management for Entrepreneurs	PEC	40/60	3	0	0	3	3
6.	25CMGT342	Financing New Business Ventures	PEC	40/60	3	0	0	3	3

VERTICAL 3: PUBLIC ADMINISTRATION

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/ Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25CMGT343	Principles of Public Administration	PEC	40/60	3	0	0	3	3
2.	25CMGT344	Constitution of India	PEC	40/60	3	0	0	3	3
3.	25CMGT345	Public Personnel Administration	PEC	40/60	3	0	0	3	3
4.	25CMGT346	Administrative Theories	PEC	40/60	3	0	0	3	3
5.	25CMGT347	Indian Administrative System	PEC	40/60	3	0	0	3	3
6.	25CMGT348	Public Policy Administration	PEC	40/60	3	0	0	3	3

VERTICAL 4: BUSINESS DATA ANALYTICS

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/ Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25CMGT349	Statistics for Management	PEC	40/60	3	0	0	3	3
2.	25CMGT350	Data mining for BusinessIntelligence	PEC	40/60	3	0	0	3	3
3.	25CMGT351	Human Resource Analytics	PEC	40/60	3	0	0	3	3
4.	25CMGT352	Marketing and SocialMedia Web Analytics	PEC	40/60	3	0	0	3	3
5.	25CMGT353	Operation and Supply Chain Analytics	PEC	40/60	3	0	0	3	3
6.	25CMGT354	Financial Analytics	PEC	40/60	3	0	0	3	3

VERTICAL 5: ENVIRONMENTAL AND SUSTAINABILITY

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	Int/ Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	25CEST331	Sustainable infrastructure Development	PEC	40/60	3	0	0	3	3
2.	25CEST332	Sustainable Agriculture and Environmental Management	PEC	40/60	3	0	0	3	3
3.	25CEST333	Sustainable Bio Materials	PEC	40/60	3	0	0	3	3
4.	25CEST334	Materials for Energy Sustainability	PEC	40/60	3	0	0	3	3
5.	25CEST335	Green Technology	PEC	40/60	3	0	0	3	3
6.	25CEST336	Environmental Quality Monitoring and Analysis	PEC	40/60	3	0	0	3	3
7.	25CEST337	Integrated Energy Planningfor Sustainable Development	PEC	40/60	3	0	0	3	3
8.	25CEST338	Energy Efficiency for Sustainable Development	PEC	40/60	3	0	0	3	3

25HST101 **PROFESSIONAL ENGLISH – I** **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To improve the communicative competence of learners
- To help learners use language effectively in academic /work contexts
- To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that is relevant to authentic contexts.
- To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.
- To use language efficiently in expressing their opinions via various media.

INTRODUCTION TO EFFECTIVE COMMUNICATION

1. What is effective communication? (There are many interesting activities for this.)
2. Why is communication critical for excellence during study, research and work?
3. What are the seven C's of effective communication?
4. What are key language skills?
5. What is effective listening? What does it involve?
6. What is effective speaking?
7. What does it mean to be an excellent reader? What should you be able to do?
8. What is effective writing?
9. How does one develop language and communication skills?
10. What does the course focus on?
11. How are communication and language skills going to be enhanced during this course?
12. What do you as a learner needs to do to enhance your English language and communication skills to get the best out of this course?

UNIT I INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 11

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 – Self Introduction; Introducing a friend; Conversation – politeness strategies; Telephone conversation; Leave a voicemail; Leave a message with another person; asking for information to fill details in a form. 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 12

Listening – Listening to podcast, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking – Narrating personal experiences / events; Interviewing a celebrity; Reporting / and summarizing of documentaries / podcasts/ interviews. Reading – Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. Writing – Guided writing– Paragraph writing Short Report on an event (field trip etc.) Grammar –Past tense (simple); Subject-Verb Agreement; and Prepositions Vocabulary – Word forms (prefixes& suffixes); Synonyms and Antonyms. Phrasal verbs.

UNIT III DESCRIPTION OF A PROCESS / PRODUCT 12

Listening – Listen to a product and process descriptions; a classroom lecture; and advertisements about a products. Speaking – Picture description; giving instruction to use the product; presenting a product; and Summarizing a lecture. 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 12

Listening – Listening to TED Talks; Scientific lectures; and educational videos. Speaking – Small Talk; Mini presentations and making recommendations. Reading – Newspaper articles; Journal reports –and Non Verbal Communication (tables, pie charts etc,.) Writing – Note-making / Note-taking (*Study skills to be taught, not tested; Writing recommendations; Transferring information from nonverbal (chart, graph etc, to verbal mode) Grammar – Articles; Pronouns – Possessive & Relative pronouns. Vocabulary – Collocations; Fixed / Semi fixed expressions.

UNIT V EXPRESSION 12

Listening – Listening to debates/ discussions; different viewpoints on an issue; and panel discussions. Speaking – group discussions, Debates and Expressing opinions through Simulations & Role play. Reading – Reading editorials; and Opinion Blogs; Writing – Essay Writing (Descriptive or narrative). Grammar – Future Tenses, Punctuation; Negation (Statements & Questions); and Simple, Compound & Complex Sentences. Vocabulary – Cause & Effect Expressions – Content vs Function words.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, learners will be able

CO1: To listen and comprehend complex academic texts
CO2: To read and infer the denotative and connotative meanings of technical texts
CO3: To write definitions, descriptions, narrations and essays on various topics
CO4: To speak fluently and accurately in formal and informal communicative contexts
CO5: To express their opinions effectively in both oral and written medium of communication

TEXT BOOKS:

1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 edition)
2. English for Science & Technology Cambridge University Press, 2021. 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 Lakshmi Narayanan, 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, R S Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.

25MAT101 **MATRICES AND CALCULUS** **L T P C**
4 0 0 4

COURSE OBJECTIVES

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

UNIT – I MATRICES **12**

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

UNIT–II DIFFERENTIAL CALCULUS **12**

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

UNIT – III FUNCTIONS OF SEVERAL VARIABLES **12**

Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maximum and minima of functions of two variables and Lagrange's method of undetermined multipliers.

UNIT – IV INTEGRATION **12**

The Indefinite integral – Integration by parts - Double integrals – Double integrals in polar co–ordinates – Area enclosed by plane curves – Triple integrals.

UNIT – V ORDINARY DIFFERENTIAL EQUATIONS **12**

Higher order linear differential equations with constant coefficients — Homogeneous equation of Euler's and Legendre's type – System of simultaneous linear first order differential equations with constant coefficients- Method of variation of parameters.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1: Use the matrix algebra methods for solving practical problems.
CO2: Apply differential calculus tools in solving various application problems.
CO3: Able to use differential calculus ideas on several variable functions.
CO4: Apply different methods of integration in solving practical problems.
CO5: Apply multiple integral ideas in solving areas, volumes and other practical problems.

TEXT BOOKS :

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

REFERENCES:

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

25PHT101 **ENGINEERING PHYSICS** **L P T C**
3 0 0 3

OBJECTIVES:

- To make the students effectively to 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**

Multiparticle dynamics: Center of mass (CM) – CM of continuous bodies – motion of the CM – kinetic energy of 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 – M.I of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope - torsional pendulum – double pendulum –Introduction to nonlinear oscillations.

UNIT II **ELECTROMAGNETIC WAVES** **9**

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

UNIT III **OSCILLATIONS, OPTICS AND LASERS** **9**

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

UNIT IV **BASIC QUANTUM MECHANICS** **9**

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

UNIT V **APPLIED QUANTUM MECHANICS** **9**

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

TOTAL: 45 PERIODS

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 energy bands.

TEXT BOOKS:

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

REFERENCES:

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

25CYT101 **ENGINEERING CHEMISTRY** **L T P C**
3 0 0 3

OBJECTIVES:

- To understand water quality parameters, treatment process and corrosion.
- To analyses absorption, adsorption and phases.
- To evaluate engineering materials and study of batteries.
- To understand the nature of polymers and recent advanced energy sources.
- To observe various chemical composition analyses and shock waves.

UNIT I **UNIVERSAL SOLVENT (WATER) AND CORROSION** **9**

Water quality parameters of-color, odour, turbidity, pH and hardness, TDS, COD and BOD. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion. Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process. Corrosion- causes- factors- type's chemical, electrochemical corrosion (galvanic, differential aeration), corrosion control and corrosion inhibitors.

UNIT II **SURFACE CHEMISTRY AND PHASE RULE** **9**

Adsorption: Types of adsorption – adsorption of gases on solids – adsorption of solute from solutions – adsorption isotherms. Langmuir's adsorption isotherm –Catalysis: Catalyst – types of catalysis – criteria – autocatalysis acid base catalysis – enzyme catalysis– Michaelis – Menten equation. Phase rule: Introduction, definition of terms with examples. One component system – water system; reduced phase rule; – Thermal analysis; two component system: lead-silver system – Pattinson process.

UNIT III **ALLOYS AND BATTERIES** **9**

Introduction- Definition- Properties of alloys- Significance and Functions and Ferrous alloys- Nichrome and Stainless steel – heat treatment of steel; Non-ferrous alloys – brass and bronze. Batteries: Types of batteries, Primary battery – dry cell, Secondary battery – lead acid battery and lithium-ion battery; Electric vehicles

UNIT IV **POLYMERS AND ADVANCED ENERGY SOURCES** **9**

Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types and mechanism of polymerization: Addition (Free Radical, cationic and anionic); condensation and copolymerization. Preparation, properties and uses of Nylon 6,6, and Epoxy resin. Advanced Energy Sources- Recent developments in solar cell materials. Fuel cells: H_2-O_2 fuel cell, microbial fuel cell; Super capacitors: Storage principle, types and examples

UNIT V **ANALYTICAL CHEMISTRY AND SHOCK WAVE** **9**

Proximate and ultimate analysis of coal. Accuracy, precision, sensitivity, detection limits, significant figures, rounding off. Types of errors determinate and indeterminate errors. Shock Wave- Description of a shock wave and its applications. Methods of creating shock waves in the laboratory using a shock tube, description of hand operated Reddy shock tube and its characteristics.

TOTAL: 45 PERIODS

OUTCOMES:

CO1: To know well about water quality parameters and corrosion nature.
CO2: To differentiate easily absorption, adsorption and also phases.
CO3: To use alloys in day to day life and also batteries.
CO4: To distinguish polymers in regular use and clearly mention about advanced energies.
CO5: To calibrate chemical composition and use of shock wave in real life.

TEXT BOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai, Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.
4. Skoog, D.A.; West, D.M.; Holler, F.J.; Crouch, S.R. (2014),Fundamentals of Analytical Chemistry, Cengage Learning..

REFERENCES:

1. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017
2. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014
3. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
4. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013
5. Shock waves made simple- Chintoo S Kumar, K Takayama and KPJ Reddy: Willey India Pvt. Ltd. New Delhi2014.

25GET101 **INTRODUCTION TO C PROGRAMMING** **L P T C**
3 0 0 3

COURSE OBJECTIVES:

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

UNIT I COMPUTATIONAL THINKING AND PROBLEM SOLVING 9

Fundamentals of Computing – Identification of Computational Problems -Algorithms, buildingblocks of algorithms (statements, state, control flow, functions), notation (pseudocode, flow chart, programming language), algorithmic problem solving, simple strategies fordeveloping algorithms (iteration, recursion), simple problems(find odd or even, sum of n numbers, find factorial of a given number, etc.)

UNIT II BASICS OF C PROGRAMMING 9

Introduction to programming paradigms – Applications of C Language - Structure of C program – Cprogramming: 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 III 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 IV FUNCTIONS AND POINTERS 9

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

UNIT V STRUCTURES, UNION AND FILE PROCESSING 9

Structure - Nested structures – Pointer and Structures – Array of structures – Self referentialstructures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes andVisibility - Files – Types of file processing: Sequential access, Random access – Sequential access file -Random access file - Command line arguments.

COURSE OUTCOMES:

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

CO1: Demonstrate knowledge on C Programming constructs
CO2: Develop simple applications in C using basic constructs
CO3: Design and implement applications using arrays and strings
CO4: Develop and implement modular applications in C using functions.
CO5: Develop applications in C using structures and pointers.
CO6: Design applications using sequential and random access file processing.

TOTAL: 45 PERIODS

TEXT BOOKS:

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

REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2. YashwantKanetkar, Let us C, 17th Edition, BPB Publications, 2020.

25GET102 **HERITAGE OF TAMILS** **L T P C**

1 0 01

UNITI LANGUAGEANDLITERATURE 3

LanguageFamiliesinIndia-DravidianLanguages–TamilasaClassicalLanguage-Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice inSangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism inTamilLand - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNITII HERITAGE- ROCKARTPAINTINGSTOMODERN 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.

UNITIII FOLKANDMARTIALARTS 3

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

UNITIV THINAICONCEPTOF TAMILS 3

FloraandFaunaofTamils&AhamandPuramConceptfromTholkappiyamandSangamLiterature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports ofSangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OFTAMILSTOINDIAN NATIONALMOVEMENT AND INDIANCULTURE 3

ContributionofTamilstoIndianFreedomStruggle-TheCulturalInfluenceofTamilsovertheother 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-REFERENCEBOOKS

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. SocialLifeoftheTamils-TheClassicalPeriod(Dr.S.Singaravelu)(Publishedby:International Institute of Tamil Studies.
7. HistoricalHeritageoftheTamils(Dr.S.V.Subatamanian,Dr.K.D.Thirunavukkarasu)(Publishedby: International Institute of Tamil Studies).

8. TheContributionsoftheTamilstoIndianCulture(Dr.M.Valarmathi)(Publishedby:International Institute of Tamil Studies.)

9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: DepartmentofArchaeology&TamilNaduTextBookandEducationalServicesCorporation,Tamil Nadu)

10. StudiesintheHistoryofIndiawithSpecialReferencetoTamilNadu(Dr.K.K.Pillay) (Publishedby: The Author)

11. PorunaiCivilization(JointlyPublishedby:DepartmentofArchaeology&TamilNaduText Bookand Educational Services Corporation, Tamil Nadu)

12. JourneyofCivilizationIndustoVaigai(R.Balakrishnan)(Publishedby:RMRL)–Reference Book.

25GET102 □□□□□□ □□□□ **LTP C**
1001

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.

25GEP101 **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 shall not be restricted to the sample experiments designed.

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1: Demonstrate knowledge on C programming constructs.
CO2: Develop programs in C using basic constructs.
CO3: Develop programs in C using arrays.
CO4: Develop applications in C using strings, pointers, functions.
CO5: Develop applications in C using structures.
CO6: Develop applications in C using file processing.

TEXT BOOKS:

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

REFERENCES:

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

25BSP101 **PHYSICS and CHEMISTRY LABORATORY** **L T P C**
(Common to all branches) **0 0 4 2**
Any Seven Experiments

PHYSICS LABORATORY

COURSE OBJECTIVES:

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

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

TOTAL PERIODS: 30

COURSE OUTCOMES:
CO1: Upon completion of the course, the students should be able to
CO2: Understand the functioning of various physics laboratory equipment.
CO3: Use graphical models to analyze laboratory data.
CO4: Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO5: Access, process and analyze scientific information.
CO6: Solve problems individually and collaboratively.

CHEMISTRY LABORATORY

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS:

1. Determination of total, temporary & permanent hardness of water by EDTA method
2. Determination of chloride content of water sample by Argentometric method
3. Determination of types and amount of alkalinity in water sample
4. Determination of DO content of water sample by Winkler's method
5. Determinationofstrengthofacidsinamixtureofacidsusingconductivitymeter

6. Conduct ometric titration of barium chloride against sodium (precipitation titration).
7. Estimation of iron content of the given solution using potentiometer

OPEN ENDED EXPERIMENTS:

1. Determination of strength of given hydrochloric acid using pH meter.
2. Conduct ometric titration of Strong acid against Strong base

COURSE OUTCOMES:

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

CO1: To independently estimate the water quality parameters, such as, acidity, alkalinity, hardness, DO, TDS, chloride and copper contents by appropriate wet chemical analyses.

CO2: To quantitatively analyze the impurities in aqueous solution by electro analytical techniques.

CO3: To determine the amount of metal ions in aqueous samples by spectroscopic techniques.

TEXTBOOKS:

1. J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, "Vogel's Textbook of Quantitative Chemical Analysis", Pearson Education, 2009.
2. 2. V. K. Ahluwalia, SunithaDhingra and AdarshGulati, "College Practical Chemistry", Universities Press (India) Pvt. Ltd., 2018.

25GEP102 **ENGLISH LABORATORY** **L T P C**
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COURSE OBJECTIVES:

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

UNIT I STRENGTHENING PROFESSIONAL WRITING 9

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

UNIT II BUSINESS WRITING IN TECHNICAL CONTEXT 9

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

UNIT III ENGLISH IN WORK PLACE 9

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

UNIT IV REPORTING OF THE EVENTS AND ANALYSING THE CONTENT 9

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

UNIT V THE ABILITY TO NARRATE THE INFORMATION PERSUASIVELY 9

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

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, learners will be able

- To apply the reading strategies to comprehend the technical terms and helps to compare and contrast products and ideas in technical texts.
- To listen and comprehend the cause and effects in events, industrial processes through technical texts.
- To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.
- To speak appropriately and effectively in varied context in formal and informal context.
- To present their opinions in a planned and logical manner, and draft effective resumes incontext of job search. It helps to report events and the processes of technical and industrial nature.

TEXT BOOKS:

1. English for Engineers & Technologists (2022 edition) Orient Blackswan Private Ltd. Hyderabad.

REFERENCES:

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. Krishna Mohan, Meera Banerji, "Developing Communication Skills", Trinity Press, 2017.