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

CHOICE BASED CREDIT SYSTEM

B. TECH AGRICULTURAL ENGINEERING

ABOUT THE DEPARTMENT:

The Department of Agricultural Engineering was established in the year 2021 with a sanctioned strength of 60. The department is an interdisciplinary hub of research, teaching and consulting expertise that relates to science and technology of producing food grains. The department endeavors to become an efficient and dynamic department capable of producing quality graduates with training, research and community services skills that will be enterprising and self-reliant. The laboratories are well equipped with the state-of-art precision defined instruments to explore ideas and visualize the concepts of technology in agriculture.

VISION OF THE DEPARTMENT:

To be a renowned resource center in the country for obtaining education in Agricultural Engineering by lead others in coordinating the teaching, research and extension education in the field of Agricultural Engineering. The academic quality, continuous efforts for excellence and our responsiveness for the need of farmers and industry would be our distinction. Our reputation will attract good students, government and corporate research support.

MISSION OF THE DEPARTMENT:

The Department strives to contribute to the expansion of knowledge in the discipline of Agricultural Engineering and aims:

- To produce good quality agricultural engineers.
- To provide the required manpower in the field of agricultural engineering suitable for research and education, extension, government agency, private industries, agro-industries, NGO etc.
- To assist farmers in reducing the cost of cultivation through better utilization of efficient farm machinery, soil and water conservation, irrigation management, value addition through farm level processing, post-harvest technology; protective cultivation and use of renewable energy ultimately help the farmers to increase their earnings Human resource development of the faculty.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

Graduates of Agriculture Engineering Programme should be able to,

PEO 1: Develop diverse capability to work with tractor and implement manufacturing industries, seed processing industries, irrigation and drainage companies and also to run self - entrepreneurship like dairy farming and custom hiring centers.

PEO 2: Take up higher studies in reputed institutes and motive towards innovative research by applying their skills in agricultural water management, farm machinery and power, processing and energy management systems in agriculture.

PEO 3: Understand the issues of ethics, safety, professionalism, cultural diversity, globalization, environmental impact and responsibility of serving the society and the environmental issues.

PROGRAM OUTCOMES (POS):

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

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 engineering activities with an understanding of the limitations.

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

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 and norms of the engineering practice.

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

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

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader 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 technological change.

PROGRAM SPECIFIC OUTCOMES (PSOS):

PSO1: To make expertise in design and engineering problem solving approach in agriculture with proper knowledge and skill.

PSO2: To enhance the ability of the students to formulate solutions to real-world problems pertaining to sustained agricultural productivity using modern technologies.

PSO3: To inculcate entrepreneurial skills through strong Industry-Institution linkage

CHOICE BASED CREDIT SYSTEM

B.TECH AGRICULTURAL ENGINEERING

CURRICULUM FOR SEMESTERS I TO VIII AND SYLLABI FOR SEMESTER I AND II

SEMESTER – I

S.NO.	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
1.	24IP101	Induction Programme				-	-	-	0
THEORY									
2.	24HST101	Professional English-I	HSMC	40/60	3	0	0	3	3
3.	24MAT101	Matrices and Calculus	BSC	40/60	3	1	0	4	4
4.	24PHT101	Engineering Physics	BSC	40/60	3	0	0	3	3
5.	24CYT101	Engineering Chemistry	BSC	40/60	3	0	0	3	3
6.	24GET101	Problem Solving and Python Programming	ESC	40/60	3	0	0	3	3
7.	24GET102	Heritage of Tamils	HSMC	100	1	0	0	1	1
PRACTICALS									
8.	24GEP101	Problem Solving and Python Programming Laboratory	ESC	75/25	0	0	4	4	2
9.	24BSP101	Physics and Chemistry Laboratory	BSC	75/25	0	0	4	4	2
10.	24GEP102	English Laboratory $	EEC	100	0	0	2	2	1
				Total	**16**	**1**	**10**	**27**	**22**

Skill Based Course

SEMESTER – II

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIOD PER WEEK			TOTAL CONTACT PERIODS	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.	24AGT201	Principles and Practices of Crop Production	PCC	40/60	2	0	2	4	3
4.	24BET201	Basic Electrical, Electronics and Instrumentation Engineering	ESC	40/60	3	0	0	3	3
5.	24GET201	Engineering Graphics	ESC	40/60	2	0	4	6	4
6.	24PET101	NCC Credit Course Level 1#	-	40/60	2	0	0	2	2#
7.	24GET202	தமிழரும் ததொழில் நுட்பமும் / Tamils and Technology	HSMC	40/60	1	0	0	1	1
PRACTICALS									
8.	24GEP201	Engineering Practices Laboratory	ESC	75/25	0	0	4	4	2
9.	24BEP201	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	ESC	75/25	0	0	4	4	2
10.	24GEP202	Communication Laboratory / Foreign Language $	EEC	75/25	0	0	4	4	2
TOTAL					**13**	**1**	**18**	**32**	**23**

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

$ Skill Based Course

SEMESTER III

S.NO.	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1.	24MAT301	Fourier Series and Linear Programming	BSC	40/60	3	1	0	4	4
2.	24AGT301	Principles of Soil Science and Engineering	PCC	40/60	3	0	0	3	3
3.	24AGT302	Unit Operations in Agricultural Processing	PCC	40/60	2	0	2	4	3
4.	24AGT303	Fluid Mechanics and Pumps	PCC	40/60	3	0	0	3	3
5.	24MET301	Theory of Machines	PCC	40/60	3	0	0	3	3
6.	24CET301	Surveying and Levelling	PCC	40/60	3	0	0	3	3
PRACTICALS									
7.	24AGP303	Fluid Mechanics Laboratory	PCC	75/25	0	0	4	4	2
8.	24AGP301	Soil Science Laboratory	PCC	75/25	0	0	3	3	1.5
9.	24CEP301	Surveying and Levelling Laboratory	PCC	75/25	0	0	3	3	1.5
10.	24GEP301	Professional Development[$]	EEC	100	0	0	2	2	1
TOTAL					**17**	**1**	**14**	**32**	**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.	24AGT401	Tractors and Engine Systems	PCC	40/60	3	0	0	3	3
2.	24AGT402	Soil and Water Conservation Engineering	PCC	40/60	3	0	0	3	3
3.	24AGT403	Strength of Materials for Agricultural Engineering	PCC	40/60	3	0	0	3	3
4.	24AGT404	Hydrology and Water Resources Engineering	PCC	40/60	3	0	0	3	3
5.	24MET401	Engineering Thermodynamics	ESC	40/60	3	0	0	3	3
6.	24GET401	Environmental Sciences and Sustainability	BSC	40/60	2	0	0	2	2
7.	24PET402	NCC Credit Course Level 2#			3	0	0	3	3#
PRACTICALS									
8.	24AGP401	Tractor and Farm Engines Laboratory	PCC	75/25	0	0	2	2	1
9.	24AGP403	Strength of Materials Laboratory	PCC	75/25	0	0	4	4	2
TOTAL					**17**	**0**	**6**	**23**	**20**

 # NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded inthe 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	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1.	24AGT501	Farm Equipment and Machinery	PCC	40/60	3	0	0	3	3
2.		Professional Elective I	PEC	40/60	3	0	0	3	3
3.		Professional Elective II	PEC	40/60	3	0	0	3	3
4.		Professional Elective III	PEC	40/60	3	0	0	3	3
5.		Professional Elective IV	PEC	40/60	3	0	0	3	3
6.		Mandatory Course-I[&]	MC		3	0	0	3	0
PRACTICALS									
7.	24AGP511	Farm Machinery Laboratory	PCC	75/25	0	0	4	4	2
8.	24AGP512	ICT in Agricultural Engineering Laboratory	PCC	75/25	0	0	4	4	2
9.	24AGP513	Summer Training (2 weeks)**	EEC	100	0	0	0	0	1
TOTAL					**18**	**0**	**8**	**26**	**20**

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

SEMESTER VI

S.NO.	COURSE CODE	COURSE TITLE	CATEGORY	Int/Ext	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1.	24AGT601	Post-Harvest Technology	PCC	40/60	3	0	0	3	3
2.	24AGT602	Irrigation and Drainage Engineering	PCC	40/60	3	0	0	3	3
3.		Professional Elective V	PEC	40/60	3	0	0	3	3
4.		Professional Elective VI	PEC	40/60	3	0	0	3	3
5.		Professional Elective VII	PEC	40/60	3	0	0	3	3
6.		Open Elective – I*	OEC	40/60	3	0	0	3	3
7.		Mandatory Course-II[&]	MC		3	0	0	3	0
8.		NCC Credit Course Level 3[#]			3	0	0	3	3 [#]
PRACTICALS									
9.	24AGP611	CAD for Agriculture Machinery Laboratory	PCC	75/25	0	0	4	4	2
10.	24AGP612	Post – Harvest Technology Laboratory	PCC	75/25	0	0	2	2	1
11.	24AGP613	Irrigation Field Laboratory	PCC	75/25	0	0	2	2	1
TOTAL					**21**	**0**	**8**	**29**	**22**

*** Open Elective – I shall be chosen from the emerging technologies**

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

 # NCC Credit Course level 3 is offered for NCC students only. The grades earned by the students will be recorded inthe 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	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
					L	T	P		
THEORY									
1.	24AGT701	Remote Sensing and Geographical Information System	PCC	40/60	3	0	0	3	3
2.	24AGT702	Renewable Energy in Agricultural Engineering	PCC	40/60	3	0	0	3	3
3.	24GET701	Human Values and Ethics	HSMC	40/60	2	0	0	2	2
4.	24GET702	Total Quality Management	HSMC	40/60	3	0	0	3	3
5.		Open Elective – II**	OEC	40/60	3	0	0	3	3
6.		Open Elective – III***	OEC	40/60	3	0	0	3	3
7.		Open Elective – IV***	OEC	40/60	3	0	0	3	3
PRACTICALS									
8.	24AGP711	Remote Sensing and GIS Laboratory	PCC	75/25	0	0	4	4	2
9.	24AGP712	Renewable Energy in Agricultural Engineering Laboratory	PCC	75/25	0	0	2	2	1
TOTAL					**20**	**0**	**6**	**26**	**23**

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

****Open Elective – II shall be chosen from the emerging technologies.**

*****Open Elective III and IV (Shall be chosen from the list of open electives offered by other Programmes.**

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.	24AGP801	Project Work/Internship	EEC	75/25	0	0	20	20	10
TOTAL					**0**	**0**	**20**	**20**	**10**

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

TOTAL CREDITS: 165

MANDATORY COURSES I

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

MANDATORY COURSES II

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

PROFESSIONAL ELECTIVE COURSES : VERTICALS

VERTICAL I Food Processing	VERTICAL II Farm Machinery and Energy	VERTICAL III Water Management and Protected cultivation	VERTICAL IV IT and Agricultural Business management
Refrigeration and cold Storage	Farm Power and Machinery Management	Watershed planning and Management	Integrated Farming System
Food and Dairy Engineering	Testing and Evaluation of farm Machinery and equipment	Groundwater and Well Engineering	Agri Business Management
Process Engineering of Fruits and Vegetables	Biochemical and Thermochemical conversion of biomass	Design of Micro-irrigation system	Sustainable Agriculture and Food Security
Storage and Packaging Technology	Waste and by product utilization	Protected Cultivation	Systems Analysis in Agricultural Engineering
Food Process Equipment and Design	Human Engineering and Safety in Farm Machinery Operations	On-farm water management	IT in Agricultural System
Food Plant Design and Management	Precision Farming Equipment	Irrigation Water Quality and Waste Water Management	Automation in Agriculture
Emerging Technologies in Food Processing	Solar and Wind energy system	Climate change and Adaptation	Landscape architecture

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 specialisation. 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. (Amendments)

PROFESSIONAL ELECTIVE COURSES : VERTICALS

VERTICAL I: FOOD PROCESSING

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24AGET01	Refrigeration and Cold Storage	PEC	3	0	0	3	3
2.	24AGET02	Food and Dairy Engineering	PEC	3	0	0	3	3
3.	24AGET03	Process Engineering of Fruits and Vegetables	PEC	3	0	0	3	3
4.	24AGET04	Storage and Packaging Technology	PEC	3	0	0	3	3
5.	24AGET05	Food Process Equipment and Design	PEC	3	0	0	3	3
6.	24AGET06	Food Plant Design and Management	PEC	3	0	0	3	3
7.	24AGET07	Emerging Technologies in Food Processing	PEC	3	0	0	3	3

VERTICAL II: FARM MACHINERY AND ENERGY

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24AGET08	Farm Power and Machinery Management	PEC	3	0	0	3	3
2.	24AGET09	Testing and Evaluation of Farm Machinery and Equipment	PEC	3	0	0	3	3
3.	24AGET10	Biochemical and Thermochemical Conversion of Biomass	PEC	3	0	0	3	3
4.	24AGET11	Waste and By Product Utilization	PEC	3	0	0	3	3
5.	24AGET12	Human Engineering and Safety in Farm Machinery Operations	PEC	3	0	0	3	3
6.	24AGET13	Precision Farming Equipment	PEC	3	0	0	3	3
7.	24AGET14	Solar and Wind Energy System	PEC	3	0	0	3	3

VERTICAL III: WATER MANAGEMENT AND PROTECTED CULTIVATION

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24AGET15	Watershed Planning and Management	PEC	3	0	0	3	3
2.	24AGET16	Groundwater and Well Engineering	PEC	3	0	0	3	3
3.	24AGET17	Design of Micro-Irrigation System	PEC	3	0	0	3	3
4.	24AGET18	Protected Cultivation	PEC	3	0	0	3	3
5.	24AGET19	On-farm Water Management	PEC	3	0	0	3	3
6.	24AGET20	Irrigation Water Quality and Waste Water Management	PEC	3	0	0	3	3
7.	24AGET21	Climate Change and Adaptation	PEC	3	0	0	3	3

VERTICAL IV: IT AND AGRICULTURAL BUSINESS MANAGEMENT

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24AGET22	Integrated Farming System	PEC	3	0	0	3	3
2.	24AGET23	Agricultural Business Management	PEC	3	0	0	3	3
3.	24AGET24	Sustainable Agriculture and Food Security	PEC	3	0	0	3	3
4.	24AGET25	Systems Analysis in Agricultural Engineering	PEC	3	0	0	3	3
5.	24AGET26	IT in Agricultural System	PEC	3	0	0	3	3
6.	24AGET27	Automation in Agriculture	PEC	3	0	0	3	3
7.	24AGET28	Landscape Architecture	PEC	3	0	0	3	3

ELECTIVE - MANAGEMENT COURSES

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24GET01	Principles of Management	HSMC	3	0	0	3	3
2.	24GET02	Total Quality Management	HSMC	3	0	0	3	3
3.	24GET03	Engineering Economicsand 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

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 ELECTIVE I AND II (EMERGING TECHNOLOGIES)

To be offered other than Faculty of Information and Communication Engineering

SL.NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24OCS351	Artificial Intelligence and Machine Learning Fundamentals	OEC	2	0	2	4	3
2.	24OCS352	IoT Concepts and Applications	OEC	2	0	2	4	3
3.	24OCS353	Data Science Fundamentals	OEC	2	0	2	4	3
4.	24OCS354	Augmented and Virtual Reality	OEC	2	0	2	4	3

OPEN ELECTIVES – III

SL.NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				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 GoodGovernance	OEC	3	0	0	3	3
4.	24OME353	Renewable Energy Technologies	OEC	3	0	0	3	3
5.	24OME354	Applied Design Thinking	OEC	2	0	2	4	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
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.	24OCE353	Lean Concepts, Tools And Practices	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.	24OB352	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 andCircuits	OEC	3	0	0	3	3
36.	24OBM351	Foundation Skills in integrated product Development	OEC	3	0	0	3	3
37.	24OBM352	Assistive	OEC	3	0	0	3	3

		Technology						
38.	24OMA352	Operations Research	OEC	3	0	0	3	3
39.	24OMA353	Algebra and NumberTheory	OEC	3	0	0	3	3
40.	24OMA354	Linear Algebra	OEC	3	0	0	3	3

OPEN ELECTIVES – IV

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				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 Modelling	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	2	0	2	4	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	Nanomaterials andapplications	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
31.	24OAI352	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
32.	24OEN352	Biodiversity Conservation	OEC	3	0	0	3	3
33.	24OCE354	Basics of Integrated Water Resources Management	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 forEngineers	OEC	3	0	0	3	3
47.	24OPT353	Properties and Testingof 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	2	0	2	4	3
50.	24OBM353	Wearable devices	OEC	3	0	0	3	3
51.	24OBM354	Medical Informatics	OEC	3	0	0	3	3

CREDIT DISTRIBUTION

SL. NO.	SUBJECT AREA	CREDITS PER SEMESTER								TOTAL
		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	-	-	-	-	-	-	**14**
4.	PCC	-	6	20.5	19.5	12.5	7.5	3	-	**69**
5.	PEC	-	-	-	-	9	9	3	-	**21**
6.	OEC	-	-	-	-	-	3	9	-	**12**
7.	EEC	1	2	1	-	-	-	-	10	**14**
	Total	**22**	**27**	**25.5**	**21.5**	**21.5**	**19.5**	**20**	**10**	**167**
8.	Mandatory Course (Non credit)					□	□			

CATEGORY		Breakup of Credits
HSMC	Humanities & Social Science Including Management	**12**
BSC	Basic Science Courses	**25**
ESC	Engineering Science Courses	**14**
PCC	Professional Core Courses	**69**
PEC	Professional Elective Courses	**21**
OEC	Open Elective Courses	**12**
EEC	Employment Enhancement Courses	**14**
	Total	**167**

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

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

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

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

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

VERTICAL I	VERTICAL II	VERTICAL III	VERTICAL IV	VERTICAL V
Fintech and Block Chain	**Entrepreneurship**	**Public Administration**	**Business Data Analytics**	**Environment and Sustainability**
Financial Management	Foundations of Entrepreneurship	Principles of Public Administration	Statistics for Management	Sustainable infrastructure Development
Fundamentals of Investment	Team Building and Leadership Management for Business	Constitution of India	Datamining for Business Intelligence	Sustainable Agriculture and Environmental Management
Banking, Financial Services and Insurance	Creativity and 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 Entrepreneurship	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

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

VERTICAL 2: ENTREPRENEURSHIP

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

VERTICAL 3: PUBLIC ADMINISTRATION

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

VERTICAL 4: BUSINESS DATA ANALYTICS

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

VERTICAL 5: ENVIRONMENT AND SUSTAINABILITY

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	24CES331	Sustainable infrastructure Development	PEC	3	0	0	3	3
2.	24CES332	Sustainable Agriculture and Environmental Management	PEC	3	0	0	3	3
3.	24CES333	Sustainable Bio Materials	PEC	3	0	0	3	3
4.	24CES334	Materials for Energy Sustainability	PEC	3	0	0	3	3

5.	24CES335	Green Technology	PEC	3	0	0	3	3
6.	24CES336	Environmental Quality Monitoring and Analysis	PEC	3	0	0	3	3
7.	24CES337	Integrated Energy Planning for Sustainable Development	PEC	3	0	0	3	3
8.	24CES338	Energy Efficiency for Sustainable Development	PEC	3	0	0	3	3

24IP3151 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 everyday for the duration of the

program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later.

(iii)Universal Human Values

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, 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. 24 Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv)Literary Activity

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

(v)Proficiency Modules

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

(vi)Lectures by Eminent People

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

(vii) Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the 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 (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science

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

References:

Guide to Induction program from AICTE

24HST101 PROFESSIONAL ENGLISH-I L T P C
3 0 0 3

COURSE OBJECTIVES:

- To enable learners of Engineering and Technology develop their basic communication skills in English.
- To emphasize specially the development of speaking skills amongst learners of Engineering and Technology.
- To develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- To inculcate the habit of reading and writing leading to effective and efficient communication.
- To develop the ability to write job applications and interviews for internship and effective reports.

INTRODUCTION TO BASIC OF COMMUNICATION

- What are the fundamentals of effective communication? (Activity based practices in classroom)
- 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 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 BASICS OF ENGLISH 11

Listening- Types of Listening, Listening to Speeches/ presentations, Listening to technical topics and completing information-gap exercises.
Reading- Reading longer technical texts, Reading and interpreting visual material- Finding key information in a given text. **Writing-** Writing emails/letters introducing oneself. **Speaking-** Describing a process, Self Introduction, Group Discussion and interaction. **Grammar-** Present Tenses (Simple and progressive), Synonyms and Antonyms, Articles **Vocabulary-** Word forms prefixes and suffixes, Different forms and uses of words.

UNIT II TECHNICAL WRITING SKILLS 12

Listening- Listening and note making, listening to specific task-focused audio tracks.
Reading-Reading short passages - skimming, scanning, predicting the inference of the passage, Reading job advertisements **Writing-**Paragraph writing, writing short report on an event **Speaking-**Role-play Group Interaction, Speaking in formal situations (teachers, officials, foreigners) **Grammar-** Past Tense (Simple and progressive) Compound words, Active & Passive voice. **Vocabulary-**Technical Vocabulary, Prepositions, One word substitution.

UNIT III EFFECTIVE ENGLISH 12

Listening-Watching videos /documentaries and Responding to questions based on them. **Reading**-Email Communication, Reading biographies, excerpts from literature **Writing-** writing definitions, writing instructions, Recommendations. **Speaking-** Showing appreciation, Asking or giving directions, seeking clarification **Grammar-** Adjectives, Subject - Verb Agreement. **Vocabulary**-Lexical items (fixed/semi fixed expressions), Phrasal Verbs.

UNIT IV PRESENTATION SKILLS 12

Listening- Listening to broadcast and telecast from Radio and TV, listening to anecdotes. **Reading-** Reading editorials and opinion blogs. Reading Newspaper articles, journal reports **Writing**-Writing Data Interpretations-Pie-Chart, Bar chart and Table, Essay writing (Descriptive and Narrative)

Speaking-Offering help, describing a process, speaking in different situations. **Grammar**-Adverbs, Tenses - future tense, Use of sequence words, **Vocabulary**-Content vs. Function words, Cause and effect Expressions

UNIT V EFFECTIVE LEARNING 12

Listening- Listening for general information - specific details - conversation, listening to interviews with celebrities. **Reading-** Reading brochures (technical content), telephone messages, social media messages, relevant to technical contexts and emails. **Writing -** Process description, Note making/Note-taking **Speaking-** Mechanics of Presentation, Participating in Group Discussion **Grammar-** Question Tag, Yes/No questions, WH questions **Vocabulary-** Discourse Markers, Negation, Simple, and Compound & Complex Sentence.

TOTAL : 60 PERIOD

COURSE OUTCOMES:

At the end of the course, learners will be able

- To listen and comprehend complex academic texts
- To read and infer the denotative and connotative meanings of technical texts
- To write definitions, descriptions, narrations and essays on various topics
- To speak fluently and accurately in formal and informal communicative contexts
- 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.
3. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

REFERENCES:

1. Technical Communication – Principles and Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. A Course Book on Technical English By 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,
6. 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 is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To understand various techniques of multiple integrals.

UNIT I MATRICES 9+3

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

UNITII DIFFERENTIAL CALCULUS 9+3

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

UNIT III FUNCTIONS OF SEVERAL VARIABLES 9+3

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

UNIT IV INTEGRATION 9+3

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

UNIT V MULTIPLE INTEGRALS 9+3

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

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

TEXT BOOKS :

1. Kreyszig E, "Advanced Engineering Mathematics" John Wiley and 10th Edition, 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.

REFERENCE BOOKS:

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.
4. Ramana. B.V., " Higher Engineering Mathematics ", McGraw Hill Education Pvt. Ltd,New Delhi, 2016.
5. Srimantha Pal and Bhunia. S.C, " Engineering Mathematics " Oxford University Press, 2015.
6. 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_vignette

3. https://learnengineering.in/ma3151-matrices-and-calculus/

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

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

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 be 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, 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

OUTCOMES:

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

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

TEXT BOOKS:

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

REFERENCES:

1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition),2009.
2. Paul A. Tipler, 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**
(Common to all branches) **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, 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- types 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:

- To know well about water quality parameters and corrosion nature.
- To differentiate easily absorption, adsorption and also phases.
- To use alloys in day to day life and also batteries.
- To distinguish polymers in regular use and clearly mention about advanced energies.
- 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

MAPPING OF COs WITH POs AND PSOs

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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
4 0 0 4

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

UNIT II DATA TYPES, EXPRESSIONS, STATEMENTS 9

Python interpreter and interactive mode,debugging; values and types: int, float, boolean, string, a nd 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 (ifelif-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: Represent compound data using Python lists, tuples, dictionaries etc.

CO5: 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
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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** **LT P C**
1 0 0 1

UNIT I LANGUAGE AND LITERATURE 3

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

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

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

UNIT III FOLK AND MARTIAL ARTS 3

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

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 INDIAN CULTURE 3

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

TOTAL : 15 PERIODS

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 நதிகரையில் 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) (Published by: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – 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.

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3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data‘‘, Third Edition, MIT Press , 2021
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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/

		L	T	P	C
24BSP101	**PHYSICS AND CHEMISTRY LABORATORY (Common to all branches)**	**0**	**0**	**4**	**2**

PHYSICS LABORATORY

(Any Seven Experiments)

OBJECTIVES:

- To learn the proper use of various kinds of physics laboratory equipment.
- To learn how data can be collected, presented and interpreted in a clear and concise manner.

- To learn problem solving skills related to physics principles and interpretation of experimental data.
- To determine error in experimental measurements and techniques used to minimize such error.
- To make the student as an active participant in each part of all lab exercises.

LIST OF EXPERIMENTS:

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.
2. .Simple harmonic oscillations of cantilever.
3. Non-uniform bending - Determination of Young's modulus
4. Uniform bending – Determination of Young's modulus .
5. Laser- Determination of the wave length 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 : 30 PERIODS

OUTCOMES:

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

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

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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) **L T P C**
0 0 2 2

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 EDTAmethod
2. Determination of chloride content of water sample by Argentometric method
3. Determination of types and amount of alkalinity in water sample
4. Determination of DO content of water sample by Winkler's method
5. Determination of strength of acids in a mixture of acids using conductivitymeter
6. Conduct metric 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 metric titration of Strong acid against Strong base

COURSE OUT COMES:

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

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

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. V. K. Ahluwalia, SunithaDhingra and AdarshGulati, "College Practical Chemistry", Universities Press (India) Pvt. Ltd., 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	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:

- Expose students to learn the basic skills of pronunciation/Vocabulary
- Help the learners learn the basic level of listening activity
- Remove the fear and hesitation of students in participating speaking activities
- Expose them learn different types of reading

Make them to learn the basics of writing

UNIT I PRONUNCIATION AND SPELLING 6

Basic sounds of English – Vowels and Consonants – Homonyms and Homophones – Utteranceof words with correct pronunciation – Word formation – Make words from the given letters

UNIT II LISTENING 6

Listening Comprehension with MCQ question – Listening to the Audio information - Listening to the famous personalities interviews/speech – Learning the Sign language and Gestures.

UNIT III SPEAKING 6

Introducing oneself and others – Conversation Practice – Face to Face and Telephonicconversation – Group Discussion Basic level – Oral Presentation on favourite place/film

UNIT IV READING 6

Skimming and Scanning from the passage – Reading Comprehension with answer the followingquestions – Reading aloud – Reading an article from English Newspaper – Note making

UNIT V WRITING 6

Coherence Writing (Jumbled) – Story making – Email/Letter writing – Formal and Informal – Writing News Article (about your institutional activities)

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, learners will be able

- Listen and respond appropriately.
- Participate in group discussions
- Participate well in conversation
- Learn different types of writing both formal & informal.
- Understand the correct way of pronunciation.

TEXT BOOKS:

1. Brooks, Margret. Skills for Success. Listening and Speaking. Level 4 Oxford UniversityPress, Oxford: 2011.
2. Richards, C. Jack. & David Bholke. Speak Now Level 3. Oxford University Press,Oxford: 2010

REFERENCES:

1. Bhatnagar, Nitin and Mamta Bhatnagar, http://www.ir.juit.ac.in:8080/jspui/bitstream/123456789/5563/1/Communication%20Skills%20for%20Engineers-C.%20Muralikrishna%20-%20Pearson.pdf New Delhi, 2010.
2. Hughes, Glyn and Josephine Moate. Practical English Classroom. Oxford UniversityPress: Oxford, 2014.
3. Vargo, Mari. Speak Now Level 4. Oxford University Press: Oxford, 2013.
4. Richards C. Jack. Person to Person (Starter). Oxford University Press: Oxford, 2006.
5. Ladousse, Gillian Porter. Role Play. Oxford University Press: Oxford, 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	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

SEMESTER II

24HST201 PROFESSIONALENGLISH-II

L	T	P	C
2	0	0	2

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 orallyand 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.

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 P C
4 0 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 - 22 factorial design.

UNIT III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

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

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

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

UNIT V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9+3

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

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

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

CO3:Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. CO4:Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

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

TEXT BOOKS:1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
REFERENCES:
1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4. Gupta S.C. and Kapoor V. K., " Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.

WEB REFERENCES:

1.https://archive.nptel.ac.in/courses/115/105/115105122/
2. https://www.youtube.com/watch?v=vMwIzfkSKBo
3. https://www.youtube.com/watch?v=BQijtvYxgIM
4. https://terna.digimat.in/nptel/courses/video/115102026/L30.html
5. https://www.youtube.com/watch?v=LhYg84HHcu4

ONLINE RESOURCES:

1.https://eepower.com/technical-articles/semiconductor-basics-energy-band-structures-in-solids/
2. https://www.sciencedirect.com/topics/chemistry/exchange-interaction
3. https://www.electronics-tutorials.ws/diode/schottky-diode.html
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

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	PSO2
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	-	

24AGT201 PRINCIPLES AND PRACTICES OF CROP PRODUCTION L T P C
2 0 2 3

COURSE OBJECTIVES:

- To introduce the students to principles of agricultural and horticultural crop production
- Understand the crop selection and establishment procedures.
- Learn about the different management practices during crop establishment and growth.

- To introduce the production practices of agricultural and horticultural crops.
- To delineate the role of agricultural engineers in relation to various crop productionpractices.

UNIT I AGRICULTURE AND CROP PRODUCTION 9

Introduction to agriculture and its crop production sub-sectors - field crop production and horticulture; Factors affecting crop growth and production: genetic (internal) and environmental (external) factors; Crop management through environmental modification and adaptation of crops to the existing environment through crop cultural practices

UNIT II CROP SELECTION AND ESTABLISHMENT 9

Regional and seasonal selection of crops; Systems of crop production; Competition among crop plants; Spacing and arrangement of crop plants; Field preparation for crops including systems of tillage; Establishment of an adequate crop stand and ground cover, including selection and treatment of seed, and nursery growing.

UNIT III CROP MANAGEMENT 9

Crop water Management; Crop nutrition management - need for supplementation to soil supplied nutrients, sources, generalized recommendations, methods and timing of application of supplemental nutrients including fertigation scheduling; Crop protection including management of weeds, pests and pathogens; Integrated methods of managing water, nutrients and plant protection; Types and methods of harvest.

UNIT IV PRODUCTION PRACTICES OF AGRICULTURAL CROPS 9

Generalized management and cultivation practices for important groups of field crops in Tamil Nadu: cereal crops, grain legumes, oil seed crops, sugarcane, and fiber crops, and special purpose crops such as those grown for green manure and fodder.

UNIT V PRODUCTION PRACTICES OF HORTICULTURAL CROPS 9

Important groups of horticultural crops in Tamil Nadu such as vegetable crops, fruit crops, flower crops; Cultivation practices of representatives of each group; Special features of production of horticultural crops - green house cultivation.

Practical

Identification of field and horticultural crops. Seeds - estimation of seed rate, germination of seeds. Nursery, demonstration on different types in field. Fertilizers-type, estimation of recommended dose. Weeds, identification of major weed type, demonstration on simple weeding implements. Weedicide uses and caution. Pest identification and control, demonstration of IPM methods. Harvesting methods for various field and horticultural crops and implements used. Observing in demonstration field, cultivation of wet land, dry land and garden land crops and documenting of growth stage and recording of biometric observations.

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

COURSE OUTCOMES:

CO1 Students completing this course would have acquired knowledge on the basic principles ofcrop production.

CO2 Students will be able to select suitable crops and decide upon its establishment procedures

CO3 Students will get knowledge on the different crop management practices.

CO4 The students will have the required knowledge in the area of production of agricultural andhorticultural crops.

CO5 Students will be able to delineate their role in relation to various crop production practices.

TEXTBOOKS:

1. Rajendra Prasad, Text Book of Field Crop Production. Directorate of Information and Publication, Krishi Anusandhan Bhavan, Pusa, New Delhi, 2015.
2. Reddy T. Sankara G.H. Yellamanda Reddi, Principles of Agronomy, Kalyani Publishers,New Delhi, 2005.
3. Handbook of Agriculture. ICAR Publications, New Delhi, 2011.

REFERENCES:

1. Bose T. K. and L.P.Yadav. Commercial Flowers, Naya Prakash, Calcutta.1989.
2. Crop Production Guide, Tamil Nadu Agricultural University Publication, Coimbatore. 2005
3. Kumar, N., Abdul Khader, M. Rangaswami, P. and Irulappan, I. Introduction to spices, plantation crops, medicinal and aromatic plants. Rajalakshmi Publications, Nagercoil. 1993.
4. Kumar, N.,"Introduction to Horticulture", Rajalakshmi Publications. Nagercoil, 7th edition, 2015.
5. Shanmugavel, K.G. Production Technology of Vegetable Crops. Oxford India Publications, New Delhi. 1989.

WEB SOURCES

1. https://byjus.com/biology/agriculture-agricultural-practices/
2. https://ncert.nic.in/textbook/pdf/hesc101.pdf
3. https://rcet.org.in/uploads/academics/regulation2021/rohini_24863213141.pdf
4. https://sswm.info/sswm-solutions-bop-markets/improving-water-and-sanitation-services-provided-public-institutions-0/crop-selection
5. https://icar.org.in/sites/default/files/inline-files/crop-management-AR-2011-12.pdf
6. https://www.geeksforgeeks.org/crop-production-and-management/
7. https://www.geeksforgeeks.org/basic-practices-of-crop-production/
8. https://safetyculture.com/topics/good-agricultural-practices/
9. https://agritech.tnau.ac.in/pdf/HORTICULTURE.pdf
10. https://tnau.ac.in/site/research/wp-content/uploads/sites/60/2020/02/Agriculture-CPG-2020.pdf

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	PSO 3
CO1	3	-	-	-	-	-	-	-	2	1	-	-	2	3	-
CO2	3	-	-	-	-	-	-	-	-	2	-	-	2	-	-
CO3	3	2	-	-	3	3	-	-	-	2	-	2	3	2	2
CO4	-	-	-	1	2	2	-	1	-	3	1	3	3	1	2
CO5	-	-	-	1	2	2	1	1	-	3	1	2	3	1	2
Average	3	2	1	1	2	2	1	1	2	2	1	3	3	2	2

24GET201 ENGINEERING GRAPHICS L T P C
2 0 4 4

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

1. Drawing engineering curves.
2. Drawing freehand sketch of simple objects.
3. Drawing orthographic projection of solids and section of solids.
4. Drawing development of solids
5. 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 AND FREE HAND SKETCHING 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.

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.

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 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 and auxiliary projection method.

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. Cut-outs and drilled holes in section of solids and development of surfaces.

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 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

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

TEXT BOOK:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. 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 — Size and lay out 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

24BET201 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING **L T P C 3 0 0 3**

COURSE OBJECTIVES :

- To introduce the basics of electric circuits and analysis
- To impart knowledge in domestic wiring
- To impart knowledge in the basics of working principles and application of electricalmachines
- To introduce analog devices and their characteristics
- To introduce the functional elements and working of sensors and transducers.

UNIT I ELECTRICAL CIRCUITS **9**

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws – 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), Three phase supply – star and delta connection – power in three-phase systems

UNIT II MAGNETIC CIRCUITS AND ELECTRICAL INSTALLATIONS **9**

Magnetic circuits-definitions-MMF, flux, reluctance, magnetic field intensity, flux density, fringing, self and mutual inductances-simple problems.

Domestic wiring , types of wires and cables, earthing ,protective devices- switch fuse unit- Miniature circuit breaker-moulded case circuit breaker- earth leakage circuit breaker, safety precautions and First Aid

.

UNIT III 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 IV 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, harmonics

UNIT V SENSORS AND TRANSDUCERS **9**

Sensors, solenoids, pneumatic controls with electrical actuator, mechatronics, types of valves and its applications, electro-pneumatic systems, proximity sensors, limit switches, piezoelectric, hall effect, photo sensors,Strain gauge, LVDT, differential pressure transducer,optical and digital transducers, Smart sensors, Thermal Imagers.

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 concepts of domestics wiring and protective devices

CO3: Explain the working principle and applications of electrical machines

CO4: Analyze the characteristics of analog electronic devices

CO5: Explain the types and operating principles of sensors and transducers

TEXT BOOKS:

1. D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Second Edition, 2020
2. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.
3. S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019
4. James A Svoboda, Richard C. Dorf, Dorf's Introduction to Electric Circuits, Wiley,2018

REFERENCES:

1. John Bird, "Electrical Circuit theory and technology", Routledge; 2017.
2. Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
3. Albert Malvino, David Bates, '**Electronic Principles**, McGraw Hill Education; 7th edition,2017
4. Muhammad H.Rashid, "Spice for Circuits and electronics", 4th Edition., Cengage India,2019.
5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

WEB SOURCES

1. http://pnbalamurugan.yolasite.com/resources/UNIT_3_BE8253%20BEEI_pdf.pdf
2. https://www.stannescet.ac.in/cms/staff/qbank/ECE/Notes/BE3254-ELECTRICAL%20AND%20INSTRUMENTATION%20ENGINEERING-877455545-BE%203254%20EIE%20Notes%20&%20Q%20Bank.pdf
3. https://books.google.co.in/books?id=XFjzDwAAQBAJ&pg=PA890&lpg=PA890&dq=BASIC+ELECTRICAL,+ELECTRONICS+AND+INSTRUMENTATION+ENGINEERING&source=bl&ots=A7UPGPj9-l&sig=ACfU3U1FGJvseeMVwD4IQHGKnyduOFopCw&hl=pa&sa=X&ved=2ahUKEwiemfzcuemFAxXqTWcHHWjDBrw4KBDoAXoECAMQAw#v=onepage&q=BASIC%20ELECTRICAL%2C%20ELECTRONICS%20AND%20INSTRUMENTATION%20ENGINEERING&f=false
4. https://www.slideshare.net/slideshow/02-basic-electrical-electronics-and-instrumentation-engineeringpdf/252624011
5. https://edubuzz360.com/be8253/

COs- PO's & PSO's MAPPING

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

24GET202 TAMILS AND TECHNOLOGY L T P C

1 0 0 1

UNIT I WEAVING AND CERAMIC TECHNOLOGY 3

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

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY 3

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

UNIT III MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and goldCoins 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) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

24PET101	**NCC Credit Course Level 1*(ARMY WING)**	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, NGOs,3 Contribution of Youth				
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

2	**NCC Credit Course Level 1*(NAVAL WING)**	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, NGOs, Contribution of 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

NX3253	NCC Credit Course Level 1*(AIR FORCE WING)	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
LEADERSHI P		**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, NGOs, Contribution ofYouth	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

OBJECTIVES:

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

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

GROUP – A (CIVIL & ELECTRICAL)

PART I CIVIL ENGINEERING PRACTICES 15

PLUMBING WORK:

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

WOOD WORK:

a) Sawing,
b) Planing and
c) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:

a) Studying joints in door panels and wooden furniture
b) Studying common industrial trusses using models.

PART II ELECTRICAL ENGINEERING PRACTICES 15

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

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

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III MECHANICAL ENGINEERING PRACTICES 15

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 air conditioner.

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

OUTCOMES:

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

1. Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
2. Wire various electrical joints in common household electrical wire work.

3. 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.

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

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	-	-	1	1	1	-	-	-	-	2	-	2
CO2	3	2	-	-	1	1	1	-	-	-	-	2	-	2
CO3	3	2	-	-	1	1	1	-	-	-	-	2	-	2
CO4	3	2	-	-	1	1	1	-	-	-	-	2	-	2
CO5	3	2	-	-	1	1	1	-	-	-	-	2	-	2
Average	3	2	-	-	1	1	1	-	-	-	-	2	-	2

24BEP201 Basic Electrical, Electronics and Instrumentation Engineering Laboratory

L	T	P	C
0	0	4	2

COURSE OBJECTIVES:

- To train the students in conducting load tests electrical machines
- To gain practical experience in experimentally obtaining the characteristics of electronic devices and rectifiers
- To train the students to measure three phase power and displacement

List of Experiments

1. Verification of ohms and Kirchhoff's Laws.
2. Three Phase Power Measurement
3. Load test on DC Shunt Motor.
4. Load test on Self Excited DC Generator
5. Load test on Single phase Transformer
6. Load Test on Induction Motor
7. Characteristics of PN and Zener Diodes

8. Characteristics of BJT, SCR and MOSFET
9. Design and analysis of Half wave and Full Wave rectifiers
10. Measurement of displacement of LVDT

TOTAL: 60 PERIODS

COURSE OUTCOMES: After completing this course, the students will be able to

CO1: Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power

CO2: Analyze experimentally the load characteristics of electrical machines

CO3: Analyze the characteristics of basic electronic devices

CO4: Use LVDT to measure displacement

COs- PO's & PSO's MAPPING

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	PSO 3
CO1	2	3	1	2	-	-	-	1.5	2	-	-	-	-	-	-
CO2	2	3	1	2	-	-	-	1.5	2	-	-	-	-	-	-
CO3	2	3	1	2	-	-	-	1.5	2	-	-	-	-	-	-
CO4	2	3	1	2	-	-	-	1.5	2	-	-	-	-	-	-
Average	1.6	1.4	0.8	1.6	-	-	-	1.2	1.6	-	-	-	-	-	-

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

OBJECTIVIES:

- Expose students to learn the basic skills of pronunciation/Vocabulary
- Help the learners learn the basic level of listening activity
- Remove the fear and hesitation of students in participating speaking activities
- Expose them learn different types of reading
- Make them to learn the basics of writing

UNIT I: PRONUNCIATION AND SPELLING

Confusing words of mispronunciation – Syllabic division with examples – Mispronounced word exercises – Tongue Twisters

UNIT II: LISTENING

Audio Listening exercises for making gist – Listening to the audio extract - Find the unknown words – Listening to the motivational videos – Listening to the BBC News

UNIT III: SPEAKING

Group Discussion (Advanced level) – Oral Presentation on Social Issues – Narrating a story/ unforgettable moments in life – Role Play (minimum two or more participants) – Extempore Speech

UNIT IV: READING

Intensive Reading – Extensive Reading – Reading Advertisements or Graphs – Picture Description – **UNIT V: WRITING**

Writing a letter of Application and Resume – Writing the review of the favourite film/story – Translating a passage of your mother tongue into English – Writing Proposals

TOTAL : 60 PERIODS

At the end of the course Learners will be able to:

OUTCOMES:

- Listen and respond appropriately.
- Participate in group discussions
- Participate well in conversation
- Learn different types of writing both formal & informal.
- Understand the correct way of pronunciation.

TEXT BOOKS:

1. Brooks,Margret. Skills for Success. Listening and Speaking. Level 4 Oxford University Press, Oxford: 2011.

2. Richards,C. Jack. & David Bholke. Speak Now Level 3. Oxford University Press, Oxford: 2010

REFERENCES:

1. Bhatnagar, Nitin and MamtaBhatnagar. Communicative English for Engineers and Professionals. Pearson: New Delhi, 2010.

2. Hughes, Glyn and Josephine Moate. Practical English Classroom. Oxford University Press: Oxford, 2014.

3. Vargo, Mari. Speak Now Level 4. Oxford University Press: Oxford, 2013.

4. Richards C. Jack. Person to Person (Starter). Oxford University Press: Oxford, 2006.

5. Ladousse, Gillian Porter. Role Play. Oxford University Press: Oxford, 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	3	3	3	2	3	3	3	3	3	3	3	-	1
CO2	3	3	3	3	2	3	3	3	3	3	3	3	-	1
CO3	3	3	3	3	2	3	3	3	3	3	3	3	-	1
CO4	3	3	3	3	3	3	3	3	3	3	3	3	-	1
CO5	3	3	3	3	3	3	3	3	3	3	3	3	-	1
Average	3	3	3	3	2.4	3	3	3	3	3	3	3	-	1